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BOVINE WELFARE AND CATTLE COMFORT

OC: 248
Farmers’ perceptions of animal welfare in dairy farms
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Objectives: The purpose of this paper was to investigate if 9 dairy farmers’, using loose housing cubic systems, were aware of their farms welfare problems by analyzing their perception of several welfare indicators.

Materials and Methods: We assessed 4 welfare indicators according to the Welfare Quality® assessment protocol – hygiene score (HS), body condition score, locomotion score (LS) and avoidance distance (AD) – and one other indicator found in the Integrated Diagnostic System Welfare – comfort indices (cow comfort index and stall use index). The farmers answered a survey which revealed their assessment of the same 5 indicators. Both results, the researcher’s and the farmers’ assessment, were compared (Mann-Whitney U test).

Results: The HS, LS and AD assessment indicated poor welfare conditions. There were a statistically significant difference between the SL and AD assessed by the researcher and the farmers’ perception of the same indicators. Although the assessment of the HS revealed poor welfare conditions in most farms, the farmers were able to identify that situation (there weren’t a statistically significant difference between the HS assessed by the researcher and the farmers’ perception).

Conclusions: These results confirm that the farmers’ perception of their animals’ welfare does not always correspond to the reality. But to understand why this happens it is necessary to conduct further studies that assess the farmers’ beliefs, attitudes and motivations. This would allow us to understand, also, why farmers don’t take action when they face a welfare problem, such as the one revealed by the HS assessment. In order to improve animal welfare it would be crucial to inform and educate the farmers, and the Veterinarian has the necessary knowledge and skills to perform this task.

OC: 249
Assessing the heat tolerance of Alentejana and Mertolenga portuguese cattle breeds under influence of solar radiation
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Objectives: During summer in Mediterranean regions, well adapted native cattle breeds present differences in environmental tolerance. The objective of this study was to compare heat tolerance of Alentejana and Mertolenga heifers under direct solar radiation, by quantifying the pathways of evaporative thermolysis and thermostability.

Materials and Methods: The experiment was carried out in 5 days. 6 Alentejana and 6 Mertolenga heifers were kept under direct solar radiation, in individual stalls (3.0 —1.1 m) and restrained by head halters. Food, water and mineral mixture were available ad libitum. Respiratory frequencies (RF) were measured by observing costal movements, rectal temperatures (RT) were measured using a digital thermometer (Digitron, with an 8-cm flexible probe) and thermal balance was calculated according to procedures described by Silva et al., (2010). These measurements were carried out every day at 06:00, 10:00, 13:00 16:00 and 20:00h. Heat storage (HS) was calculated as described by McGovern and Bruce (2000). Sweat rate was measured at 15:00 hours using methodology described by Pereira et. al. (2010). Variables were analyzed according to a general linear model procedure with 2 fixed factors (breed and hour) and 1 nested factor (animal within breed).

Results: Except for the cases of RT and HS, in the other variables no significant differences between the breeds were found. Despite the absence of significant differences in the thermal balance between breeds, there was a slightly tendency for a bigger acquisition of heat in Alentejana and a faster recovery in the Mertolenga after 16:00h. The sweating rates were not significantly different, with mean values of 271.5 and 286.3 (g.m-2.h-1) respectively for the Alentejana and Mertolenga. Respiratory frequencies were virtually equal between breeds. In RT there were significant differences between breeds. The Mertolenga has shown significantly lower RT at 16:00h and 20:00h, with 38.9°C and 38.7°C compared to 39.3°C and 39.1°C in Alentejana. The same trend was found in the HS at 16:00h and 20:00h with 0.018 and 0.016 W.m2 in Alentejana compared to 0.014 and 0.009 W.m2 in Mertolenga.

Conclusions: The results show that both breeds present good heat tolerance. The sweating rate values of both breeds are very high and are quite similar to those found in tropical cattle breeds. However, Mertolenga shows slightly better thermal balance and evaporative heat loss (SR ans RF), which eventually may have contributed to the enhanced thermostability comparatively to Alentejana. The superior stability of the RT and particularly the lower HS suggest a higher heat tolerance of Mertolenga breed.

OC: 250
Visually undetected fever episodes in newly-received beef bulls at fattening operations: Occurrence, duration and impact on performance
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Objectives: Monitoring body temperature of newly-received cattle allows for identification of fever episodes not visually detected by feedlot personnel (FENO). Information concerning the occurrence, duration and impact on performance of these FENO are not available in the literature. Such information is crucial to assess the potential benefit of the identification and treatment of FENO. Therefore, the objectives of this study were to describe the occurrence and duration of FENO and to evaluate their impact on ADG.

Materials and Methods: One hundred twelve beef bulls (initial BW = 346 ± 36 kg) were studied throughout 40 d after arrival at 3 French fattening operations. At d 1, each animal was administrated orally a recticulo-rumen bolus, which allowed continuous measurement and recording of recticulo-rumen temperature. Animals were weighed on d 1 and 40. Bulls were observed twice daily by personnel for visual signs of apparent disease. Bulls that appeared ill, had a rectal temperature ≥ 39.7°C, and demonstrated symptoms consistent with bovine respiratory disease (BRD) were treated with antibiotics. After d 40, data obtained from the boluses were retrospectively analyzed using a cumulative sum test to detect significant increases in recticulo-rumen temperature considered as fever episodes.

Results: Numerous fever episodes (n = 449) were retrospectively detected in 110 bulls. Of these 449 fever episodes, 74% were not associated with any visually detected clinical signs of disease, and thus were identified as FENO. These FENO were often transitory (75% lasted less than 47 h). However, 25% lasted from 47 to 263 h. Of the 112 bulls, 88 were treated for BRD with 20 and 7 animals treated, respectively, 2 and 3 times. In treated animals, fever episodes began 4 to 177 h (mean = 50 h) before BRD treatment. The duration of FENO was associated (P = 0.002) with a lesser ADG (d 1 to 40): -33 g/d for daily FENO duration.

Conclusions: Our results demonstrated that FENO occurred frequently in bulls during the first weeks after entrance into a fattening operation and can last up to 11 d. The impact of FENO observed on ADG in this study indicated a potential benefit of treating affected animals, specifically those with FENO of long duration. However, further research is needed to determine the medical and economic relevance of such treatment.

OC: 251
Risk factors for rib lesions in dairy cattle kept in intensive management
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Objectives: Rib lesions are seen as more or less painful swellings over different ribs, usually presenting some degree of ossification. The objectives of
this study were to determine the prevalence of this condition in dairy cows kept in intensive production systems and to identify associated animal and farm risk factors.

**Materials and Methods**: A total of 22 dairy farms and 1,319 adult lactating cows were included in the study. Cows were kept in loose housing with cubicles (12 farms), in straw yards (7) or in tie stalls (3). Farms were characterized accordingly to management and infrastructure outline. Cubicles, flooring and bedding were graded from 1 (good) to 3 (very bad). A questionnaire was prepared for evaluating stockperson attitude towards animals. All animals in each farm were thoroughly examined to detect even small rib lesions. Full clinical history and physical examination was then performed on all animals presenting rib swelling.

**Results**: Rib lesions were identified in 31 animals, showing a total prevalence of 2.3%. Intra-herd prevalence ranged from 0% (n=12) to 6.08% (n=1). Prevalence accordingly to the rib affected was: 8th rib bilateral (26%), 9th rib bilateral (3%), 7th rib unilateral (3%), 8th rib unilateral (23%), 9th rib unilateral (11%), 10th rib unilateral (3%), 11th rib unilateral (5%); 12th rib unilateral (6%); 13th rib unilateral (20%). Affected animals had an average of 3.7 lactations, an average lameness score of 2.5 and 81.5% had an history of chronic foot disease. Very few rib lesions were painful and most of them were in an advanced stage of ossification. Farms risk factors shown to be statistically significant were: grade 3 cubicles, not enough space for animals at trough and unprotected rear cubicle curb. Prevalence in cubicle stalls was 90.3% and in straw yards only two animals showed lesions on the 8th and 13th rib. No farmer had noticed any of the lesions.

**Conclusions**: The main conclusion is that there are dairy cows with rib injuries that are not diagnosed. Extrapolating from rib injuries in humans, it is reasonable to assume that at some point these lesions must be painful and so reduce the welfare and performance of affected animals. There is sufficient evidence that lameness is implicated in the genesis of these rib lesions although at the moment it is not possible to determine its pathogenesis. However, the fact that most of the animals were kept in cubicles and that the size and design of these were considered to be farm risk factors, suggests that housing also plays a role. Overcrowding, as was shown by the relation between lesions and not enough space at trough, may be an adjuvant factor by increasing agonistic behaviours such as butting. Our results suggest that lame cows kept in cubicles have difficulty in lying or standing and so may hit the most exposed costal segments, but more studies are needed to fully understand the factors involved.

**OC: 253**

**Effects of changing dairy cows from straw yard to cubicles with sand on animals cleanliness, and mastitis and lameness incidence.**

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**Objectives**: This study was performed on a dairy farm that changed the housing system from straw yards to cubicles because of the high incidence of mastitis. The objective of this study was to evaluate the effect of this change on mastitis and lameness incidence and on animal cleanliness.

**Materials and Methods**: The study was carried out in a commercial dairy farm in Portugal. The farm has 370 cows in milking. A group of animals (n=150) was moved from a straw yard to a free-stall barn with sand bedding. Three days before moving the animals we scored: lameness, hock lesions and hygiene of the flank, udder and claws. One month after moving the animals the same parameters were assessed. The lameness and hock lesions scoring were again done 6 month after the change. Data related to mastitis was also registered. We compared the lameness scoring, cleanliness scoring and hock lesions scoring, before and after the change. A comparison was made between the number of cases of mastitis per month, in the four month before and after the change.

**Results**: A significant difference was observed in the improvement of the hygiene of the flank (p<0,001), udder (p<0,001) and claws (p<0,001) after the change. The decrease in the number of animals with mastitis (60% reduction) was also significant (p<0,001). There was no difference on the incidence of lameness, but there was a very significant increase in hock lesions (p<0,001).

**Conclusions**: Housing dairy cows in cubicles with sand bedding reduces the incidence of mastitis and improves animal hygiene suggesting an improvement on udder health, when compared to straw yards. Surprisingly there was no change in lameness incidence in the first 6 months, but the hock lesions increase suggests that this might change in the future. The increase of hock lesions could indicate that straw beds are more comfortable than stalls with sand bedding and that lying and getting up in cubicles is difficult for cows. Further investigation is needed to confirm these suggestions, but overall sand bedding seem to have served the purpose of improving udder health.

**OC: 254**

**Comparison of claw development and claw health in dairy cows on abrasive rubber or concrete flooring.**

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**Objectives**: The study evaluates the effect of partially abrasive rubber flooring compared with concrete flooring on claw shape and claw health in dairy cows.
Materials and Methods: Totally 81 cows, originating from two different breeds (German Holstein, German Fleckvieh and their different crossbreeds) were compared during a whole lactation period. Inside the same housing system two groups of cows were built and either housed on concrete (CSF; n=40) or on rubber matted slatted flooring (20% abrasive; RMSG; n=41). At 21d before expected calving (M1), 150d (M2) and 350d (M3) after calving, cows were measured, trimmed, and claw health was recorded. Wall length (WL), wall diagonal (WD), heel depth (HD), heel length (HL), sole length (SL), toe angle (TA), and heel angle (HA) were determined before and after trimming. Following diseases were recorded: sole ulcer (SU), hemorrhages distal to the insertion of deep flexor tendon (HDFT) as an early state of SU, White Line Disease (WLD), Limax (LM), and signs of Laminitis (La). A scoring system was used to categorize digital dermatitis (DD) and heel erosion (HE). In order to compare claw shape between the two groups, differences between M1-M2/M2-M3 were evaluated using a generalized linear model, Differences in the change of DD and HE scores were analyzed using a chi-square test.

Results: Between M1-M2, WL, HD, HL (p<0.01), and WD (p<0.05) became longer in the RMSG group, but SL was longer on CSF (p<0.05). TA did not differ and HA became larger on RMSG (p<0.01). Between M2-M3, WL, WD and SL became longer on RMSG (p<0.01). Alone HL declined more on CSF (p<0.05). The proportional change of DD and HE scores for M1-M2 between RMSG/CSF (improved, deteriorated, even) resulted in: 34.8/29.0, 33.5/43.6, 31.7/27.4 (p<0.05) and 17.7/14.3, 39.3/40.2, 43.0/45.5 (p=0.50), respectively. Score changes showed no differences for M2-M3. At M2, cows on RMSG/CSF showed the following absolute frequencies: SU 4/2, HDFT 14/17, WLD 1/2, LM 2/5, and La 29/35. At M3, the absolute frequencies were: 0/1, SU 3/12 HDFT, 1/1 WLD, 2/8 LM, and 26/28 La, respectively. Between the scheduled trimmings (M1-M2 vs M2-M3), 13 vs 10 RMSG cows and 12 vs 12 CSF cows stood out by clinical lameness. Conclusions: Although claw shape still differs between rubber and concrete flooring, a proportion of 20 % abrasive rubber mats keeps the claw from growing out of shape. Cows on RMSG showed less hemorrhages and less worsening regarding the DD score. Incidence of clinical lameness was not affected by flooring.

OC: 256

Feed First cow traffic: changes in daily rhythm in relation to free cow traffic

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Objectives: With automated milking systems (robot milking) (AMS) cows can either walk around freely or have a forced cow traffic. At Feed First farms the cows can only access the lying area after feeding through a selection gate (Smartgate), which can also direct them to the AMS. In this study, the way cows spend their daytime has been analysed.

Materials and Methods: In particular there has been looked at two different types of farms: Feed First cow traffic farms and free cow traffic farms. Ten farms with AMS are included. Five are free cow traffic farms and five farms make use of the Feed First system. At every farm twelve cows have been observed for ten hours during the day. The cows are classified in parity and DIM. Every ten minutes the location and behaviour of every cow has been recorded. The statistical analyses are conducted 1. on the total period, 2. on the average continuous period, and 3. the number of periods of the changes in behaviour. A number of significant differences regarding the behaviour of the cows have been found.

Results: The cows at Feed First farms were less active due to less moving between the different places in the cowshed. The cows ate less and were lying down less at Feed First farms than at the free cow traffic farms. The average continuous period and total period of doing nothing behind the feeding fence was higher at Feed First farms. Furthermore, within the Feed First system a heifer seems to be functioning better than an older cow.

Conclusions: The longer period of standing idle behind the feeding fence may be detrimental to claw health. More care will have to go to the feeding. Because a decrease in the number of meals may cause disturbances, such as rumen acidosis (Bach et al., 2009). The cows are less lying down, this could lead to decreased milk production (Metcalf et al., 1992). With the fact that the cows are less dynamic, the feed first system seems to be less suitable for the cow in comparison with free cow traffic.

OC: 257

Behavioural reactions before and during vaginal examination in dairy cows

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Objectives: Vaginal examinations are routine procedures on dairy farms to diagnose postpartum diseases. Cows express their discomfort in certain situations with discrete behavioural reactions. These reactions can be described in their occurrence and extent. The impact of vaginal examinations on animal welfare has not been evaluated yet. We hypothesized that 1) cows show discomfort before and during vaginal examination with different behavioural reactions, 2) these reactions can be semi-quantitatively scored, and 3) the examination with the Metrichcheck device is less invasive than a manual examination.

Materials and Methods: In experiment 1, behaviour of 10 cows during vaginal examinations was videotaped and analysed. Based on these observations, a 4-point numerical scoring system was developed. The avoidance reaction score (ARS) consists of evasive reactions, i.e. standing still, tripping, stepping sideways, leaning against the divider and kicking. Signals of discomfort are also included, i.e. arched back, stretched neck and vocalisation. In experiment 2, vaginal examinations of 30 cows were videotaped and scored with the ARS by nine observers and four times by one observer. The inter- and intra-observer repeatability was calculated with Cohen’s kappa coefficient. In experiment 3, 435 vaginal examinations were conducted either with the gloved hand (group GH) or the Metrichcheck device (group MD). Behavioural reactions before and during examination were scored.

Results: Cohen’s kappa was 0.44 and 0.81 during examination for inter- and intra-observer repeatability, respectively. The median ARS increased
from 1 before (Inter quartile range, IQR = 1 – 2) to 3 during examination (IQR = 2 – 4). Cows in the group MD showed less avoidance reactions compared to cows in the group GH (P = 0.006). Parity, days in milk, vaginal discharge or repeated examinations did not affect the ARS.

Conclusions: Our study showed that cows express their discomfort with different avoidance reactions which can be quantified with a score. Moderate inter-observer and substantial intra-observer repeatability demonstrated that the ARS can be applied in practice and might be a useful tool to estimate the level of discomfort. Furthermore, vaginal examinations were more invasive than mere restraining or touching. The examination with the Metricheck device was less invasive than a manual examination.

OC: 258
Relation between dairy cattle welfare and bulk milk somatic cell count
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Objectives: As consumers’ awareness towards the living conditions of farm animals increases, the veterinary science is designing new studies and new markers to evaluate systems of animal welfare assessment. Given the lack of a European set of rules that defines the minimum levels of welfare in cattle farms, the Italian National Reference Centre for Animal Welfare at Istituto Zooprofilattico Sperimentale in Brescia has established a system to evaluate it. The method was applied to dairy cattle farms and compared with values of bulk milk somatic cell count (BSCC). The objective was to verify whether the number of BSCC may be used as an marker of welfare as well as udder infection.

Materials and Methods: The method of welfare assessment evaluates the conditions of four areas: company management, housing structures, animal behavior and health conditions and exposure to environmental hazards. The evaluation is performed through 54 observations, ranked from 0 (bad) to 6 (excellent). The total of all scores shows the level of animal welfare in the farm. Such total ranged from 44 to 182 points (minimum and maximum scores in each observation). The analysis was applied to 265 farms with loose housing system and an average of 98 lactating cows and 26.8 kg/day of milk produced. In each farm, the average value of BSCC was calculated from 5 samples analyzed along 3 months before the assessment in study. Afterwards the score of animal welfare assessment and the value of somatic cells were compared.

Results: The 265 farms had an average welfare score of 139. The average value of BSCC was 287000/ml. The results of the assessment animal welfare are shown in Table 1, divided into 4 farm groups as per their respective level of BSCC. BSCC Group < 200,000 200/300,000 300/400,000 > 400,000 No of farms 74 62 41 4 Average welfare score 142.6 143.1 138.1 127.6 Average BSCC 159,000 255,000 345,000 489,000 No relation was shown between animal welfare scores and farms with BSCC below 300,000/ml, while the welfare score decreased with BSCC above 300,000/ml. Said decrease was more remarkable in farms where BSCC was above 400,000/ml.

Conclusions: The study shows that the level of BSCC not only is an indicator of mastitis but it can also serve as an marker of animal welfare in dairy cattle every time the BSCC increases above 300,000/ml

OC: 259
Post-surgical analgesia after correction of left-side displacement of the abomasum in dairy cows.
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Objectives: Pain management in production animal is a duty for veterinarians and a growing demand from producers and consumers. The pain derived from abdominal surgery can extended for days after the procedure. Previous studies have shown the advantage of flunixin-meglumine used for pain management after left-side displacement of the abomasum (LDA) surgery, compared to non-treated control groups. The objective of this study was to assess if the larger duration of carprofen action compared with flunixin-meglumine benefits the management of post-surgical pain, and therefore is more interesting for the control of pain after abomasopexy in dairy cows.

Materials and Methods: The study was conducted on 26 Holstein-Frisian cows with LDA, operated by right paramural fossa. The animals were divided into two groups: Group F (n = 13, 2.2mg/kg flunixin-meglumine) and Group C (n = 13, 1.4mg/kg carprofen). Animals were also given xylazine IV (0.05mg/kg), local anesthetic infiltration (lidocaine 2%) and penicillin G procaine + dihydrostreptomycin IM for 4 days. The animals were characterized by type of operation, days in milk, parity, body condition score and liver condition (palpation of the borders during the surgery). To evaluate the analgesic efficacy, the groups were compared for milk production in the first 8 days after surgery and blood ketone bodies on the day of surgery (d 0) and 1 and 3 days after the procedure.

Results: The ketone bodies values decreased from day 0 to day 1 and to day 3, but no statistical differences between groups was found at any time. There were also no statistical differences between groups in total milk production for the eight days, in the difference between day 0 and day 8, and the animals’ lactation curve was similar between groups. Only the type of installation showed statistical difference, with 79% in Group F being housed in stalls with cubes while 58% in Group C were kept in tie stalls.

Conclusions: Both NSAIDs favored an increase in milk production and led to a noticeable decrease in blood levels of ketone bodies, suggesting an increased intake of food. There was no advantage in using carprofen over flunixin meglumine in the management of postoperative pain. The difference in housing was not considered as an important factor in pain management.

OC: 260
Pain management in the dehorning of calves with Flunixin
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Objectives: Dehorning in calves is common on most commercial dairy farm. The management of pain of the calves has been the objective of several studies. It is generally accepted that a local anesthesia before dehorning (DX) is essential for pain management and should be completed by a non-steroidal anti-inflammatory drug (NSAID). The objective of the present study was to test the use of Flunixin as a NSAID in addition to a local anesthesia. Further, it has been described that cortisol as an indicator for pain or stress increases approx. 3-4 hrs after DX. Therefore, we tested the efficacy of a second application of Flunixin 3 hrs after DX.

Materials and Methods: The study was conducted as a randomized, blinded and controlled study at the Teaching and Research Unit Kremesberg, Vetmeduni Vienna, Austria. Calves at the age of 5-9 wks were allocated to four groups. In each of 20 replicates four calves were randomly assigned into four groups, received a local anesthetic (10ml Procain) and a first treat- ment 20 min before hot-iron dehorning, and second treatment 3 h after DX. Groups were PP (2xPlacebo=Saline), FP (2.2mg/kg Flunixin, Placebo), FF (2xFlunixin) and CON (Control group, no DX, no treatment). Blood samples were collected from all calves, including CON, 30 min before arresting in a headlock for DX, 2min after DX, as well as 30min, 1h, 2h, 4h, 6h, and 8h after DX. Samples were analyzed for concentration of cortisol by Enzyme-Immunnoassay (EIA).

Results: It was found that concentration of cortisol, analyzed as area under the curve, was greater for PP compared with FF (p<0.05) and tended to be greater compared with FP (p=0.06). Differences between PP and FF were detected at 30 min and 2h after DX (p<0.05). The comparison between Flunixin-treated groups and CON demonstrated that cortisol concentrations were at the same level throughout the observation period, indicating a certain level of stress for the calves in a headlock but not a higher level in Flunixin-treated groups after CX. A second peak in cortisol concentration was not found in any of the groups.

Conclusions: In conclusion, this study has demonstrated the efficacy of a treatment with Flunixin in the pain management in dehorning of calves.
OC: 261
Evaluating welfare quality in Hungarian dairy herds
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Objectives: The aim of our study was to assess animal welfare quality in Hungarian dairy herds.

Materials and Methods: The Welfare Quality protocol was used in 15 lactating dairy farms, covering about 10 thousand animals, to assess the animal welfare situation in our country. The protocol has four main welfare areas and they are further divided into sub-areas. These sub-areas determine the required tests to get a reliable picture on the welfare status of the animals. The areas for testing are the following: good feeding, good housing, good health and appropriate behaviour. Depending on the total number of lactating cows, from 15 to 20% of the animals were examined individually, according to protocol requirements.

Results: Out of the 15 tested farms 6 had “good” and 9 had “acceptable” rating. When examining the criteria, however, there were major differences. The four “poor” rates in good feeding principal was due to the inadequate number and cleanliness of the drinkers. Often it would have been enough to achieve a higher score to clean or position better the drinkers. The good housing principle was rated “good” in almost every farm but details show that this is largely due to the loose system of housing. The “excellent” score can be achieved by removing the manure more frequently and the appropriate design of boxes. The good health principal was only “acceptable” everywher, this is mainly due to the large percent of lameness and disbudding carried out without anesthesia or analgesia. To measure the appropriate behavior the protocol uses the QBA (Qualitative Behaviour Assessment). Reliable and reproducible measurements are used to assess the behavior of the animals. An important part of this study point is the assessment of the animal-human relationship. The rude behaviour of the workers and cruel treatment of the animals can be seen from the scores as well as a patient, animal-loving attitude.

Conclusions: It can be stated that using the Welfare Quality protocol is reliable to assess the animal welfare status in the Hungarian large scale dairy herds. There is definitely room for improvement regarding animal welfare on Hungarian dairy farms, especially in the fields of lameness, animal and stock hygiene and human-animal relationship.

OC: 262
Effect of transportation during periods of extreme heat on physiological and behavioral in feedlot aged beef heifers
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Objectives: The objectives of this study were to determine the effects of transportation on biotherm regulation and behavioral changes in calves during hyperthermal (maximum ambient temperature > 37°C) conditions.

Materials and Methods: Twenty heifers averaging 217.8 kg were blocked by breed and initial liveweight 513 (s.d. 39.0) kg were blocked by breed and initial liveweight and assigned to one of five treatments: 1) Concrete slats alone, 2) Mat 1 (Durapak), 3) Mat 2 (Easyfylx), 4) Mat 3 (Mayer) and 5) Out-wintering pads (OWP’s). Animals assigned to treatments 1-4 were accommodated in a roofed building with concrete slatted floors. There were four pens per treatment, with nine steers per pen at a mean space allowance of 2.73m²/head, whereas animals accommodated outdoors on the OWP’s had a space allowance of 12m²/head. Animals were fed a total mixed ration (TMR) comprising of grass silage and a barley based concentrate on a 50:50 dry matter (DM) basis and were slaughtered after 153 - 154 days.

Results: Animals on the OWP’s had a higher (P<0.05) dry matter (DM) feed intake compared with the slats and three mat types. Animals on the OWP’s had a greater liveweight gain (P<0.05) compared with Mat 2 and Mat 3 and were not different (P>0.05) from slats or Mat 1. There was no overall effect (P>0.05) of treatment on liveweight or no treatment × time interaction (P>0.05). The carcass weight was greater (P<0.05) on the OWP’s and Mat 1 treatments compared with the slat treatment, and were not different from Mat 2 and Mat 3 treatments. Feed conversion efficiency (FCE) was lower (P<0.05) for Mat 1 treatment compared with slats and was not different (P>0.05) from Mat 2, Mat 3 and OWP’s. The number of hoof lesions was higher on all mat types (P<0.05) compared with slats and OWP treatments. Dirt scores did not differ (P>0.05) among the treatments.

Conclusions: There was no difference in animal performance and diet scores among the mat treatments. Although carcass weight was greater in animals housed on OWP’s and Mat 1 it was not significantly different from Mat 2 or 3. There were a greater number of lesions on the hooves of animals housed on mats compared with slats and OWP treatments.

CAMELIDS
OC: 280
Diagnostic value of animal-side antibody assays for rapid detection of Mycobacterium bovis or Mycobacterium microti infection in South American camels.
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Objectives: In South American camels (SAC) Tuberculosis (TB) can be caused, among others, by Mycobacterium bovis or Mycobacterium microti. TB infections are usually difficult to recognize in live animals because of the lack of reliable ante-mortem diagnostic tests and the non-specific nature of the clinical signs. The intradermal tuberculin test is often used, but this
method has poor accuracy in SAC. To improve the reliability, 2 serological methods, the rapid test (RT) and the dual path platform (DPP) assay, were evaluated on naturally with M. bovis and M. microti infected SAC.

Materials and Methods: The study population included 156 alpacas and 175 llamas from UK, Switzerland and the US. Each SAC species was represented by 3 groups: (1) confirmed TB: animals naturally infected with M. bovis (n=34 (alpacas); n=10 (llamas)) or M. microti (n=1; n=7), (2) presumed TB-free: SAC from herds with no history of TB (n=96; n=122), and (3) TB-exposed: culture-negative animals with no gross lesions from the infected herds (n=25; n=36). TB due to M. bovis (n=44) or M. microti (n=8) had been diagnosed by gross pathology examination and culture in 35 alpacas and 17 llamas. All serum samples were obtained from live animals and stored frozen at -70°C until use in antibody assay.

Results: In alpacas, RT and DPP showed sensitivity of 71% and 74%, respectively, while it was 77% for both assays in llamas. Specificity was higher for DPP (98%) as compared to RT (94%) in llamas and similar for the 2 assays in alpacas (98%). When the 2 antibody tests were combined, the parallel test interpretation enhanced the sensitivity of antibody detection to 89% in alpacas and 88% in llamas, but at the expense of lower specificity (97% and 93%, respectively), whereas the serial testing interpretation maximized the specificity to 100% in both SAC species, although the sensitivity was 57% for alpacas and 65% for llamas.

Conclusions: This study has demonstrated the diagnostic potential of 2 animal-side antibody detection assays for rapid identification of alpacas and llamas infected with M. bovis or M. microti. The serologic techniques appear to be more sensitive in SAC than the intradermal tuberculin test and the diagnostic accuracy of ante-mortem TB detection can be maximized by combining available immunoassays.

OC: 281

Embryo transfer success in alpacas – a retrospective study

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Objectives: Embryo transfer offers great advantages to camelid farmers to reach their breeding goals but the technology still plays a minor role in South American camelids in comparison to other domestic farm animals like sheep and cattle. Very little is known about factors affecting embryo transfer in South American camelids since most procedures have been uncritically extrapolated from other species. The aim of the present study was to review a large data set collected from commercial embryo transfer in alpacas in recent years and identify factors which have significant influence on embryo transfer success rate.

Materials and Methods: A dataset containing information about 4516 embryo transfers was available for analysis. Either a single ovulation or multiple ovulation embryo transfer protocol (MOET) was used. Numerous factors (year, season, farm, age, parity, lactation status, body condition, day of flushing, embryo size, embryo quality, day of transfer, placement of the embryo, synchrony between donor and recipient) were studied to investigate their influence on embryo transfer success rate. Statistical analysis (logistic binary regression, Chi-Square test and Pearson rank correlation) was performed to determine the factors that influence number and quality of embryos, embryo transfer success and gestation length.

Results: An embryo recovery rate of 66.9 ± 37.1% in single ovulation donors and of 41.4 ± 32.2 % in MOET donors was found. Overall 4516 embryos were transferred which resulted in 1892 cria born alive (embryo transfer success rate 41.8 %). The variables: day of flushing, embryo diameter, embryo quality, day of transfer, and the age of the recipient were identified to have significant impact on the success rate. Embryo transfer in alpacas was equally successful during the year. The transfer of embryos of lower quality classes and the transfer of smaller embryos result in decreased transfer success rates. Optimal days of obtaining the embryos from donors are Days 8 and 9 after mating; optimal days for transfer into recipients are Days 7 and 8 after treatment with buserelin (GnRH analogue).

Conclusions: Embryo transfer success rate has improved recently in comparison to previous studies; however, it is still lower in comparison to farm animal species. The study was able to identify factors which are influencing the embryo transfer success in alpaca. The new knowledge has the potential to improve embryo transfer success rate in alpacas.

OC: 282

Clinical studies on skin diseases in the arabian camels (camelus dromedarius) in UAE

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Objectives: In the literature there is only a little information on camel skin diseases worldwide. Accordingly, the present study was taken up with a view to carrying out a systematic survey to determine the incidence/prevalence of the common camel skin diseases and/or conditions in UAE, the causes, epidemiology and the clinical findings. It may be mentioned that, prior to this no detailed studies had been made on skin diseases in camels in UAE.

Materials and Methods: A total of 4073 racing and dairy camels (613 organized private camel farms) around Abu Dhabi Emirate during September 2009 to January 2010. Camel herds were investigated for the occurrence of skin diseases. Sick animals were carefully examined for clinical signs, type, severity and location of skin lesions and also for the general body condition. Blood samples were collected from clinical cases for hematology and blood biochemistry examinations. Specimens of skin lesions were also collected and reported to the laboratory for the isolation and identification of the causative agents. Additional data concerning identity of the camel, housing and management, concurrent disease, body weight, age, duration of lesions, previous skin disease history, feed intake and medication of the camel were collected.

Results: Out of 432 dairy camel herds (2772 camels) examined for the presence of skin lesions, 161 camel herds (603 dairy camels) were found to have skin lesions, the incidence being 37.27% (21.75% on animal basis). A total of 181 racing camel herds (1301 camels) were examined for estimating the prevalence of skin lesions, 62 (34.25%) and 149 (11.45%) racing camel herds and animals were found to have skin lesions, respectively (Table 1). It was further observed that the incidence of skin diseases in dairy camels was higher than racing camels. Observation in regard to the incidence of different causes of skin lesions were recorded (Table 2.). Traumatic injuries (31.43%), mange (27.69%), subcutaneous abscess (27.27%) and camel pox (22.12%) were the main causes of skin lesions in camels. While, ringworm (14.39%), skin tumors (14.39%) and caseous lymphadenitis (10.25%) were found to be less common. The incidence rate of other causes of skin diseases such as, contagious ecthyma (7.22%) and Papillomatosis (2.06%) were reported to be rare cases. The epidemiological and clinical aspects of each pathological condition were also reported in the present study.

Conclusions: A systemic survey was conducted to determine the incidence/prevalence of skin diseases in camels in UAE. For this purpose, a total of 613 camel herds (4073 dairy and racing camels) were examined for the presence of skin lesions. The incidence of skin diseases on herd basis was found to be 36.38%, while on animal basis 18.46%. Dairy camels 603 (21.75%) were more susceptible to skin diseases than racing camels 149 (11.45%). Observations in regard to the incidence of different causes of skin lesions were recorded. Skin wounds (31.43%), mange (27.69%), subcutaneous abscess (27.27%), camel pox (22.12%), ringworm (14.39%), skin tumors (14.39%), caseous lymphadenitis (10.25%) contagious ecthyma (7.22%) and papillomatosis (2.06%) were the main causes of skin lesions in camels. The predisposing factors, etiology, epidemiology and clinical findings of each skin disease were also reported.

OC: 283

Clinical studies on surgical field operations in camel (camelus dromedarius) in UAE

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Objectives: The overall objective of the present study was to explained the common surgical field operations in camels with special references to the incidence/prevalence, causes, clinical findings and the successful surgical techniques.
Materials and Methods: Animals: Between January 2010 to September 2011, 1421 camel were subjected to different surgical field operations and presented to the Central Veterinary Hospital, Al Wathba, Emirate of Abu Dhabi. The information pertaining to the camel examined during this study was conducted. This included breed, age, pregnancy, previous disease history if any, clinical findings, type and severity of the lesions, nutrition and management, etc. The Sick animals were carefully examined for clinical signs, location, type and severity of the lesions. Also, Blood samples were collected from diseased camels and examined at Central Veterinary Hospital. Restriction Anaesthesia: The animal is restrained in the sitting position and/or lateral recumbency according to the surgical technique. The animal should be kept fasting for at least 36–72 hours. Sedation is effective with a combination of Xylazine (0.25-0.3 mg/kg bwt) and Ketamine (0.2-0.3 mg/kg bwt) hydrochloride, intravenously. Local anaesthetic infiltration with 2% Lignocaine hydrochloride at the operative area is also necessary. Surgical technique: Different surgical field operations were done. This included Dulaa Resection, Prolapse of rectum, Skin cutaneous abscess, Fractures of bones, Castration, Uterine prolapse, Caesarean Section and Foot affections. Results: The incidence/prevalence, causes and clinical findings of the sick camels were reported. The successful surgical techniques for the various field operations (Dulaa Resection, Prolapse of rectum, Skin cutaneous abscess, Fractures of bones, Castration, Uterine prolapse, Caesarean Section and Foot affections) were also explained in details during the present study. Conclusions: Camels are prone to many diseases and/or pathological conditions that some of them require a successful surgical intervention. Dulaa Resection, Prolapse of rectum, Skin cutaneous abscess, Fractures of bones, Castration, Uterine prolapse, Caesarean Section and Foot affections were the most common surgical field operations in camels. For any surgical intervention that requires immobilization and recumbency (lateral or sternal), the animal should be kept fasting for at least 36-72 hours. Sedation is effective with a combination of Xylazine (0.25-0.3 mg/kg bwt) and Ketamine (0.2-0.3 mg/kg bwt) hydrochloride, intravenously. Local anaesthetic infiltration with 2% Lignocaine hydrochloride at the operative area is also necessary. The basic principles of camel surgery are similar to that in the horses and livestock, but the surgical techniques are differing according to the type of infected organ or tissue. For the success of any surgical operation in camels, the veterinarian must be familiar with the normal healthy state, anatomy of the surgical site and proper anaesthesia in camels, and those with this knowledge are limited in numbers. Accordingly, the objective of the present study was to summarize the common surgical field operations in camels with special references to the incidence/prevalence, causes, clinical findings and the successful surgical techniques.

OC: 284

Serum concentration of cardiac troponin I in healthy dromedary camels and water buffaloes

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Objectives: The aim of this study was to evaluate the serum concentration of cardiac troponin I in dromedary camels (Camelus dromedarius) and water buffaloes (Bubalus bubalis). Materials and Methods: It was measured in 84 and 45 clinically healthy camels (slaughtered in a slaughter house in Yazd province, in central Iran) and water buffaloes (slaughtered in a slaughter house in Ahvaz city, in southwestern Iran), respectively, from July to September 2010, using commercial ELISA kits (cThELISA, Delaware Biotech Inc., USA). The age of the animals was estimated using dental characteristics, and [omit] the health of the sampled animals was confirmed by examination of their carcass. Pearson’s correlation test, two sample t-test and Kruskal–Wallis test were used for analysis. Results: The mean serum levels of troponin I in camels and water buffaloes were 0.467±0.083 ng/mL (range from <0.2 to 3.8 ng/mL) and 0.79 ± 0.119 ng/mL (range from <0.2 to 3 ng/mL), respectively. There was no significant difference in the serum concentration of the troponin I between the two sexes and different age groups of camels, and there was no significant correlation between age and serum troponin I. Conclusions: The serum concentrations of this cardiac marker have not been measured in dromedary camel and water buffalo previously, and were somewhat different from those of other species. This study may be considered as a basis for evaluation of serum cardiac troponin I in upcoming researches in the future.

OC: 285

Health problems of llamas and alpacas in Austria

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Objectives: Within the last five years the number and popularity of llamas and alpacas in Austria has been growing in a considerable way. In Austria llamas and Alpacas are kept mainly for trekking, breeding and sources of fibre. With the growing number of animals also the number of camelid patients that are introduced to the vets increased. Llamas and alpacas represent a diagnostic challenge for the veterinary clinician due to their stoic nature and the fact that these animals show only vague clinical symptoms until a late stage of disease. This study describes the most common diseases of the camelid patients seen at the Clinic for Ruminants, University of Veterinary Medicine Vienna and discusses the diagnostic and therapeutic approach.

Materials and Methods: The diseases of llamas and alpacas that were introduced at the Clinic for Ruminants were divided into gastrointestinal, respiratory tract and urinary tract diseases, diseases of the genital tract, the skin, the central nervous and the musculoskeletal system and also of the teeth. Additional indications were castration, traumatic injuries and animal health checks. Anamnesis, results of physical examination, therapy and clinical outcome were documented.

Results: In the last 5 years a number of 144 llamas and alpacas have been examined at the Clinic for Ruminants, University of Veterinary Medicine Vienna. Whereas during 2005 to 2009 the average number of llamas and alpacas was about 13 patients per year, the number increased to 43 in 2010 and is increasing since Indications such as castration, health check, traumatic injuries, gastrointestinal and skin diseases are among the leading diseases of llamas and alpacas referred to the Clinic for Ruminants at the University of Veterinary Medicine, Vienna. On the basis of a few clinical case reports, the most common diseases are discussed concerning diagnosis and therapeutic possibilities.

Conclusions: Endoparasite infestation, mainly with Dicrocoelium dendriticum, zinc deficiency and teeth problems with concomitant abscess formation turned out to be major problems in New World Camelids in Austria.

OC: 286

Efficacy of monepantel for treatment of gastrointestinal nematode infections of new world camels

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Objectives: Gastrointestinal nematodiasis is a major health concern in domesticated New World Camelids (lama glama, lama pacos) bred and raised in Western Europe. Infections with gastrointestinal nematodes are commonly treated either with benzimidazoles (e.g. fenbendazole, mebendazole, albenzadole) or with macrocyclic lactones (e.g. ivermectine, doramectine, moxidectine), but also other drugs such as imidazothiazoles (e.g. levamisole) can be used. Since prevalence of resistance was reported against some of the above mentioned substances, a study was designed to evaluate the efficacy of monepantel, a new amino-acetonitrile derivative, in llamas.

Materials and Methods: Monepantel is licensed for the use in sheep and was used off label as none of the anthelmintics on the market are currently approved for use in alpacas or llamas. 45 llamas naturally infected with gastrointestinal nematodes were randomly assigned to one of three treatment groups. Group 1 was given the dose rate recommended for sheep (2.5 mg/kg BW, PO) group 2 was treated with 5 mg/kg BW PO, and group 3 with 7.5 mg/kg BW PO. Fecal samples were examined and worm egg count were taken before and two weeks after treatment. Study procedures were discus-
Clinical and epidemiological aspects of mastitis in Camelus dromedarius in Saudi Arabia

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Objectives: To classify mastitis forms as well as different causes participated.

Materials and Methods: A total of 1094 of camel mastitis have been treated in the Veterinary Teaching Hospital at King Faisal University in Saudi Arabia between 2006-2011.

Results: It has been found that 70% of cases diagnosed were chronic form. Many bacteria have been isolated from mastitis like Streptococcus spp. Staph.aureus, E. coli, etc. Accordingly, forms as subclinical, sub acute, per acute, acute, chronic, suppurative and gangrenous mastitis have been classified.

Conclusions: Many epidemiological as well as environmental factors have been contributed for occurrence of mastitis. Bad management, ignorance either by owner or camel boy, long distance to treatment services, suitable transport vehicle, dusty periods, mixed breeding system, dirty bedding, fodder contamination and application of folk medicine.

OC: 287

Eimeria infection in camels (Camelus dromedarius) in Yazd province, central Iran

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Objectives: This study was carried out during the winter of 2008 to the summer 2010 to determine the rate of infection of Eimeria spp. in dromedary camels in Yazd province, Iran at that period.

Materials and Methods: A total of 305 fecal samples were taken per recta from live and slaughtered, apparently healthy camels 9 months to 23 years old. Using saturated zinc sulfate solution floatation technique, samples were prepared and investigated microscopically to detect Eimeria spp. oocysts.

Results: revealed that the overall frequency of infection in samples was 9.51%. Identified species were Eimeria cameli (47.5%), Eimeria dromedari (42.5%) and Eimeria bactriani (10%). The rate of infection was higher in the winter season, and in camels aged 5 to 10 years old. Statistical analysis showed that there is a significant difference between infection rate and season, but no effect by age or sex on eimeriosis was found.

Conclusions: Since most of the positive cases in our study were adult, our findings suggest that older camels may play an important role in spreading infection as asymptomatic oocyst exchaders.

OC: 289

Seroprevalence of brucellosis in camels (Camelus dromedarius) in center of Iran

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Objectives: Brucellosis is one of the most important zoonoses, and human beings are accidental hosts. Camels are frequently infected with Brucella spp., especially if they will be in contact with infected ruminants.

Materials and Methods: In order to investigate the seroprevalence of Brucella infection in camel (Camelus dromedarius) in Yazdi province (central of Iran), blood samples were taken from 230 (169 males and 61 females) camels on April 2008 and December 2009. The animals were divided into three age groups, <5 years (n=48), 5-10 years (n=151), and >10 years (n=31). Sera were tested by Rose-Bengal test (RBT), Standard Tube Agglutination test (STA) and 2-Mercaptoethanol test (2-ME) to detect antibodies against Brucella.

Results: One hundred out of 230 samples (43.5%) were positive by RBT. The results of STA showed that 17.8%, 15.7% and 10% of samples had titers of 20, 40 and 80, respectively. The results of 2-ME test revealed that 27%, 12.6% and 1.3% of samples had titers of 20, 40 and 80, respectively. Statistical analyses showed that infection rate was significantly higher in summer months, but it did not vary between different sexes or age groups.

Conclusions: Regarding public health importance of brucellosis due to the large number of camels in the study area which are mostly kept for consumption of their meat, the authors suggest implementation of a national program for diagnosis, control and management of infected animals.

DIAGNOSTIC IMAGING

OC: 134

Ultrasoundography of the thyroid gland in calves

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Objectives: The objectives of the study were thesonographic measurement of the thyroid gland dimensions, the establishment of reference values for thyroid gland size and to determine if a good correlation between sonographic findings and actual volume of the thyroid gland (lobes) exists.

Materials and Methods: 40 healthy and 43 euthanized calves under the age of three months were enrolled in the study; the majority (n=72) were German Simmental, five calves were Holstein Friesians and the remaining six were of different breeds. A standardized sonographic examination of the thyroid gland was performed on all calves on the day of discharge from the clinic (healthy group) or on the day of euthanasia (euthanized group), respectively. The measurements included the dimensions length (L) (cranio-caudal extent of the gland parallel to the axis of the neck), width (W) (lateral-medial extent of the gland perpendicular to the axis of the neck) and height (H) (ventrodorsal extent of the gland perpendicular to the axis of the neck). In order to obtain these values, the ultrasonic probe was placed in the jugular groove directly caudal to the larynx and the probe was moved either longitudinally or transversally until the greatest dimension of the gland was achieved. All three measurements were repeated three times. In the euthanized group, the thyroid gland was dissected, the dimensions measured in situ with the aid of a calliper and the volume determined by water displacement. Linear regression analysis was used for values obtained in the euthanized group to define a correlation between sonographic (LUS, WUS, HUS) and calliper measurements (LC, WC, HC).

Results: The coefficient of variation (CV) for the repeated measurements was 3.51 % for length, 7.30 % for width, and 3.55 % for height. There was no significant influence of age, gender, and breed on the sonographic measurements (p > 0.05). There was a relation between body weight and the thyroid gland volume (coefficient of correlation was r = 0.61). The dimensions measured for the right lobe were: LUS: 30.14 mm (SD ± 2.96 mm), WUS: 9.74 mm (SD ± 1.48 mm) and for HUS: 22.11 mm (SD ± 2.47 mm). For the left lobe the following dimensions were measured: LUS: 30.10 mm (SD ± 3.60 mm), WUS: 10.35 mm (SD ± 1.71 mm) and for HUS: 21.99 mm (SD ± 2.73 mm).

Conclusions: This is the first study describing reference values for thyroid gland dimensions in calves. Our results will be valuable for clinicians in order to estimate the thyroid gland size and volume in calves by sonography.
OC: 135
Correlation of rectal temperatures with infrared non-contact temperatures of the eye, third eyelid, nose and udder in holstein dairy cattle
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Objectives: To determine if a correlation exists between rectal temperature and infrared temperatures of the eye, third eyelid, nose, and udder across Holstein dairy cattle.

Materials and Methods: Two studies were conducted to examine correlations between rectal temperature (RT) and non-contact infrared (IR) temperatures. For study 1: 108 individual Holstein dairy cattle (HDC) had RT recorded using a digital thermometer (GLA M770 Series Digital Thermometer). Within 2 to 3 minutes of the RT being taken, the inside of the nares (IRN), cornea of the eye (IRE), and the udder (IRU) (caudal aspect on midline near the attachment to the body) were recorded using a non-contact IR thermometer (Fluke 568). Using the IR thermometer, 10 consecutive readings were taken and averaged for each IR location; only mean readings with a deviation of less than 0.2°C were used. For study 2: 601 individual HDC had temperature readings recorded daily for approximately 12 consecutive days. Sequence and timing of all temperature readings were the same as in study 1. The sites for temperature recordings in study 2 were RT, cornea of the eye (IRE2), and third eyelid (IRTE), resulting in 3,121 data points for each location. The IR thermometer was held approximately 91 centimeters from the sample site when temperature was taken for the eye, third eyelid, and udder in both studies. At this distance the spot size for the IR thermometer was approximately 1.8 centimeters. Temperature readings were taken, for both studies, between 0700 and 0900 daily to reduce ambient effects on basal temperatures.

Results: Data was analyzed using Spearman Correlation (r). Study 1: RT and IRN (r=0.06609 P=0.4968), RT and IRE (r=0.20036 P=0.0376), RT and IRU (r=0.28918 P<0.0017). Study 2: RT and IRE2 (r=0.09377 P<0.0001), RT and IRTE (r=0.14468 P<0.0001). Except for IRN, this data shows a statistically significant non-correlation between IR of these 4 locations and RT.

Conclusions: Previous studies (Mendes et al. WBC 2010, Cadioli et al. WBC 2010, Barnabe et al. WBC 2010) have shown that IR may be of value for determining body temperature (BT) in large groups of animals. However, in our studies, variations in skin color across animals appeared to affect IR temperature readings of the udder and nose. IR temperatures across cows appear to have too much variation. Infrared temperature readings of the eye, third eyelid, nose, and udder are not correlated to rectal temperature readings in Holstein dairy cattle.

OC: 136
Epidural cervical abscess in a newborn calf
FCAV/ Unesp, Brazil

Objectives: Medullary compression of cervical spinal cord is involved with limbs movement limitation, from ataxia to spastic tetraplegia. Lesions were most commonly due to fractures, luxation or subluxation, vertebral body abscess, and malformation or compromised articularization between atlas and axis. Central nervous system abscess is observed in young animals presence of umbilical infection, or subjected to orchiectomy and caudectomy, which resulting in temperature on the dorsal side of feed have been marked as a laminitis signs. Osteophitic formation on extensorious processes. In histological examination, treatment was performed by laminar tissues histo-patologic analysis. The sections were stained by hematoxylin-eosin dye method and were examined by light microscopy.

Results: Suspected animals for laminitis were seen difficulty for walking during routine clinical examination. Especially, the level of heel is increased and to diverge of each other. The length of the dorsal edge size compare to heel length rate was found to reduce. Claw horn quality production base with expansion depending on the flattening and deformation of rings and plump appearance was evident in paries ungulae. Radiological examination show to osteophytic formation on extensorious processes. In histological examination, mild hyperemia and edema in the dermal vessels in the lamellar region was remarkable. Infiltration of mononuclear cells with occasional neutrophils and granulocytes in these areas also were found.

Conclusions: In the study, laminar tissue was taken in the dermal lamellar from the feet with laminitis, showed that histopathological changes in the region. The formation of inflammation were seen in these areas. It has been re-
cognized that thermographic diagnosis methods can be used with confidence in the diagnosis of laminitis. But, it has been proposed that the necessity of new studies for diagnosis of subclinical laminitis.

**E-LEARNING/CONTINUING EDUCATION**

**OC: 213**

Project-based learning – an approach to written examination and objective grading

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**Objectives:** Group-work with concrete field-problems is a widely used framework for teaching (‘learning-by-doing’). Presentation of the results and oral defense is a common approach to examination and subsequent grading. If the number of students becomes large, this may be a very expensive approach in terms of teacher time, and grading may be subjective because several examiners usually need to be involved. Finally, a defense of a product may not be a true test of the students’ ability to solve similar problems in another context, which should be the ultimate goal of profession-oriented education. I suggest an approach to a written examination of individual students based on reports written by groups of veterinary students.

**Materials and Methods:** The new approach (NEW) has been used for 2 similar veterinary courses on herd health issues. The total number of students was 70 divided into 20 groups. The second course was a continuation of the first course. Each group completed comprehensive analyses of herds based on up to 5 herd visits and the available health and production records. There were stringent requirements to topics addressed in the report (e.g. statistical analyses and assessments of the scientific quality of evidence). The differences between the students’ achievements in NEW were compared with the achievements in previous courses with traditional oral examination and the same requirements to learning outcomes (OLD). The teaching and supervision input were similar in OLD and NEW. A 4-hour test was organized. The students could use all the information and tools they wanted except for access to mail and internet. The questions were formulated in a way that allowed the students to use examples and text from their group-specific report to demonstrate their knowledge and skills.

**Results:** Grades in the first course were clearly lower in NEW vs. OLD. NEW clearly demonstrated that many students were unable to apply key principles and tools in a new context. Often too much time was spent on rather irrelevant details, while key problems were overlooked (a poor ability to prioritize time during the test). Course #2 gave markedly better results showing improved problem-solving skills.

**Conclusions:** NEW allowed us to maintain the benefits of collective work on problem-solving (‘learning-by-doing’), and allow a cheap, uniform (objective), and documented (in writing) assessment of the reports and the students’ ability to use the required knowledge and skills in a new context (competency).

**OC: 214**

Integrating the industry requirements of new graduates throughout the MVB farm animal curriculum at University College Dublin

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**Objectives:** To define new graduate competencies relevant to farm animal practice and vertically integrate these into teaching and assessment across the 5 years of the MVB curriculum at University College Dublin.

**Materials and Methods:** The structure outlined by Welsh et al. (2009) was adapted to create the following steps. 1. A provisional list of new graduate competencies relevant to farm animal practice was constructed by amalgamation of benchmark lists from the Veterinary Council of Ireland (VCI), Royal College of Veterinary Surgeons (RCVS), European Association of Establishments for Veterinary Education (EAVE) and the American Veterinary Medicine Association (AVMA). 2. A postal questionnaire was sent to all veterinary practitioners registered to the VCI. Practitioners were asked to rank the provisional list of competencies based on frequency of use and expected and observed level of proficiency in recent graduates. Practitioners were also asked to provide additional competencies not contained in the provisional list. 3. The entire provisional list was then reviewed independently by all senior staff in the farm animal clinical studies department. Members of staff were asked to categorise each competency and rate them according to priority, and to suggest the most appropriate teaching and assessment methods. Members of staff were also asked to provide additional competencies not contained in the provisional list. 4. The authors combined the feedback from academic staff and veterinary practitioners to create a categorised list of new graduate competencies. The final list included both ‘day-one’ and ‘year-one’ competencies. 5. A database of the current learning outcomes and teaching and assessment methods relevant to the farm animal curriculum was created and each component was matched to relevant competencies. 6. Over-lap, gaps and inconsistencies in learning outcomes and teaching and assessment methods were identified. This informed decision-making by module coordinators aiming to integrate both vertically and horizontally and optimise the teaching and assessment of learning outcomes throughout the 5 years of the modularised MVB curriculum.

**Results:** A provisional list of 108 competencies was created. 190 of 1920 questionnaires were returned by veterinary practitioners, with 124 eligible for use. There was a trend that practitioners considered frequently performed activities to require a higher level of proficiency in new graduates. Most deficiencies concerned practical reproductive and surgical skills. Provisional results from the academic staff survey have identified an additional 50 competencies to be considered for inclusion in the working list.

**Conclusions:** Vocational tertiary education must remain focussed on the needs of the industries it supports while ensuring the academic freedom of teaching staff and delivering the broadest possible education to students. This framework allows the consideration of industry and academic priorities when compiling a list of new graduate competencies. In addition, the framework facilitates the vertical and horizontal integration of these combined priorities throughout the veterinary curriculum.

**OC: 215**

Development of a computer simulation to teach the methodology of the clinical examination of cattle

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**Objectives:** There are several limitations to teaching the methodology of clinical examination of cattle. The use of actual case material assumes the availability of suitable cases and students are subjected to considerable stresses that detract from the learning experience.

**Materials and Methods:** A computer-based simulation has been developed which integrates case data and images to allow students to practice the methodology of the clinical examination process on a wide variety of cases without being distracted by the constraints associated with their inexperience in practical techniques and other factors. The use of a model that requires free text entry and which provides little prompting or suggestion requires the student to initiate the interrogation of the clinical database and, in so doing, forces them to develop skills and thought processes that are very similar to those required of clinical examination in the ‘real world’.

**Results:** CrookMoo is a computer program in which case material incorporating textual and audiovisual components can be entered by an expert user. This allows the compilation of a wide variety of cases including cases with unusual clinical presentations, diseases which are rare or which are exotic diseases. This material can then be interrogated by a student user entering free text in an appropriate and structured way. Information is fed back to the student user subject to realistic constraints (eg examination techniques appropriate to the gender and sex of the case, in an appropriate order) to simulate as closely as possible the methodology of an actual case. The student’s performance is recorded and assessed to provide feedback to the student, as well as being forwarded to the teacher user so that the student’s performance can be analysed.

**Conclusions:** CrookMoo is a realistic simulation of the clinical examination
process. It offers considerable advantages in the teaching of clinical skills to students. Having used this simulation to build their confidence in their own thought processes, students are better prepared to practice the other skills necessary to be a competent bovine clinician.

**OC: 216**

A framework for the development of an online graduate certificate in dairy herd health

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**Objectives:** Online learning is growing in popularity as a method to deliver lifelong learning to veterinary professionals, as many are unable to commit to full-time, on-campus educational programmes. However, the number of academic staff engaging in this method of educational delivery is low. The reality of developing and delivering high-quality online learning programmes presents several hurdles to overcome.

**Materials and Methods:** The Dairy Herd Health group in University College Dublin established a Graduate Certificate in Dairy Herd Health as a direct response to the challenges facing the dairy sector in the Ireland. It was designed as an online programme targeted at veterinarians to offer a flexible learning experience. The desired graduate attributes specific for Dairy Herd Health practitioners were identified, and the course was then designed with these in mind. Students engage in modules such as herd health investigation skills, dairy herd fertility, nutrition and production diseases, milk quality and mastitis, calf health and heifer rearing, biosecurity / infectious diseases and parasite control.

**Results:** The course was successfully delivered in 2011 and initial feedback from both students and educators is positive. Practitioners have developed skills for herd data analysis and practical herd evaluation, and an ability to integrate the multiple facets of dairy herd health for the development of holistic herd level solution with regard to herd profitability and animal health and welfare.

**Conclusions:** This paper offers a model for the development of online graduate programmes with limited resources and a support framework for academic staff that are new to online programme delivery. We reflect on the challenges that academic staff members encountered in the design and delivery of their online teaching strategies. Finally we provide recommendations on how to overcome these teaching and learning challenges.

**OC: 217**

Survey of postgraduate continuing education for veterinarians in dairy practice in Austria

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**Objectives:** In Austria, postgraduate education for veterinarians is obliged by veterinary law. The objective of this study was to analyze the demands and requirements for continuing education of livestock veterinarians by a survey.

**Materials and Methods:** This survey consisted of a general part (e.g. age and experience of the veterinarians, mean herd size of the served farms), a special part (e.g. attendance frequency, average expenses for continuing education, experiences with e-learning) and finally questions about interests regarding 20 different topics of dairy practice. The survey was distributed at conferences as well as by E-mail. A total of 259 surveys were returned anonymously. If a participant did not answer more than 10% of the questions, the survey was excluded from analysis (n=64).

**Results:** The majority of participants were male (68%), had more than 10 years of experience in veterinary practice (59%) and were serving herds with a number of less than 20 milking cows (60%). More than a half of the veterinarians (51%) quoted to visit more than 5 continuing educations per year and thereby 63% were spending up to 500 euros per event. The most important reasons to attend events were the content of education besides the possibility to keep contact to colleagues. Regarding e-learning, 72% never used it and only 6% were taking part in more than 3 e-learnings within the last 3 years. The most interesting topic in dairy practice was fertility (87%), followed by metabolic disorders (86%) and calf diseases (79%), while homeopathy/pyrotheraphy was not of interest for 23%.

**Conclusions:** The survey showed the interest in attending continuing education events by Austrian practitioner. E-learning is playing a minor role, maybe due to a limited number of offers in Austria or because practitioners appreciate the direct contact to colleagues at meetings. Classical bovine topics, as fertility and metabolic disorders, are the main interests for practitioners to attend continuing educations. Further analysis will show interactions between specific answers, in order to provide data for improvements regarding veterinarian continuing education.

**OC: 218**

Structure of external communication in Veterinary Advisory Practice

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**Objectives:** The influence of communication on the effectiveness of veterinary practice, especially advisory practice, is increasingly discussed. Unlike companion animal practice production animal practice regularly involves long-term consultancy work. Literature and anecdotal evidence describe difficulties in billing these services, achieve a long-term dedication of the farmers to the process and measure results of the process. Starting and maintaining Veterinary Advisory Practice is therefore often perceived as being difficult.

**Materials and Methods:** While interpersonal communication strategies are discussed elsewhere, a model helps to illustrate the organization of a veterinary practice to achieve better results in Veterinary Advisory Practice. Three types of communication are discernible: (1) The person-orientated communication is a permanent process between veterinarian and client with a rather personal perspective. (2) The problem-orientated communication deals with emerging difficulties; the objective here is to solve an acute health problem. (3) The solution-orientated communication is the phase in which both veterinarian and client address longstanding problems with the objective to improve herd health and subsequently productivity performance.

**Results:** The communication skills required in veterinary advisory practice are more complex and long-term in nature than in “classic” farm-animal and companion animal practice. The skills have to cover not only the problem-orientated communication like in a traditional consultation. The veterinarian in advisory practice has to be aware of the different needs and challenges of a solution-oriented communication and is especially dependent on a functioning person-orientated communication.

**Conclusions:** Based on this model, it appears useful for a veterinary practice to offer both a curative and an advisory service, but to keep these two separated when deemed appropriate. In veterinary education, the strategies and techniques necessary for solution oriented communication should be included in the teaching of communication skills, as they differ substantially from the skills required in problem-orientated communication.

**OC: 219**

A web-based seminar as an e-Learning method

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**Objectives:** Ireland has 2250 veterinarians distributed over an area of 70273 km². Each vet is required to accumulate 20 hours of continuing veterinary education [CVE] per annum. Local clinical societies are an important part of the CVE process. The objective was to achieve maximum coverage for a seminar on ‘responsible use of antimicrobials’ without repeating the event at multiple locations.

**Materials and Methods:** The audio and video of 12 presentations was encoded at the conference site and the encoded stream was sent via the HEANet server to 11 satellite venues. Each location required good broadband access and bandwidth and amplification of the audio stream. The Power-
Point presentations were distributed beforehand to allow a second projector to be used. Contributions from practitioners in the field were pre-recorded and edited to ensure delivery of content on time. A moderator at each venue collected and transmitted audience questions for the discussion. The recorded content is available for reference.

**Results:** Streaming is an inexpensive method of dissemination of educational content. Videoconferencing allows full interactivity between venues at a higher cost. Use of web-based conferencing helps to overcome distance barriers and can be used internationally.

**Conclusions:** Keywords: conference, e-Learning, education, video-streaming, videoconferencing, distance. References HEAnet Ireland’s National Education and Research Network http://www.heanet.ie/

**OC: 220**

Use of a learning management system (moodle) to provide online training for risk assessors in a Johne’s control programme

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**Objectives:** As part of a Johne’s Control Programme it is very important that a risk assessment is carried out on participating farms. Risk assessors must have an adequate knowledge of JD in order to carry out the assessment.

**Materials and Methods:** A series of thirteen online lectures were provided through an Open Access Learning Management System (Moodle). A day long seminar was held at which the lectures were delivered by international speakers. The audio was recorded and synchronised with the PowerPoint slides, which were then uploaded to the Moodle server. In addition to the lectures facilities available in Moodle that were utilised included forums, glossaries, quizzes, workshops and surveys.

**Results:** On completion of the lectures participants had to get a passing score in a multiple choice questionnaire and also produce a PowerPoint synopsis of three recently published articles on Johne’s Disease before continuing to the next module. The second module consisted of four lectures on risk assessment. Once they had obtained a passing score on this module they were assigned to a herd to carry out a risk assessment under the direction of a monitor.

**Conclusions:** If this was successfully completed they were certified as a Johne’s Disease Risk Assessor.

**EPIDEMIOLOGY AND ANIMAL HEALTH ECONOMICS**

**OC: 17**

Effectiveness of antibiotics and vaccination to prevent Coxiella burnetii shedding at calving in infected dairy cows

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**Objectives:** The aim of this study was to assess the effectiveness of vaccination and/or antibiotic therapy to prevent vaginal shedding of Coxiella burnetii (Cb) at calving time in cows from infected dairy herds. Materials and Methods: To reach that goal, 22 dairy herds experiencing abortions due to Cb (positive PCR on placenta and 50% of seropositive animals) were recruited and followed over 18 months. Four strategies applied to cows (vaccination using phase 1 Cb vaccine, vaccination and oxytetracycline at drying off and/or calving time, oxytetracycline at drying off and/or calving time, or nothing) were randomly assigned to herds. Nulliparous heifers (NH) in all herds were expected to be vaccinated. Vaginal swabs were performed on each animal at calving time to detect Cb using PCR. Vaccination was considered through 3 modalities: not vaccinated, vaccinated after artificial insemination (AI), vaccinated before AI, pregnancy being suspected to affect vaccine effectiveness. Oxytetracycline treatment had 2 modalities (yes vs. no). A mixed logistic regression was run to assess the risk for a cow to be detected shedder in vaginal mucus at calving, depending on the treatment she received, after adjustment for the possible effects of serologic status (previously reported to impact vaccine effectiveness), age and herd (random).

**Results:** Among the 780 studied cows, 18.3% were detected shedder at calving. Antibiotics use was associated with a significantly lower risk of shedding ($OR=0.43$, $P=0.02$). The estimated ORs associated with vaccination of cows before AI was lower than unity ($OR=0.51$), but not significant ($P=0.20$). Seronegative NH, when vaccinated before AI, had a significant lower risk of shedding ($OR=0.37$, $P=0.04$), than the few NH that were not vaccinated for practical reasons. Antibiotics use did not significantly impact the bacterial load of the shedder cows, while vaccinated cows tended to shed at a lower level.

**Conclusions:** To our knowledge, this is the first study conducted at such a scale which aims at assessing vaccination and antibiotics effectiveness to prevent shedding at calving in naturally infected dairy herds. The present study confirms the significant preventative effect of vaccination on shedding in seronegative NH. Although the risk of shedding for cows receiving antibiotics appears to be significantly reduced, this finding should be considered in regards to the necessary reasoned use of antibiotics.

**OC: 18**

Monitoring and control of bovine enzootic haematuria on Sao Miguel Island, Azores

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**Objectives:** Bovine enzootic haematuria (BEH) is a chronic disease with progress characterized by intermittent episodes of haematuria, associated with the development of inflammatory and neoplastic lesions of the inner surface of the urinary bladder in cattle more than two years old. Urinary bladder tumours (UBT) constitute the main lesional feature of BEH. Ingestion of bracken fern (Pteridium aquilinum) and its main toxin, Ptaquiloside, are considered the main cause of BEH and UBT. The aim of this study is to control BEH on São Miguel Island (SMI), to decrease the incidence and economic impact of the disease on the cattle industry in the Azores, and to evaluate the preventive measures implemented to safeguard herds mainly based on bracken control.

**Materials and Methods:** SMI is the largest island (745 km²) of the Azores archipelago located in the North Atlantic between Europe and North America (36º to 39º N and 24º to 31º W). The climate is typically oceanic, rainy with mild temperatures (17ºC ±9ºC). There are about 120,000 cattle on SMI of which 54,000 are dairy cows, almost all being Holstein-Friesians. There are 1500 herds with an average of 36 cows per farm. BEH monitoring is based on systematic opening of all urinary bladders from slaughtered cattle during routine post-mortem meat inspection. UBT diagnoses are analyzed geographically by herd and by district to identify the most affected herds and regions of SMI. Slaughterhouse records obtained from the only abattoir of SMI during the period January 2000 to December 2010 showed that UBT was the main cause of whole carcass condemnations. 13.7% (17,915) of cows slaughtered (117,755) were rejected due to UBT. Prophylactic measures for BEH were implemented to control and eradicate bracken from cattle pastures on SMI. Systemic herbicides like asulam (Asulox®) and glyphosate were used successfully to control bracken. Farmer advisory meetings were organized to impart information on stock husbandry and bracken control methods.

**Results:** These control measures were successful in reducing the number of condemnations due to UBT at the SMI slaughterhouse from 18% in year 2004 to 6.2 % in year 2011. The total number of herds affected by UBT is also decreasing, from 60% in 2004 to less than 30% in 2011. At herd level, a reduction in the number of clinical cases of BEH and acute bracken poisoning has also been observed.

**Conclusions:** It is possible to reduce BEH incidence by control and eradication of bracken on pastures. BEH monitoring and the methods of control applied on SMI could usefully be implemented in other regions of the world where bracken-induced diseases occur in cattle.
Risk factors for condemnation in cattle slaughtered in a French abattoir from 2006 to 2009

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Objectives: Slaughterhouse, focal point of farm animals, is a potential source of data not otherwise available and used under for cattle health monitoring. In 2005 in France, the ministry of agriculture initiated the NERGAL-Abattoir project which consisted in collecting data from slaughterhouses in real time. In the objective of evaluating the relevance of such data for cattle surveillance, the first step was to understand which risk factors could influence condemnation especially since there are few publications available on that subject.

Materials and Methods: A multiple logistic regression model was performed on 523,330 animals culled at the Coutances abattoir in Normandy (France) from 01/01/2006 to 9/10/2009 to assess the risk factors for a cattle to have at least one part of the carcass condemned (part/whole carcass or offal). The outcome variable was the condemnation of at least one part of the carcass for each bovine. Different covariates were tested: zootechnical (sex, age group, production type), spatial (farm location at regional level), temporal (month and year of slaughtering) as well as interactions between zootechnical covariates. Likelihood ratio statistic and Akaike information criterion were used to select the final model. Among the 523,330 cattle studied, 13.74% (n=71,890) have had at least one part of the carcass condemned. All covariates and interactions tested were significant and kept in the final model.

Results: Among the 523,330 cattle studied, 13.74% (n=71,890) have had at least one part of the carcass condemned. All covariates and interactions tested were significant and kept in the final model. The results highlighted that the risk of condemnation increased with age. Sex and production type had a lower impact on condemnation rate than age but showed that castrated male of mixed production type had the highest risk of condemnation. The odds of “Basse-Normandie” were significantly higher than other regions. The odds of April to October and December were significantly lower than January which could hypothesize the existence of a seasonal effect linked to diseases or production periods. The odds of 2008 were significantly higher than other years. As there was a Blue tongue epidemic in France in 2008, further investigation could be carried out to identify if these increased odds could be linked to this event.

Conclusions: This study analyzed condemnation data without taking into account condemnation reasons; a polymorph logistic regression could be performed based on a typology of lesions observed to enhance condemnation risk factors understanding.

A multidisciplinary and evidence-based methodology applied to prioritize diseases of food-producing animals and zoonoses

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Objectives: The main objectives of a prioritization process are to optimize financial and human resources for the surveillance, prevention, control and eradication of infectious diseases and to target the surveillance for an early detection of any emerging disease. The method presented here is based on multi-criteria analysis consisting in listing the criteria to assess pathogens, evaluating the pathogens on these criteria (scores), determining the relative importance of each criterion (weight), aggregating scores and weights of criteria into one overall weighted score per pathogen.

Materials and Methods: This prioritization method is based on a multi-criteria decision making including multidisciplinary experts’ opinion and evidence-based data. Hundred diseases were included in the process (OIE listed diseases and emerging diseases in Europe) and five categories of criteria (N =57) were considered. According to their field of expertise, international experts (N =40) first performed an intra-category weighting of criteria, then 6 multidisciplinary experts performed an inter-category weighting. Information corresponding to each criterion/disease was collected through an evidence-based methodology (use of more than 1,800 scientific references). An overall weighted score was calculated for each disease using a probabilistic approach (Monte Carlo simulation) to estimate the uncertainty and the consecutive ranking was established. A classification and regression tree analysis (CART) allowed the classification of diseases with the aim to obtain subgroups with minimal within-variance (grouping diseases with similar importance).

Results: A final ranking of diseases was presented according to their overall weighted scores and using a probabilistic approach. Few differences were observed between deterministic (mean of each weight) and probabilistic approaches (distribution function of weights) (Pearson correlation coefficient = 0.999; p-value < 0.0001). This is probably linked to few subjective interpretation problems or to the dilution of individual discordances among the high number of experts. CART analysis permits to differentiate 4 groups of diseases in function of their relative importance.

Conclusions: The present methodology is a generic and predictable tool applicable to different contexts. The standardization of criteria ensures the transparency and the reproducibility of the model. It could be easily applied for diseases affecting domestic or exotic pets or for enzootic conditions in order to better re-target surveillance and re-adapt prevention and control measures.

Prevalence and risk factors of bovine leptospirosis in the State of Maranhão

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Objectives: The study aimed to investigate the epidemiological features of bovine leptospirosis in the state of Maranhão, in order to determine the prevalence of the infection in cattle and herds, to determine the occurrence of serovars of Leptospira spp., to identify risk factors associated with leptospirosis in cattle and to differentiate the livestock circuits itself regarding the prevalence of leptospirosis.

Materials and Methods: The survey was conducted in 136 herds in the circuit I, in which 841 = 24 months old females were analyzed; 238 in the circuit II and 2,582 females were analyzed; 122 in the circuit III and 869 females were analyzed; 77 in the circuit IV and 540 females were analyzed; a total of 573 herds and 4,832 females were analyzed. The presence of antibodies against Leptospira spp. was verified by microscopic agglutination test (MAT).

Results: Of the 4,832 cows examined, 1,904 (35.94%, CI 95% = 33.01% - 38.98%) were positive. Of the 573 herds, 380 (64.81%, CI 95% = 61.10% - 68.35%) were positive. Serovars Hardjo and Wolffi were the most frequent in the state. The circuit III showed the lowest prevalence of leptospirosis in all comparisons. The variables presence of horses (p = 0.000), presence of capybaras (p = 0.034) and herds with up to 32 adult females (p = 0.002) were identified as risk factors for leptospirosis.

Conclusions: Strategies are required for more effective prophylaxis for leptospirosis in the state of Maranhão, especially in places with poor sanitation and with constant presence of wildlife reservoirs, in order to achieve improvements in health status of flocks and thus expand the role of the state of Maranhão in the international scenario of exporting beef. Keywords: Cattle, Maranhão, prevalence, risk factors, leptospirosis

Seroprevalence and risk factors for leptospira hardjo in irish beef suckler herds

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Objectives: The aim of the present study was to describe the previously unknown herd and animal-level prevalence of Leptospira Hardjo infection in the Irish suckler cattle population, and to investigate the associated risk factors.
for herd seropositivity to L. Hardjo.

**Materials and Methods:** For the purposes of the study, the 26 counties of the Republic of Ireland were divided into 6 regions of approximately equal cow numbers, from which a representative number of herds were selected. A herd was considered eligible for sampling if it was not vaccinating against leptospirosis and if it contained ≥9 breeding animals of beef breed ≥12 months of age. A total of 320 herds were randomly selected and each received a postal questionnaire aimed at collecting relevant information for inclusion in the risk factor (RF) study. A total of 286 of the randomly selected herds were eligible for inclusion in the seroreprevalence (SP) dataset analysis. Serological testing was carried out using a commercially available monoclonal antibody-capture ELISA (Linnodea Leptospira Hardjo ELISA®), (sensitivity 100%; specificity 86.67%). SP herds were categorised as either “Free from Infection” or “Infected” using the epidemiological software tool, FreeCalc 2.0. Questionnaire data, available from 128 of the SP herds, was subjected to statistical analysis in the RF study. Following the use of Pearson’s Chi-Square Test, those variables associated with a RF herd being “infected” with a significance level of P<0.2 were considered as candidates for multivariable logistic regression modelling.

**Results:** Using FreeCalc 2.0, 237 herds were classified as “Infected” (82.29%). The South West and South East regions had the highest herd prevalence. A true animal-level prevalence (TP) of 41.75% was calculated using the epidemiological software tool, TruePrev. There was a statistically significant regional trend, with TP being highest in the South East (P<0.05). Following logistic regression modelling, breeding herd size (BHS) was found to be a statistically significant risk factor. The odds of a herd being positive for leptospiral infection were 5.47 times higher (P=0.032) in herds with 14 to 23 breeding animals compared with herds with <13 breeding animals, adjusting for Region, and 7.08 times higher (P=0.033) in herds with 32.6 to 142 breeding animals.

**Conclusions:** Leptospirosis is a widespread endemic disease in beef suckler herds in the Republic of Ireland. BHS was identified as a significant risk factor for leptospiral infection in Irish suckler herds.

**OC: 23**

**Estimated frequency of Leptospiroa interrogans spp in dairy cattle in the Valley of Toloca, Mexico. Geographical area with temperate to cold climate**

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**Objectives:** The aim was to estimate the frequency of cows and herds affected by the bacteria Leptospiroa interrogans spp and circulating serovars in dairy cattle in the Valley of Toloca, Mexico. The survey is presented for considering the re-emerging disease associated with climate change and its implication on public health. Leptospirosis is most common in areas with tropical and subtropical climates. The study area has a cold temperate climate, is located at 2680 msnm and temperatures between 5 and 12°C. In this region, milk production is type family (5 to 30 units/animal).

**Materials and Methods:** We use the survey method by invitation; directed aimed at owners of dairy herds. The interview was conducted to farmers face-face, using a structured questionnaire with questions of the structure, management and production of dairy herds, also asked about medical history of the disease in cows. With the consent of the producer, were taken randomly from 5 to 10 cows per production unit to extract a blood sample. Sera were analyzed with the microscopic agglutination test (MAT) to determine the presence of antibodies against L. interrogans spp, using a battery of 14 strains (11 international and three native references). Sera with positive reaction to dilution = 1/100, was considered positive, and the herds that had one or more positive animals were considered affected herd.

**Results:**

- **Results:** We recorded the participation of 55 farmers (54.4%) of the 101 registered in a government program to support small producers, and took blood samples from 491 of their cows (15%). All herds studied were classified as affected; and the individual frequency was 71.7% (95% CI 67.5-75.6). The most prevalent strains recorded were the bratislava (29.3%), canicola (25.2%) and Palo Alto (50.5%, native strain).
- **Conclusions:** We conclude that the frequency serological of L. interrogans spp in dairy herds of the place is high, being rare in places with cold climate, and should be considered as a potential risk to public health and its impact on the economy of the producers.

**OC: 24**

**Economic implications of rearing dairy youngster: The estimation of total costs with special attention to calf diseases**

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**Objectives:** For veterinarians, it is important to have insight in the costs of youngster rearing. With a good estimation of the total rearing costs both farmer and veterinarian can become more aware of the importance of the distribution in rearing costs, and start to prioritize and change the rearing management to improve the profitability of the dairy farm. The objective of this study is to estimate the total costs of rearing under Dutch circumstances.

**Materials and Methods:** To estimate the costs, a stochastic model was developed in Microsoft Excel to simulate the rearing process of a calf till first calving, thereby accounting for variation in growth and reproduction and the occurrence of calf diseases (calf scours and bovine respiratory disease) in a detailed manner. Inputs for the model were based on scientific literature, expert knowledge (veterinarians and nutritionists) and author’s expertise. The output of the model consisted of non-economic output such as first calving age and weight, as well as, economic output considering healthcare costs (prevention costs and treatment costs), feed costs, barn costs, breeding costs and labor costs, which were calculated as the accumulated costs from two weeks of age until first calving, death or culling age.

- **Results:** On average, birth weight of a calf was 46 kg, and first calving occurred on average at 25 months of age with an average bodyweight of 542 kg. On average, 6.7% of the calves died during the rearing period starting at an age of 2 weeks till the first calving age. The total costs of rearing was €1,567 per heifer and varied between €1,427 and €1,715. Total treatment costs were on average €21 per heifer and the mortality costs were on average €19 per heifer. A heifer that was diseased at least once had €90 higher in total costs. Delay in the age of first calving by one month, increased the total costs by €40 to €90 per heifer. The results showed that a faster growth (10%) resulted in an additional costs of €43 per heifer with an average first calving age and body weight of 24 months and 595 kg, respectively.

**Conclusions:** Combining the results of this study with the general characteristics of a Dutch dairy farm demonstrates that the total costs of rearing contributes approximately 13% to the cost price of milk, demonstrating the relevance of the rearing activity to overall farm profitability. In addition, on average the healthcare costs and mortality costs were minimal, the costs for an individual heifer that was sick at least once was however costly.

**OC: 25**

**Biosecurity risks and bio-containment risks of paratuberculosis in uk dairy herds**

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**Objectives:** This paper describes the results of an analysis of specific risks of Paratuberculosis entering and spreading within the UK dairy herd. The aim of the risk assessment being to identify herds at significant risk of the disease and to engage farmers in effective prevention and control programmes before the prevalence of Paratuberculosis increases and causes significant economic loss.

**Materials and Methods:** Risk data has been collected by veterinary surgeons and farmers involved in a major campaign to raise awareness of Johne’s disease in UK dairy herds. Over 2000 dairy herds have become involved in the programme. The risks of entry and risks of spread are explained to participating farmers, and data collected using a web based health management tool. The risk data comprises a series of questions and answer options where each answer is scored and weighted to provide an overall summary for the risk of disease entering and spreading within the herd. The results form the basis of any prevention and control plan, dependent upon...
the current infection status of the herd. High risk herds that are currently not infected are provided with a protection plan, and infected herds are provided with an effective control programme.

**Results:** Of 2216 dairy herds that have submitted complete data, 53% are categorised as being at high risk of Paratuberculosis entering the herd. The main risk is due to the introduction of cattle of unknown disease status into the herd (53% have purchased groups of cows of unknown disease status).

A number of farms (5%) spread slurry from other farms onto their young-stock grazing pastures, and 35% of farms allow their youngstock to drink from watercourses that have passed through another cattle farm. The risks of spread are higher than the risks of entry, with 78% having high risks of spreading the disease within the herd, mainly through the use of multi-occu-
pancy calving yards (70%) and frequent use of pooled, untreated clostometer for feeding replacement heifer calves (34%). In all, 30 separate risk factors have been analysed. In conclusion,

**Conclusions:** UK dairy farms are at high risk of significant infection with Paratuberculosis, with modern dairy husbandry practices tending to favour the entry and spread of the disease.

**OC: 26**

**Questionnaire on knowledge and motivation of participants of a voluntary control program on Johne disease in Northern-Belgian dairy cattle herds**

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**Objectives:** In Belgium, participation in a control program for Johne disease is voluntary. In Northern-Belgium the participation rate among dairy cattle farms is limited to a 24.6% (October 2011). Knowledge on Mycobacterium avium subspecies paratuberculosis (Map) and motivation for Map control of farmers are key-factors for a successful program in dairy herds.

**Materials and Methods:** Therefore a questionnaire on this subject was conducted by method of an interview in 69 dairy cattle owners in Northern Belgium, which all participated on a voluntary basis in the Johne disease program in 2009-2010. Dairy farmers were questioned on their knowledge of the disease, Map prevention and reasons for enrollment in the Map program.

Respondents were divided into 4 categories for the description of results and analysis: (a) negative herds (no Map-infected animals detected ever), (b) problem herds, (c) herds with (re)occurrence of infection and finally, (d) herds being categorized as probably free after earlier occurrence of Map infected animals.

**Results:** Eight of the interviewed dairy farmers had zero knowledge on Map. In the remainder dairy owners, knowledge was not optimal, although most important symptoms of disease (diarrhoea, wasting) and its main transmis-
sions routes (colostrum, milk, faeces) were known. The fact mostly young animals were susceptible for infection was rarely known. Knowledge was especially low in cat. (a) herds. The main reason for participation in the program was the demand of enrolment in the program of the dairy industry (milk retributers). Other reasons mentioned were: export, home processing of milk and participation in shows/exhibitions. Mainly cat. (a) differed in their response. Cat. (b) herds started control mainly because of suspicion of presence of Map because of occurrence of clinical symptoms. Regarding preventive measures and Map, the questionnaire demonstrated a clear gap in knowledge on control. Over 50% never used quarantine when buying-in animals. Only one out of 4 herds used other measures to prevent Map from entering (disinfection of boots, herd coverall etc.). Cat. (d) herds significantly used more milk replacers compared to other categories and Cat. (b) herds significantly bought more replacement young stock. For the latter, it remains uncertain what is cause or result. This questionnaire confirmed the obliged culling of Map infected animals is a big restraint for dairy owners to enrol in the program. Remarkably, most of the respondents were in favour of a mandatory control program.

**Conclusions:** This questionnaire in participants in voluntary Map control demonstrates a lack of knowledge in Map infection and control, making it necessary that veterinarians and official authorities invest in education of farmers in the subject. This, accompanied with supporting the effective cull-

ing of Map infected animals will aid the program. Further efforts also have to focus on non-participants as we can assume their knowledge is also limited, thereby hampering their enrolment in a program.

**OC: 27**

**Management of bovine digital dermatitis using copper sulfate: economic and environmental considerations**

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**Objectives:** Calculate the economical and environmental impact of usage of copper sulfate and 4Hooves in dairy operations.

**Materials and Methods:** First, a simulation model was set up using on-farm applications of copper sulfate or 4Hooves, a quaternary ammonium-based commercial hoof sanitizer, to calculate failure and preventive costs associ-
ated with bovine digital dermatitis (DD). Economical losses caused by DD were obtained from established values in the literature. Calculations pre-
pared herein represent a 200 cow dairy farm hoofbathing cows with either 5% copper sulfate or 1% 4Hooves, once per day, 3 times per week. Failure cost (EUR/cow/year) and preventive cost (EUR/cow/year) were calculated for various incidence rates of DD (cases DD/100 cows/year). Second, lab tests were set up using a positive control, copper sulfate and 4Hooves to calculate the possible losses in biogas generation due to the disinfecting properties of the products on the anaerobic bacterial population over a 25d period, assuming that the inclusion of these hoofcare products would make up 1% of the total digestate.

**Results:** The simulation model showed that the preventive cost of DD was 6.3% higher when using copper sulfate compared to 4Hooves. While con-
sumption of 4Hooves was 312 kg/year, it was 1560 kg/year for copper sulfate. Because copper sulfate contains 25% elemental copper, it can be calculated that 390 kg/year of elemental copper would be disposed of in ma-
ture systems in that particular dairy. Failure cost of DD only assumed costs associated with treatment, milk loss and decrease in fertility. Balance be-
tween failure cost and prevention cost existed when the incidence rate of DD (cases/100 cows/year) was 25 for 4Hooves and 27 for copper sulfate. In the lab tests it was observed that biogas generation over the test period was 391 Nm3/ton (positive control), 266 (5% copper sulfate) and 595 (1% 4Hooves). The inclusion of copper sulfate produced 32% less biogas compared to the positive control while it was 52% higher for the 4Hooves solution.

**Conclusions:** Usage of copper sulfate in dairy farms is still one of the most common means to help farmers manage digital dermatitis in farms. Nev-
evertheless, it is shown here that its cost in use, environmental impact and effect on biogas generation merits that effective alternative options should be considered by the dairy farmer.

**OC: 67**

**Prevalence and antimicrobial resistance of mexitilin-resistant S. aureus in herds of dairy cows and veal calves in Germany**

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**Objectives:** A livestock associated strain of MRSA has been observed in farm animals in a number of countries. The objective of the study was to estimate the prevalence of MRSA in dairy cows and veal calves in Germany and to study their resistance to antimicrobials.

**Materials and Methods:** Bulk tank milk samples from dairy herds and dust samples from veal calf herds were collected in the framework of a natio-
nal monitoring programme in 2010 in Germany. Distribution of the samples across the country was based on the size of the regional population of dairy cows and veal calves, respectively. Samples were analysed using a double enrichment protocol as described previously. Testing for antimicrobial resis-
tance was done using the broth microdiffusion method. Minimum inhibitory concentrations were evaluated to epidemiological cut off values as published by EUCAST.

**Results:** MRSA were isolated from 4.7 % of 297 bulk tank milk samples and in dust from 19.6 % of 296 veal calf herds. All isolates were from spa-types
assigned to the clonal complex 398. Of the isolates tested from BTM (n = 12) and veal calves (n = 53) all were resistant to cefoxitin and tetracycline, respectively. High resistance rates were also observed against erythromycin (58 and 85%), clindamycin (75 and 89%), trimethoprim (67 and 77%). Resistance to ciprofloxacin was only observed in isolates from veal calves (21%) but not from bulk tank milk. Likewise, resistance to sulfamethoxazole (3%), fusidic acid (4%) and linrozid (2%) were only observed in isolates from veal calves but not in those from BTM. No resistance was observed to mupirocin and rifampicin, two drugs of major importance for treatment of MRSA in humans.

Conclusions: Results confirm the prevalence of MRSA in dairy cows and veal calves and high resistance rates to several antimicrobials frequently used in veterinary medicine. Overall, MRSA were more frequently observed in veal calf herds than in dairy herds. Resistance rates in isolates from veal calves were also higher and to a greater variety of drugs, although this has to be evaluated carefully due to the limited amount of isolates from dairy herds. On the other hand, results in isolates from dairy herds are in line with those previously published for Germany.

OC: 68
Comparison of income over feed costs (IOFC) among commercial dairy herds of northern Portugal using Excel based tool
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Objectives: The objective of this work was to use an Excel based tool to evaluate and compare profitability of commercial dairy herds.

Materials and Methods: This tool, an Excel based worksheet developed by the authors, named “Contapac”, was used in thirty (n=30) commercial dairy herds from northern Portugal. Feed components quantities and costs were recorded. The dry matter intake (DMI) was recorded and used to calculate the average feed cost per cow per day. Number of cows, milk yield and milk value was used to calculate the value of milk produced for each cow. IOFC was calculated for each farm using milk value and feed cost data.

Results: From 27% of the farms, the preliminary results showed us a wide range of milk yield per cow (21-36 kg/cow/day). The feed cost/ cow/ day started at 3.26 € and could rise to 6.53 € , twice the minimum value. Feed costs represented 39.1% to 62.6% of the total cost of producing milk. IOFC values were varying from 3.03 € to 5.96 € /cow/day.

Conclusions: Contapac allow us to have real time information about the profitability of the farm. When the volatility is high, the availability of real time information may minimize the risk. For that reason, Contapac may be an important support to the decision process in commercial dairy herds.

OC: 69
Description and variation factors of prevalence of BVDV Persistently Infected calves and heifers in dairy herds with a low level of antibodies in bulk tank milk
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Objectives: In Brittany (western France), around 13,000 dairy and 6,000 beef herds are enrolled in a BVDV control scheme, based on the detection of antibodies against BVDV in bulk tank milk (BTM) or in mixed blood sample by using a blocking ELISA. Dairy herds with 6 consecutive BTM samples (taken every 6 months from date1 to date6) with the percentage inhibition < 35% (ie with a within-herd seroprevalence < 10%) at each sampling time are classified as free of BVDV infection. The aim of this study was to assess the reliability of qualifying such herds as BVDV free in young cattle.

Materials and Methods: To do so, the prevalence rate of Persistently Infected (PI) animals among three categories (named C1, C2, C3 respectively) of animals born in these herds (C1: heifers older than 19 months at date6, C2: heifers aged between 0 and 19 months at date6, and C3: the calves born between date6 and date6 + 90 days) was calculated.

Results: A total of 46,977 herd-sequences with 6 consecutive BTM samples were selected in 7,163 dairy herds. In C1, C2, C3 respectively, 2 PI were detected among 351,173 heifers, 88 PI among 982,704 heifers and 52 PI among 133,777 calves. The rate in C2 was significantly different (p < 10-4) in herds without any introduced cattle during the 27 months before date6 (40/645,193 ie 0.006%) compared to herds introducing animals not tested for BVDV during the same period (48/33,751 ie 0.014%). In C3, the PI rate was 0.063% in herds with introduced animals, while it was 0.025% in closed herds. In these latter herds, in case they exhibited a very low percentage of inhibition (<15% at date5 and date6), the rate of PI was 5/59,107 ie 0.008% (0.0028;0.014).

Conclusions: These findings showed that in herds with a low level of antibodies against BVD in BTM, the prevalence of PI among heifers aged more than 19 months is quite nil, while in younger heifers and calves to be born, additional conditions in relation to biosecurity must be implemented to guarantee a very low risk of harbouring PI. BTV is a very relevant tool for management of BVDV control scheme and to predict the presence of PI among young cattle. To improve the accuracy of these results, more sensitive ELISA applied to BTM could be tested. Epidemiological models representing BVDV spread within a herd could be also used to strengthen these results based on field observations.

OC: 70
Considerations on BVD eradication for the Irish livestock industry
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Objectives: The purpose of the study was to outline the BVD control programmes which are in place in other countries and inform the debate in the livestock industry on moving forward the control and eradication of BVD in Ireland.

Materials and Methods: This study was based on a review of the scientific literature on BVD control, an online international survey of BVD experts, visits to three countries which have embarked upon or are about to embark on national BVD control programmes, and a stakeholder workshop.

Results: The review of the scientific literature included, a brief synopsis of the relevant clinical implications of BVD, the economic impact of BVD, epidemiological aspects of the disease to its control, and general models of BVD control. An online survey of BVD experts concluded farmers, were considered to have a major input into the decision that lead to the initiation of BVD control. Economic loss at individual farm level was considered the most significant driver in initiating BVD control. The majority of BVD programmes initially started as voluntary control, with 60% of the time that commenced as voluntary eventually becoming compulsory. Detailed studies of BVD eradication were undertaken in Sweden, Germany and Switzerland. The Swedish experience showed that BVD control was demand led. Awareness of the disease was built among farmers. The farmers received a simple consistent message from the various stakeholders. Industry provided both encouragement and indirect compulsion to increase uptake among farmers. The Swedish programme is based on antibody testing. A key lesson from the German experience has been the lack of success of voluntary efforts to eradicate BVD. Germany commenced a mandatory BVD eradication programme in 2011, based on virus detection through collecting tissue tag samples at routine tagging. The programme appeared to be legislatively driven. Switzerland commenced an aggressive BVD eradication scheme in 2008, based on virus detection on tissue tag testing. The programme required a lot of resources and while farmers made a significant contribution the state had a very significant contribution. The Swiss experience emphasised the need for an integrated real time database, and proactive programme coordination and management at the highest level.

Conclusions: The technical knowledge and test technology exists to eradicate BVD. The identification and prompt elimination of persistently infected (PI) cattle is the basis of any control programme. The trade of such animals must be curtailed. International experience indicates systematic, well co-ordinated programmes have the most success, while voluntary programmes can make good initial progress but ultimately fail. The farming community must buy into any proposed programme. To buy into the programme and create such a demand for BVD control, farmers must first be well informed.
It is likely that stemming economic loss and improving productivity will be the primary motivator at individual farm level.

**OC: 71**  
**Economic analysis of an acute outbreak of bovine viral diarrhoea virus (BVDV) in a South Australian dairy herd – a case study**  
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**Objectives:** Bovine viral diarrhoea virus (BVDV) is widespread across the cattle-producing world and is acknowledged to have a considerable financial impact on infected herds. The worst-case scenario is an acute outbreak of BVDV in a previously naive herd. Such outbreaks are characterized by dramatic reproductive losses and the birth of congenitally deformed or persistently infected (PI) calves. This paper describes an acute BVDV outbreak in a previously naive South Australian dairy herd.

**Materials and Methods:** A closed South Australian dairy herd, milking 320 (predominantly Friesian) cows, was investigated in early May 2009 when the farmer noticed a dramatic increase in abortions, morbund calves with unusual symptoms and a reduced calving rate.

**Results:** This outbreak began following the expansion of the herd in early 2008 by purchase of 129 females and 11 bulls from 11 properties. Diagnostic testing later determined one introduced bull to be PI with BVDV, and the source of infection. Further testing confirmed the presence of PI calves born in 2009. Upon post mortem, four congenitally deformed calves showed signs consistent with foetal infection with bovine viral diarrhoea virus (BVDV), including cerebellar hypoplasia and hydrocephalus. The herd’s bulk milk somatic cell count and incidence of mastitis increased significantly for the duration of the outbreak. This is proposed to be a result of the well-documented immunosuppressive effect of BVDV infection. This outbreak amounted to a total estimated cost of $149,500. The losses accumulated from a variety of sources, including: reduced milk value, lost milk production, purchase of replacement animals and the need to dry off the herd to eliminate mastitis infection.

**Conclusions:** Over half of the costs associated with this outbreak stemmed from an increase in the occurrence of mastitis. While the direct costs of an acute BVDV outbreak are accepted to be substantial, this case demonstrates that the indirect, related costs, can equal or exceed the direct costs.

**OC: 72**  
**Seroprevalence and risk factors associated to BHV-1 and DBV in dairy herds in Pasto, Colombia**  
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**Objectives:** Determine the prevalence of serum antibodies to bovine herpesvirus-1 (BHV-1) and bovine diarrhea (BVDV) virus and risk factors associated to these infections in dairy herds in the municipality of Pasto, Colombia.

**Materials and Methods:** The study was conducted in dairy farms in Pasto, Colombia, belonging to an ecosystem of lower mountain dry forest. Farm prevalence levels were obtained by a cross-sectional study using a strategy of simple random sampling of animals. Epidemiological data was collected through a structure fill in questionnaire obtained by a direct interview with the farmer. The presence of antibodies against IBR virus and DVB were tested using a commercial indirect enzyme-linked immunosorbent assay (ELISA) kits (SVANOVA Biotech®). The apparent prevalence of antibodies to BVDV and IBR was estimated from the ratio of positive results to the total number of cattle examined. The association between seroprevalence and risk factors was quantified using a multivariate binary logistic regression with a confidence interval of 95%. The significance of the association was estimated by determining Odds Ratio (OR) of each factor with a P value <0.05. Calculations were performed using SPSS® version 19.

**Results:** Percentage of abortions in this study was of 7%. The medical records of the farms reported placental retention return, to estrus after service, increased services per conception, interacting directly with the open days ranging from 140 ± 20 days. Forty two cows were ELISA seropositive; the animal level prevalence for antibodies to BHV-1 was estimated at 17.65% and seventy eight cows were seropositive; prevalence for antibodies to BVDV was 32.77%. The binary logistic regression showed that bull used instead of artificial insemination (OR = 30.56, CI 6.87, 135.98, P <0.0001) is a risk factor with BHV-1, and abortion (OR = 22.70, CI 4.21, 122.42, P <0.0001) and acquisition of new animals from other farms and regions (OR = 34.90, CI 6.30, 193.43, P <0.0001) are risk factors with BVDV.

**Conclusions:** This study shows a low general and individual seroprevalence to BHV-1 in herds in Pasto, Colombia. Due to the type of herd management carried out in this population, these results could indicate the absence of PI animal, not indicate existing disease in animals serologically positive, but suggests that at some point in his life were exposed to the disease.

**OC: 73**  
**Risk factors associated with the presence of Neospora caninum, bovine viral diarrhea virus and infectious bovine rhinotracheitis virus in organic herds in Québec**  
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**Objectives:** The objectives of this study were to evaluate the risks factors associated with the presence of Neospora caninum (NC), bovine viral diarrhoea virus (BVDV) and infectious bovine rhinotracheitis virus (IBR) in organic herds in Québec.

**Materials and Methods:** A region-stratified random sample of 60 out of the 106 registered organic herds was selected. Each herd was visited once in 2009-10. Thirty adult cows were randomly selected and bleed to estimate NC seroprevalence. Five unvaccinated animals >6 months old were selected to estimate BVDV and IBR seroprevalence. Serological analyses were performed using ELISA for NC and seroneutralization techniques for BVD and IBR. A questionnaire was administered to the herd manager. Unconditional estimates of association between exposures under investigation and the outcomes “having = one animal seropositive to BVDV” and “having = one animal serositive to IBR” were obtained using logistic regression models. Variables with P=0.20 were retained for subsequent multivariable analyses. For each outcome, a multivariable model was constructed using a stepwise forward procedure with P=0.05 as inclusion criterion. The same steps were followed for the outcome “count of NC seropositive animals”, but using a Poisson regression model with a log link and the natural logarithm of the number of animals tested used as offset.

**Results:** Complete data from 58 herds were available for BVDV and from 57 herds for IBR. Twenty-one herds had at least one of the tested animals seropositive for BVDV and 17 had = one animal seropositive to IBR. A strong relationship between these two pathogens was observed. Having seen cats wandering on the facilities and owning a dog were associated with lower odds of BVDV, while having = one breed of cows was associated with lower odds of IBR. On 29 (50%) herds, NC positive cows were found. Herds that had a confirmed case of NC in the past had greater odds of having additional NC positive animal. Similarly, having pigs on the farm, stating that the dogs on the farm were never seen eating fetal membranes, and having = one calf drinking from the same bottle or bucket on a given day were all associated with greater odds of NC.

**Conclusions:** Some associations observed most likely reflect indirect relation between exposures investigated and outcomes, which may be different from conventional herds. More specific studies should be conducted for evaluating the risk factors associated with the presence of these pathogens in organic herds.

**OC: 74**  
**Diagnosed BVDV PI-animals in Northern-Belgium: where do they go?**  
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**Objectives:** The key to Bovine Viral Diarrhoea Virus (BVDV) control in cattle...
is the detection and consequent removal of PI-animals. In this paper, data containing all cattle that tested BVDV antigen positive from a 2-year period from October 2009 to October 2011 in Northern-Belgium was investigated.

**Materials and Methods:** Test-positive animals (BVDV ELISA Ag/ Serum Plus Test®, IDEXX or BVDV PCR, Adiagen) were considered as ‘highly-likely’ to be PI-animals. Laboratory data were linked to the I&R database (Sanitel-Cattle) to determine the location of the herd of detection of these animals. This was compared with the actual location and animal status of the detected PI on the date of October 1st 2011. This way, ‘where-abouts’ and animal status of these detected PI-animals were constructed.

**Results:** A total of 2,951 animals tested BVDV antigen positive. Tested animals originated from 1,076 different herds. Motives for sampling of these animals by local veterinarians varied from suspected animals or screening purposes (85.2%), purchases (5.0%), abortions (8.6%) and other (import...). About 409 antigen test-positive results failed to be linked with the I&R data (incomplete or missing identification) and were left out the further analysis. Based on the animal status and location on October 1st 2011, we can make the following conclusions:

**Conclusions:** only 55.5% (1,411) of the presumed PI-animals were classified dead without first being moved to another herd (either through removal or natural death), 13.8% (351) animals were dead but had been moved to other herds after their detection. 470 animals (18.5%) were still alive and or natural death), 13.8% (351) animals were dead but had been moved to other herds after their detection. 470 animals (18.5%) were still alive and...
**HERD HEALTH AND QUALITY RISK MANAGEMENT**

**OC: 221**

**Straightening out priorities: how aware is the veterinarian of farmers’ wishes and goals regarding veterinary herd health management?**

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**Objectives:** To determine whether veterinarians are aware of farmers’ goals, priorities and wishes regarding topics of veterinary herd health management (VHHM).

**Materials and Methods:** During the summer of 2011, 29 veterinarians attached to 15 veterinary practices were followed during a VHHM visit on a dairy farm. Each veterinarian was asked to fill in a questionnaire at the veterinary practice, about time consumption, discussed topics and farmers’ needs regarding VHHM. The researchers then accompanied the veterinarian to the farm, where the farm visit was recorded with a voice recorder. Afterward, the farmers (n=30) received a questionnaire about time consumption, discussed topics and the farmer’s needs regarding VHHM, together with a stamped envelope. The farmer was asked to fill in the questionnaire after the veterinarian and researcher had left and to send it back by mail. All data was summarized and statistically analyzed.

**Results:** Veterinarians had different priorities than farmers regarding discussed topics (fertility, udder health, nutrition, milk production, claw health, young stock rearing, housing). Nutrition was more important to veterinarians than to farmers, while farmers found young stock rearing more important than veterinarians did. Veterinarians and farmers were asked to rate the importance of the topics between 1 and 5. Veterinarians rated milk production and nutrition significantly (P<0,05) higher and fertility significantly lower than farmers did. Veterinarians were also asked to indicate how important the different topics were to their farmers. Again milk production and nutrition were rated significantly higher and fertility significantly lower. Veterinarians set goals with the farmer in 24% of the cases. Most important reason not to set goals, according to the veterinarian, was that farmer and veterinarian intuitively knew from each other what they wanted to achieve. Still, when veterinarians were asked to name farmer’s main goal for VHHM, in most cases the answer was different from the farmer’s answer. Veterinarians indicate that farmers actively state their wishes regarding VHHM. Farmers, however, indicate that they seldom or never do that. The difference in opinion was significant (P<0,05).

**Conclusions:** Veterinarians were not always aware of the needs and priorities of farmers regarding VHHM. They often could not name the farmer’s main goal for VHHM and thought their farmers asked actively for information more often than farmers actually did.

**OC: 222**

**Bulk milk testing and risk based blood serology for disease surveillance in cattle**

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**Objectives:** Control programs based on government regulations for the eradication of Brucellosis, Enzootic Bovine Leucosis (EBL) and Infectious Bovine Rhinotracheitis/Pustulovaginitis (IBR/IVP) in Austrian cattle herds had been successfully completed. For maintenance of freedom of diseases, a representative antibody ELISA monitoring program was implemented.

**Materials and Methods:** The Austrian cattle population comprises approximately 2 million animals kept in 70,000 herds. Each dairy farm is annually tested for Brucellosis, EBL and IBR/IVP specific antibodies in bulk milk. Herds with suspicious ELISA results are re-examined by blood testing of individual samples. 3400 beef herds are annually selected by risk factors such as common grazing or international cattle trading and tested by blood ELISA for the above mentioned diseases.

**Results:** 35488 dairy farms were tested in 2010. The number of farms which had to be tested by blood sampling because of a suspicious bulk milk ELISA result was 0,19%. 108 farms showed not-negative results in Bru-
celsiosis ELISA, 31 in EBL ELISA and 62 farms in IBR/IPV bulk milk ELISA. No Brucellosis or EBL infected animals were found in the follow up investigations, but 2 IBR/IPV vaccinated animals could be detected within the total of 3,869 blood testings.

**Conclusions:** The combination of bulk milk examination and risk based blood sampling is a cost effective and efficient tool for monitoring cattle herds on a national level. The pool size of bulk milk was determined on IBR/IPV ELISA sensitivity and allows the examination of up to 50 dairy cows with a single pooled sample. The target orientated testing of beef herds on annually determined risk factors increases the sensitivity in the monitoring of non-milk-supplying farms.

**OC: 223**

**Controlling paratuberculosis in UK dairy herds using milk tests and risk management**

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**Objectives:** The paper describes a voluntary paratuberculosis engagement program within the UK adopted in over 2000 dairy herds between 2008 and 2011 utilising a standardised web based risk management program (www.myhealthyherd.com) and milk tests with the aim to encourage farmers to know their Paratuberculosis risks and disease status.

**Materials and Methods:** A web based relational database was created which allowed vets, labs, monitoring organisations and farmers to manage the health of cattle herds securely via their own bespoke web portal. A specific Johnes' Disease module was created which assessed the risk of disease entry, spread, predicted prevalence and also allowed the development of farm specific strategies for control, biosecurity and biocontainment for paratuberculosis. Electronic storage of lab results and traffic light scoring of risks and status allowed farmers to clearly understand the risks and likely future prevalence of Johnes' disease if these risks were not managed effectively. The use of the Myhealthherd tool was combined with targeted sampling of 30 high risk cows from the herd providing the farmer with an understanding of his own risks and status. Farmers received a consistent education program delivered through milk processors using trained consultant veterinarians. The engagement program has progressed to more effective veterinary led control plans being applied in specific regions of the UK utilising funding routes for farmer training.

**Results:** Within 6 months over 20% of farmers in the South West of England have engaged with the program. 6 possible control strategies could be adopted by the farmers and the Myhealthherd program scores the robustness of the plan according to the agreed tasks selected.

**Conclusions:** The aim is to expand the program to a wider national commercially driven control with the objective of reducing the risks of spread of paratuberculosis within the UK dairy herd. The program seeks to include all dairy farms in a control program that offers both protection for low prevalence herds and control for infected herds using bespoke options defined by the guidance of the vet and the aspirations of the farmer.

**OC: 224**

**Opinions and practices of vets and dairy farmers towards herd health management in the UK**

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**Objectives:** The objective of this study was to compare farm veterinary surgeons' and dairy farmers' opinions on Herd Health Plans and Herd Health & Production Management with the aim to do better.

**Materials and Methods:** For the purpose of this study ‘Herd Health Plans’ were defined as ‘the current paper document issued by the British Cattle Veterinary Association or other organisations’. ‘Herd Health & Production Management’ was defined as ‘regular scheduled farm visits that go beyond the ‘one-off’ tasks such as pregnancy diagnosis, castrations and dehorning; the purpose being to prevent disease and/or improve animal health and production by introducing long term strategies focusing on the herd as a whole.’

Two comparable questionnaires, one for farm vets and one for dairy farmers, were distributed to 436 dairy farmers and 160 farm animal practices throughout the UK between June and September 2008.

**Results:** Vet and farmer respondents differed when listing the ‘major roles’ of the vet on the farm; although vets see ‘Optimising milk production’ and ‘Being an independent advisor’ as important roles this does not seem to be perceived as such by the farmer. Furthermore, when presenting themselves to clients, vets seemed to favour the ‘friend of the farmer’ style approach; a much smaller proportion of farmers seemed to prefer this approach. The majority of farm respondents (81%, n=38/121) valued the discussions with their vet and it was apparent from the relatively small proportion of vets instigating a discussion on farm (26%, n=33/125) that there is the opportunity for a more proactive approach from vets. The study underlined that ‘demonstrating cost effectiveness’ is still a main concern for vets and farmers.

**Conclusions:** The vet is an important stakeholder to motivate change on dairy farms and the results of this study identified areas that can be improved by more training and effective communication.

**OC: 225**

**Bovicontrol – towards health assurance of dairy herds**

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ICBAS, Porto University, Portugal

**Objectives:** Bovicontrol® is a registered mark of Segalab for a herd health program designed to assure biosecurity and to control the health status in dairy herds in Portugal. Our purpose is to present the concept and discuss the results, difficulties and achievements after three years.

**Materials and Methods:** Bovicontrol® is a private and voluntary herd health scheme. It involves farmers, vets, pharmaceutical companies a diagnostic laboratory, Portuguese Dairy Cooperatives. The program has a double purpose: 1) to improve the health status concerning IBR, BVD, Paratuberculosis (MAP) and Neospora, 2) to allow selling animals with assured health status. The implementation takes four steps: 1) The characterization of the farm infection status using blood and bulk milk tank samples - the herds are classified as infected, probably infected or free of infection for each of the four pathogens; 2) after the assessment of laboratory results and of the farm risk profile, a plan for biosecurity, control and monitoring (BCM Plan) the diseases at the farm is designed; it may involve the use of BVD (monovalent) and or IBR (DIVA) vaccines; 3) implementation of the BCM Plan at the farm; 4) systematic control of new animals entering the farm: origin, tests, clinical signs. 5) Revision: The program is reviewed every two years. Laboratory tests include ELISA and PCR in sera, blood, milk and faeces as appropriate.

**Results:** The program started in 2009. Until 31-Oct-11 more than 300 herds / 35,000 animals have joined the program. Results by 31-Dec-10 were: 218 farms with 21.566 animals voluntarily joined the program. Control programs towards IBR and BVD in place in 125 farms. Biosecurity programs without IBR and BVD vaccination implemented in 43% of the farms which were not infected with any of these 2 virus and were at sufficient low risk to assume the no vaccination option. Furthermore 22% of the farms in Bovicontrol® stopped IBR vaccination and 37% stopped BVD vaccination; MAP was found in 63% of the herds, cow seropositivity from 1% to 30% - sanitary measures discussed with the vets, the farmers are in place. Neospora is present in 80% of the farms, within farm prevalence up to 80%. Three farms became infected after joining the program; the risk of new infection was higher for BVD than for IBR.

**Conclusions:** With Bovicontrol® there was a reduction in disease costs and expenditures at farm, better biosecurity, an increased efficiency in the use of vaccines and tests and the early detection of pathogen entry at the farm.
OC: 226
Latent class growth analysis of the effect of individually tailored biosecurity advice on the presence of endemic pathogens in British beef suckler herds.

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Objectives: Although farm biosecurity is considered to be integral in the avoidance of pathogen incursion, the effect of implementing these measures is rarely studied. This study investigated the effect of individually tailored biosecurity advice on the presence of four pathogens (bovine viral diarrhoea virus (BVDV), bovine herpesvirus 1 (BHV1), Leptospira interrogans hardjo (L. hardjo), and Mycobacterium avium paratuberculosis (Map)) amongst beef suckler herds in Great Britain.

Materials and Methods: 116 farms were randomly assigned to ‘intervention’ and ‘control’ groups. The farmer’s vet visited these farms annually for three years to blood sample 50 cattle and conduct a biosecurity assessment, which gave a numerical ‘biosecurity risk score’ for each pathogen. At least three pieces of biosecurity advice were given to intervention farms and advice was given to control farms if requested. Bayesian methodology was used to quantify the probability that farms contained seropositive animals (amongst youngstock for BVDV, BHV1 or L. hardjo; and oldstock for Map). Farms were classified as pathogen positive if the mean probability of pathogen presence was 0.5 or more. Latent class growth analysis (LCGA) was used to identify patterns of pathogen experience and biosecurity risk score over time. This allowed the categorisation of each farm into a group relating to pathogen presence and a group relating to risk score, for each pathogen. The effect of intervention status on pathogen presence and risk score within these groups was then studied.

Results: Three risk score groups (low, medium and high starting scores) and two pathogen presence groups (low and high odds of pathogen presence) were identified for each pathogen. In all cases, the medium risk score group showed a gradual decrease over time, with the other groups remaining static. A decrease in odds of BVDV presence was observed amongst farms with low odds of BVDV, but pathogen presence otherwise remained static. Intervention farms had a reduced risk score for BHV1, L. hardjo, and Map amongst farms in the medium score group, but were similar to control farms regarding pathogen presence.

Conclusions: LCGA is a potentially useful tool for capturing complex heterogeneity in longitudinal data. This study successfully identified a group of farms that reduced their risk score over time, which were more likely to achieve this if they were intervention farms. No effect of intervention status on pathogen presence was observed; likely due to control farms commonly receiving advice.

OC: 227
Diagnostic of dairy cattle producers in the city of Fatima do Sul – Mato Grosso do Sul – Brazil: pasture and soil management and dry season supplementation

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Objectives: The objective of this study was to develop a diagnosis of the pasture and soil management and the dairy cattle dry season supplementation in the city of Fátima do Sul, Mato Grosso do Sul.

Materials and Methods: In the months of October 2008 to January 2009 were 152 registered milk producers, which were carried out two questionnaires: the first with 152 producers, and a second with a sample of 16 producers. In the first questionnaire was conducted the following questions: farm size, number of animals, number of milking cows, breed of animals and milk production. And in the second questionnaire: management of pasture and feeding during the dry season.

Results: According to the diagnosis, it became clear how little attention is given to the management of soil and pastures, these are mostly degraded or degraded because 43.75% of the producers never held any pasture or soil management, and only 6.25% performed some analysis of soil in their pastures. The positive is the big adoption in recent years of dairy farming in the intensive grazing system, using the short duration grazing system (25.0%), with monitoring of the institutions of technical assistance and rural extension (TARE) and projects extension linked to universities. In the dry season, sugarcane (Saccharum spp) (93.75%) and Elephant grass (Pennisetum purpureum, Schum) (56.25%) are the main forage used in the form of additional properties such as animals, yet in a way not considered ideal, since there are few that adopt the sugarcane with urea, as many have fears of using urea due to the mismanagement of this technology. Fits the TARE institutions reverse this myth that exists about the use of urea. Another positive point is the adoption of the use of cassava foliage hay (Manihot esculenta, Crantz) (12.50%) than in the region has enough supply of this product, and that is a source of forage of good quality.

Conclusions: Therefore, the producers need closer monitoring of TARE and universities for clarification about the importance of good pasture and soil management.

OC: 228
Milk quality assurance for paratuberculosis in The Netherlands: achievements of 2006 - 2011

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Objectives: In 2006, a milk quality assurance program (MQAP) for paratuberculosis in Dutch dairy herds was initiated. The aim of the MQAP is to reduce the concentration of Mycobacterium avium subsp. paratuberculosis in milk delivered to the milk factories.

Materials and Methods: Herds participating in the MQAP are assigned a herd status based on the results of herd examinations by individual milk-ELISA. Farmers are entitled to confirm positive ELISA results by faecal culture. Test-negative herds are assigned status ‘A’. Test-positive herds are assigned status ‘B’ (if all test-positive cattle have been removed from the herd) or status ‘C’ (if any test-positive cattle are retained in the herd). The MQAP promotes preventive management measures and culling of test-positive cattle to reduce the spread of Map. On the herd-level, these measures increase the probability to obtain and maintain status ‘A’. On the national level, these measures taken by individual farmers increase the milk quality of the national dairy herd.

Results: Based on the results achieved in the programme, the Dutch dairy processing industries are requiring all dairy herds delivering milk to their factories to have at least status ‘A’ or ‘B’ since January 2011.

Conclusions: The aim of this paper is to present results obtained over a five-year period in the first cohort of herds that entered the MQAP in 2006 - 2007, and to provide a road map to nation-wide participation in paratuberculosis programmes.

OC: 229
Subclinical ketosis and relationships with postpartum diseases in European dairy cows

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Objectives: Subclinical ketosis (SKC) is defined as concentrations of B-hydroxybuturate (BHBA) above 1200 to 1400 μmol/L and the gateway condition for other metabolic disorders such as displaced abomasum, impaired immune function, milk fever, metritis, mastitis, retained placenta, and cystic ovarian diseases. Reported prevalence rates range from 6.9 % to 14.1 % in the first 2 month of lactation. However, there is a dearth of information on prevalence rates considering the diversity of European dairy farms. The objective of this study was to determine prevalence of SKC and relationships with postpartum related diseases such as retained placenta, milk fever, clinical ketosis, displaced abomasum, lameness in European dairy farms.

Materials and Methods: From July to September 2011 a convenient sample of 170 dairy herds from Italy, Hungary, Poland, Serbia, Slovenia and Croatia was studied. BHBA concentration (mmol/l) was measured in a total of 1,903 cows with a handheld meter (Precision Xtra, Abbott Diabetes Care)
within the first two weeks postpartum. On average 14 cows were enrolled per farm and relevant information (e.g. days in milk, postpartum diseases, herd size) recorded. BHBA concentration in whole blood was considered as a predictor of metritis, mastitis, clinical ketosis, displaced abomasum and lameness. For each disease a critical threshold of BHBA was calculated based on the highest combined sensitivity and 1-specificity and used to categorize the blood BHBA concentrations into high and low risk categories. Multivariate binary logistic regression models were built for each disease, considering cow as the experimental unit including effect of parity and random effect of herd.

**Results:** Overall prevalence of SCV was 26.4%. Cows with blood BHBA concentration ≥ 1.19 mmol/L were more likely to develop clinical ketosis [Odd Ratio (OR) = 5.3; 95% Confidence Interval (CI) = 3.2 to 8.7], claw diseases [OR = 1.7; CI = 1.1 to 2.5] and displace abomasum [OR = 4.8; CI = 2.7 to 8.5]. Cows with BHBA concentration ≥ 3.1 mmol/L, and ≤ 0.5 mmol/L were more likely develop mastitis [OR = 0.4; CI = 0.2 to 0.7] and the metritis, [OR = 2.0; CI = 1.5 to 2.9], respectively.

**Conclusions:** Elevated BHBA concentrations within two weeks after calving are associated with increased risk of metritis, mastitis, lameness, clinical ketosis and displace abomasum.

**OC: 230**

**Herd health management practices and problems on Irish suckler beef farms- results from veterinary practitioner and farmer questionnaires**

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**Objectives:** There have been few studies internationally which document animal health management practices and their association with herd health status in suckler beef herds and no published Irish studies. The study objective was to audit animal health control practices and to assess risk management factors associated with herd health status in sixteen Irish suckler beef herds over a two year period (2009-2010).

**Materials and Methods:** The farms used in the study, with herd as the epidemiological unit, were part of a technology transfer programme (http://www.teagasc.ie/advisory/better_farms/beef/), and were representative of suckler beef enterprises in Ireland. The number of suckler beef cows per herd ranged from 31 to 121 cows (mean 68, s.d. 27.6). Two questionnaires were designed: 1), a veterinary questionnaire to collect information on the extent of animal health monitoring by the practitioner servicing that farm and identification of on-farm herd health issues 2), a farmer questionnaire was designed to collect information on farm background, potential risk factors for the herd turnover rate was only established in 4 of the 10 farms (11.7%, 11.7%, 17.6% and 20.5% for the 1st semester).

**Conclusions:** The sample was collected only from farms with organized and reliable data, so it only represents a small part of the Portuguese reality, but could be the first step for further investigation. We concluded that a high number of intensively kept dairy calves are culled very soon after calving and at a relatively young age. However, primiparous cows are kept for longer compared with older animals probably suggesting a bigger effort to save these animals. A more detailed and comprehensive analysis will be performed in the future in order to gather more information about the management and culling strategies in Portuguese dairy farms.

**OC: 231**

**Analysis of culling patterns in Portuguese dairy farms**

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**Objectives:** Culling analysis may help to identify management and husbandry problems in a farm. In Portugal investigation on the rates and reasons for culling dairy cows has never been attempted. The data presented here is the first part of a study intended to evaluate culling patterns in Portuguese dairy farms.

**Materials and Methods:** Preliminary data was collected from ten commercial dairy farms in the south of Portugal milking between 90 and 1100 cows. Data referring to the total of animals culled (n=606) in the 1st semester of 2011 was retrospectively collected from the farms records. Days in Milking (DIM), age, number of lactation (NL), age at first calving, date of culling, reason for culling and destination were assessed.

**Results:** The mean age, DIM and number of lactations at the time of culling were 5.02 years, 202 days and 2.92, respectively. The destinations after culling were: 32% died on the farm, 64% were sold for slaughter and 4% were sold to other farms. Thirty six percent of primiparous animals died on the farm and 53% of these deaths occurred in the first 30 DIM. As for the multiparous, 31% died on the farm and within that group 44% of the deaths occurred in the first 30 DIM. Mastitis and udder problems (35,7%), reproductive problems (21,3%), unidentified causes (11%) and lameness (9,8%) were the most prevalent reasons for culling. When analyzing culling after 5 months in lactation it was shown that the average DIM for primiparous culling was 413 compared with 341 for the multiparous cows. Due to a lack of data the herd turnover rate was only established in 4 of the 10 farms (11,7%, 11,7%, 17,6% and 20.5% for the 1st semester).

**Conclusions:** The sample was collected only from farms with organized and reliable data, so it only represents a small part of the Portuguese reality, but could be the first step for further investigation. We concluded that a high number of intensively kept dairy calves are culled very soon after calving and at a relatively young age. However, primiparous cows are kept for longer compared with older animals probably suggesting a bigger effort to save these animals. A more detailed and comprehensive analysis will be performed in the future in order to gather more information about the management and culling strategies in Portuguese dairy farms.

**OC: 232**

**Dairy farm quality risk management**

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**Objectives:** Further to the issues of food safety on dairy farms, Quality Risk Management (QRM) may also help improve farm economic performance. QRM is based on quality analysis and hazard control, holistically analyzing the farm and all processes involved. Hence it becomes clear that an optimal farm organization will be paramount. Within this project we will demonstrate the adaptability of the HACCP concept to dairy farms, how to implement a HACCP-like Quality Risk Management program on a dairy farm using VA-CQA International’s web-based SWOT assessment tools for preliminary risk analysis. The evaluation of VA-CQA International web-based SWOT assessment software’s efficacy and efficiency is also included in this paper as a secondary goal.

**Materials and Methods:** Eight dairy farms in Portugal were selected to test VA-CQA International’s web-based SWOT assessment software, for its efficacy and efficiency based on a time trial, and to determine how long it takes to do a whole SWOT assessment on a dairy farm. The selected farm for the time trial and to develop the QRM manual was the Santarém College of Agriculture Dairy Farm (SCADF).

**Results:** The training done on the other seven dairy farms has helped to reduce farm assessment time from an initial seven hours to about three, a great increase in efficiency. The introduction of the data in the VA-CQA-International website took about ninety minutes, after which the immediate display of the detailed farm evaluation (Strong Points, Weak Points and Items
of Particular Attention) accounted for the assessments effectiveness. Results from the experience of different stakeholders (veterinarians; farmers; farm workers) after having worked with the QRM, are expected in late January 2012.

Conclusions: By reviewing the development of this paper it is clear that, although seemingly laborious, the HACCP concept is perfectly adaptable to individual dairy farms. It is also evident that the implementation of a QRM program of this kind, while preventing or reducing quality risks and including the factors related to animal health and wellbeing, will boost production. Given that the implementation of a program of this nature does not require a significant investment, apart from consulting and labor, one may conclude that, when animal health and welfare improve, the dairy farm income will also increase.

OC: 233

Animal welfare – a practical swedish approach in herd health

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Objectives: Dairy herd welfare assessment is a tool that could be beneficial within a regular herd health system. The cow that can express her most important behavioral needs will stay healthy and more easily bring both milk and calves. To secure welfare is therefore actually a win – win cooperation between cow, farmer, different advisors and the veterinarian. The Swedish Dairy Association has created a system of easily adapted welfare services for objective monitoring of the challenges for the high producing milking cow.

Materials and Methods: The first step is WELFARE SIGNALS, a web application with smileys relating to 24 database figures significant correlation to animal welfare. With a simple click the animal health costs in the herd will also appear on the site. Ask the Cow, an animal based welfare assessment, is then performed on the farm. It is delivered by trained assessors who are calibrated recurrently every second year. Assessment points are body condition, cleanliness, injuries, lameness, rising behavior, claws and fur on animal level and stall standing index, lying behavior, positive and negative behavior on group level. The HEALTH PROFILE will now protrude with support from several resource- based CHECK LISTS. A farm meeting gains acceptance among all actors and out of this profile a HERD HEALTH PLAN is agreed. The follow through of this plan is supervised by the local veterinarian in HERD SERVICE which focuses on risk animals at calving, birth and drying off. Finally an EVALUATION with partly the same tools is made, usually after 6-12 months of time.

Results: The whole system is communicated as HEALTH PACKAGE MILK (HPM) to Swedish farmers since 2009. HPM has been extremely highly ranked in repeated surveys conducted by an independent market investigator reaching a customer index well above 90. 200 farms take part of HPM yearly and the 100 specially trained HPM veterinarians tend to meet the rapidly growing preventive market with confidence.

Conclusions: An important remark is that treatments, even with the most intensive documentation, will not be enough if we really want to reach optimal animal welfare. This aim demands the analysis, acceptance process and actual change in human behavior that Health Package Milk can create.

OC: 234

Prevalence of uterine disease in Austrian dairy farms determined by vaginoscopic, bacteriological and cytological examination

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Objectives: Several studies have been published on the occurrence of endometritis on dairy farms in Germany and North America. Information from countries with smaller agricultural structures, e.g. Austria is rare. The objective of this study was to determine the prevalence of clinical (CE) and subclinical endometritis (SE) on dairy farms in Austria.

Materials and Methods: The study was conducted on 11 commercial dairy farms with 35 to 290 cows per farm. All cows were examined for CE at 20-30 days postpartum by rectal palpation of uterus and vaginoscopy. Subsequently intrauterine samples were collected with the cytobrush-technique for bacteriological and cytological examination. A proportion of =5% polymorphonuclear cells (PMN) in the cytological preparation was defined as threshold for the diagnosis of SE. For the bacteriological examination, the cytobrushes were rolled on Columbia-Sheep-Blood-Agar and MacConkey-Agar and incubated for two days at a temperature of 37°C. The differentiation of bacteria was performed by Fourier-Transform-Infrared-Spectroscopy (FTIR).

Results: The objective of this study is to include 400 cows. Preliminary results of 70 sampled cows show in 23 % of cows signs of CE based on vaginal discharge. In 94 % of those bacteriological samples were positive. The cytological samples of cows with CE showed only in 25 % more than 5 % PMN. Subclinical, cytological endometritis was diagnosed in 56 % of cows free of clinical signs of endometritis. Overall 9 % of the cows were free of clinical, cytological and bacterial signs of endometritis. Further analyses of bacteriological samples by FTIR will provide detailed information on bacteria.

Conclusions: Preliminary result showed that the prevalence of CE is within the range of prevalence reported from other countries with large dairy farms, while SE is similar to other reports. Detailed information on bacterial species involved in CE and SE is essential for a targeted therapy or prevention in the future.

OC: 235

Relationship between body condition scores and ultrasound measurements of backfat thickness in Holstein dairy cows

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Objectives: The aim of the present study was to determine the relationship between body condition scores (BCS) and ultrasound measurements of backfat thickness (BFT) over different times of the lactation cycle.

Materials and Methods: This study was carried out as a field study and all animals originated from some dairy herds, where the body conditions were poorly managed in these farms, therefore the cows were selected randomly and classified according to their lactation stages into four different groups as close-up stage (3-1 week postpartum) (n = 295), early-lactation stage (3-5 weeks postpartum) (n = 293), and mid-lactation stage (15-18 weeks postpartum) (n = 312). The age and lactation numbers of animals ranged from 5 to 8 years and 3 to 6, respectively. All cows were different and housed in straw yards and fed a diet of grass and maize silage and concentrate. The BCS for each cow, at each time was evaluated using a scale of 1-5 with 0.25 increments. On the same day, ultrasound measurements of backfat thickness were obtained using a portable B-mode ultrasound generator with a linear transducer and a frequency of 5 MHz.

Results: During assessment of BCS, the bony structure of obese cows especially of spinous processes, hooks, and pin bone regions was not visually apparent. In contrast, the bony structure of thin cows was sharp and prominent. The ultrasound appearance of subcutaneous fat was hypoechoic and separated by a hypechoic strand representing superficial fascia. The correlations between BCS and BFT were evaluated for Holstein dairy cows at four different lactation stages, high correlations (r = 0.96 to 0.98) were verified between the two variables. Body condition score and BFT were strongly correlated at values from 2 to 4.5 units for BCS and from 10 to 35 mm for BFT, while they were less associated at values lower than 10 mm and 2 units of BFT and BCS respectively. In the four different groups, regression was evaluated. The regression was significant over all lactation stages (P < 0.001). It was assumed that body condition score was linearly and positively associated with BFT, increasing approximately 1 unit with every 10 mm of BFT.

Conclusions: It can be concluded that BCS is an easy, cheap, and reliable tool for herd health management and it may be as valid as BFT for estimation of subcutaneous fat over time in Holstein dairy cows.
OC: 236
Effects of a mycotoxin adsorbent applied with the diet to cattle being exposed to rice straw naturally contaminated with zearalenone
Takagi, M.; Takagi M.; Hasunuma H.; Uno S.; Kokushi E.; Matsumoto D.; Watanabe U.; Okamoto K.; Tischering C.; Deguchi E.; Fink-gremmel J.
Kagoshima University, Japan

Objectives: Zearalenone (ZEN), a nonsteroidal estrogenic mycotoxin produced by Fusarium spp. exhibit distinct estrogenic and anabolic properties in animals. In the series of our study, we reported that one cattle herd that showed significantly higher urinary ZEN concentrations than other herds, and that rice straw used in that herd was the likely source of the high urinary ZEN concentration (Hasunuma et al., 2012 in WBC). This study was subsequently conducted to evaluate the effects of a mycotoxin adsorbent (MA). To this end, we monitored the urinary ZEN concentrations along with the analysis of blood biochemical parameters.

Materials and Methods: One fattening Japanese Black cattle herd showing persistently high urinary ZEN concentrations due to naturally ZEN contaminated straw was considered for this study. Three groups of cows from the herd were assessed as follows; MA1 (n=6; MA was mixed with concentrates), MA2 (n=6; MA was top dressed on the concentrate) and control (n=4) without MA. The maximum recommended dose of MA was supplemented (twice a daily) for 2 weeks period. Both urine and blood samples were collected at the day of starting supplementation (D0), 2 weeks (Day14) and 5 weeks after (Day35) the supplementation of MA. Urinary ZEN concentration [pg/mg of creatinine (Crea)] were measured by ELISA, and effects of the MA supplementation were evaluated among the groups. Blood biochemical analysis was performed to monitor the hepatic, renal and the nutritional status as well as mineral intake.

Results: Significant differences of the urinary ZEN concentrations were observed between the MA supplied groups and the control group at Day14 (MA1, >30975; MA2, >17985, versus control, 52720 pg/mg of Crea) and at Day35 (MA1, >15951; MA2, >15062 vs control, >20555 pg/mg of Crea). In the blood parameter analysis, ∆-glutamyltransferase tended to be higher (P = 0.08) in the control group compared to that of MA1 at Day14 (M1; 52.9 U/l vs Control; 65.1 U/l), suggesting some hepatic dysfunction possibly related to high ZEN concentrations.

Conclusions: Based on this result of urinary ZEN monitoring, supplementation of MA to the ZEN contaminated diet may be beneficial in reducing ZEN absorption from cattle intestine; however, its effect may depend on the contamination level of mycotoxin of the herd and may have limitation in its preventive effect. Additionally, exposure to high levels of ZEN may possibly cause hepatic dysfunctions.

OC: 45
Clinical findings in lambs and sheepes following an intrauterine infection with Schmollenbergivirus (SVB) in Germany
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Objectives: From December 2011 on, mother sheep were presented at the clinic due to dystocia caused by malformed fetuses. Number of affected animals was even significantly increased in the first months 2012. Following thorough diagnostics of all known malformations and causes for abortions in sheep, an intrauterine infection with SVB was diagnosed by the Friedrich-Loeffler-Institute, Riems, Germany. Diagnostic approaches were forwarded to the local animal health services which resulted in a significant increase in diagnosed and verified cases of SVB as the reason for fetal malformation in sheep lambs. The aim of the present study was to characterize malformations induced by prenatal SVB infection in lambs to differentiate them from malformations due to other causes. Besides, clinical relevance for the lambing sheep should be evaluated.

Materials and Methods: From a total of 238 farms, 457 lambs that were suspicious for SVB infection due to their phenotype were examined by radiological, pathological, histological and microbiological means. Besides details of the breeding season were recorded and analysed in ten sheep farms.

Results: The following fetal malformations - which occur often simultaneously - are typical for prenatal SVB infections: torticollis (wryneck*), arthrogryposis, hydranencephaly, cerebellar hypoplasia or aplasia, brachygnathia inferior, lordosis, scoliosis and skull malformation. Only single, individual fetuses may be affected in case of twins or triplets and macroscopically normal lambs without any obvious malformations may show neurological symptoms congenital. Initially healthy neonates often die within the first week of life. Diseases and problems affected sheep suffer from are usually a consequence of dystocia (puerperal septicaemia/toxaemia due to prolonged and omitted parturition) or of injuries due to inadequate assistance at lambing (wombing of the uterus by hand). A direct effect

OC: 44
Schmollenberg Virus (SVB): Detection of a novel orthobunyavirus in cattle in Europe
Holsteg M., Heimberg P., Hoffmann B., Jungblut R., Schirrmieier H., Breilhaupt A., Beer M.

Objectives: In summer and autumn 2011, farmers and veterinarians in North Rhine-Westphalia (Germany) reported to the animal health services, the local diagnostic laboratories and the national research institutes that an unidentified disease was observed in dairy farms with a short period of clinical signs including fever and milk drop. All classical endemic and emerging viruses such as pestiviruses, bovine herpesvirus type 1, foot-and-mouth disease virus, bluetongue virus, epizootic hemorrhagic disease virus, Rift Valley fever virus or bovine ephemeral fever virus could be excluded as causative agents.

Materials and Methods: Blood samples from suspicious cattle were pooled and analysed with a metagenomics approach. The results suggested that the novel virus is a virus within the genus Orthobunyavirus. Members of this genus within the family Bunyaviridae are widely distributed in Asia, Africa and Oceania; transmission is predominantly through biting midges, mainly Culicoides spp. and mosquitoes. Especially the “Simbu serogroup”, comprising e.g. Akabane, Aino and Sharamoda virus, can play an important role as pathogens of ruminants. In a first animal trial 3 SBV-infected calves became PCR-positive between 2 and 5 days post infection.

Results: Clinical signs in cattle: Most of the naturally infected adult dairy cows showed mild clinical signs. Starting in September 2011, some cows showed fever > 40°C, milk loss of up to 50% - 80% and fatigue. For the duration of 3 to 4 days, the herd milk yield decreased by about 10%. In two serologically tested herds in North Rhine-Westphalia, 80% of the lactating cows (n=170) had antibody tiers against SVB. At later time points, congenital defects; newborns, stillbirth and abortion were observed. The first virus-positive calf with ataxia was born in the beginning of December. Most calves with neurological signs were SBV PCR-negative. The first calf with arthrogryposis (AG) was a twin calf born on the 14th of December 2011, but most calves with arthrogryposis, torticollis or scoliosis were born after the 15th of February 2012.

Conclusions: The clinical signs following an SBV-infection in adult cows are mild, but seem to be more visible than it has been reported for Akabane virus infections. However, the teratogenic potential seems to be very similar to the one reported for Akabane virus. Starting from the first SBV-positive cattle in the beginning of September 2011, the first calves with neurological signs were born 90 days later and most calves with AG were born 180 days later. Therefore, depending on the stage of pregnancy, different defects can occur. From day 70-100 of gestation, arthrogryposis should be expected, and from day 100-180 damages of the neurological system might be possible. Until now preliminary analyses suggest that only a low number of infected cows (probably < 2 %) gave birth to calves with AG or neurological disorders.

HOT TOPICS

OC: 236
Effects of a mycotoxin adsorbent applied with the diet to cattle being exposed to rice straw naturally contaminated with zearalenone
Takagi, M.; Takagi M.; Hasunuma H.; Uno S.; Kokushi E.; Matsumoto D.; Watanabe U.; Okamoto K.; Tischering C.; Deguchi E.; Fink-gremmel J.
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Objectives: Zearalenone (ZEN), a nonsteroidal estrogenic mycotoxin produced by Fusarium spp. exhibit distinct estrogenic and anabolic properties in animals. In the series of our study, we reported that one cattle herd that showed significantly higher urinary ZEN concentrations than other herds, and that rice straw used in that herd was the likely source of the high urinary ZEN concentration (Hasunuma et al., 2012 in WBC). This study was subsequently conducted to evaluate the effects of a mycotoxin adsorbent (MA). To this end, we monitored the urinary ZEN concentrations along with the analysis of blood biochemical parameters.

Materials and Methods: One fattening Japanese Black cattle herd showing persistently high urinary ZEN concentrations due to naturally ZEN contaminated straw was considered for this study. Three groups of cows from the herd were assessed as follows; MA1 (n=6; MA was mixed with concentrates), MA2 (n=6; MA was top dressed on the concentrate) and control (n=4) without MA. The maximum recommended dose of MA was supplemented (twice a daily) for 2 weeks period. Both urine and blood samples were collected at the day of starting supplementation (D0), 2 weeks (Day14) and 5 weeks after (Day35) the supplementation of MA. Urinary ZEN concentration [pg/mg of creatinine (Crea)] were measured by ELISA, and effects of the MA supplementation were evaluated among the groups. Blood biochemical analysis was performed to monitor the hepatic, renal and the nutritional status as well as mineral intake.

Results: Significant differences of the urinary ZEN concentrations were observed between the MA supplied groups and the control group at Day14 (MA1, >30975; MA2, >17985, versus control, 52720 pg/mg of Crea) and at Day35 (MA1, >15951; MA2, >15062 vs control, >20555 pg/mg of Crea). In the blood parameter analysis, ∆-glutamyltransferase tended to be higher (P = 0.08) in the control group compared to that of MA1 at Day14 (M1; 52.9 U/l vs Control; 65.1 U/l), suggesting some hepatic dysfunction possibly related to high ZEN concentrations.

Conclusions: Based on this result of urinary ZEN monitoring, supplementation of MA to the ZEN contaminated diet may be beneficial in reducing ZEN absorption from cattle intestine; however, its effect may depend on the contamination level of mycotoxin of the herd and may have limitation in its preventive effect. Additionally, exposure to high levels of ZEN may possibly cause hepatic dysfunctions.
of intrauterine SBV infection on the sheep at the time of parturition could not be proven up to date.

**OC: 46**

**Seroprevalence of antibodies to Schmallenberg virus in dairy cattle, winter 2011-2012, The Netherlands**

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**Objectives:** Since the autumn of 2011, infections with Schmallenberg virus (SBV) have been associated with congenital malformations in calves, lambs and goat-kids in at least eight European countries. In the Netherlands, there is an obligatory reporting of suspect cases (ocurrence of malformations of the arthrogryposis hydramnionencephaly syndrome) followed by confirmatory testing of brain tissue samples by RT-PCR. It is likely that observed suspect cases underestimate the true rate of infection

**Materials and Methods:** A seroprevalence study was executed to detect past exposure to SBV in dairy cattle in the Netherlands. Furthermore, in order to get some preliminary insight into the within-herd seroprevalence of infected herds (based on PCR test results), in two sheep flocks and two cattle herds a considerable number of animals were blood-sampled. The sampling frame comprised of dairy cattle that were blood sampled in the period November 2011 – January 2012 for monitoring-testing of antibodies to Bluetongue virus. Because we presumed a high intra-class correlation with respect to serological status of animals within the same herds, on average two dairy cattle from the same dairy herd were allowed in the sampling list. This selection procedure resulted in a total of 1,123 samples of dairy cattle from 489 dairy herds to be tested. The mean age of cows tested was 23 months (range: 12–79 months). Sera were tested for antibodies to SBV using a virus neutralisation test.

**Results:** SBV-seroprevalence in dairy cattle was 73% (95% CI: 70 – 75%). This indicates widespread exposure to SBV in 2011. SBV-seroprevalence of dairy cattle in the central-eastern part of the Netherlands (83%, 95% CI: 79 – 86%), was significantly higher compared to that in the northern (67%, 95% CI: 63 – 71%) and southern part of the Netherlands (61%, 95% CI: 54 – 68%). This could be an indication that introduction of SBV started somewhere in the eastern part of the Netherlands.

**Conclusions:** High (70-100%) within-herd seroprevalence was observed in the two SBV-infected sheep and dairy herds tested, indicating that by the end of an outbreak season, most of the animals within an affected herd might be infected. There were no significant differences in age-specific (cohorts: < 18 months; 18–24 months; > 24 months) prevalence of antibodies to SBV, which is an indication that SBV is newly arrived in the area. This is the first report of SBV-seroprevalence in cattle in Europe.

**OC: 47**

**Current View on the Availability of Antimicrobials in bovine veterinary medicine: the industry perspective**

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**Objectives:** The appropriate antimicrobial treatment and responsible use of antimicrobials has become a hot topic for the public, the regulators, veterinarians and the veterinary industry. Politicians get more concerned about potential threats for humans. In a joint approach, the European Commission has initiated a couple of measures that may influence the use and availability of antimicrobials in the future. Albiet all these activities, there is undoubtedly the need for the veterinarian to have options to treat animals with infectious disease. Restrictions were implemented for certain classes of antimicrobials and are expected for further classes. The author intends to give an update on the situation as present in spring 2012.

**Materials and Methods:** Initially voluntarily by some ethical animal health companies, label restrictions and warnings have now been implemented in the EU by the appropriate bodies for fluoroquinolones and 3rd and 4th generation cephalosporines. “Use of the product deviating from the instructions given in the SPC may increase the prevalence of bacteria resistant to the fluoroquinolones and may decrease the effectiveness of treatment with other quinolones due to the potential for cross resistance.” EMEA/CVMP/SAGAM/81730/2006-Rev.1 sets similar limitations for cephalosporines: For systemically administered broad spectrum cephalosporins it should be reflected that these are to be reserved for the treatment of clinical conditions which have responded poorly.

**Results:** Regulatory authorities currently discuss with industry the consequences for efficacy testing including the requirement to limit efficacy testing of these substances to the requirements of these limitations of use. New classes of antimicrobials are not expected to be licensed in the near future, unless they are narrow spectrum and do not compete with any human use of such antimicrobials.

**Conclusions:** The climate for the registration and use of antimicrobials in animals is discouraging. Although the need of antimicrobials for the treatment of bovine infectious disease is well perceived and, regarding target animal and consumer safety, well controlled, the discussion on antimicrobial resistance issues is a high topic at all levels of production and control. There appears to be a high risk of over-regulation, finally stopping any innovation in the development of innovative antimicrobials in Europe.
IMMUNOLOGY

OC: 56
Intracellular reactive oxygen species production by milk polymorphonuclear leukocytes in healthy cows with different lactation stages
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Objectives: The present study aimed to evaluate the intracellular ROS by milk PMNLs from healthy Holstein dairy cows with different lactation stages.

Materials and Methods: We used 61 bacteriologically negative milk samples from quarters with milk somatic cell count (MSCC) lower than 2 x 105 cells/ml divided as follow: 27 milk samples in the early lactation (90 days), 11 milk samples in the midlactating (180 days) and 23 milk samples in the end of lactation (270 days). The MSCC was performed using an automatic cell counter by the Fossomatic method. The PMNLs were identified using the monoclonal antibody CH138 and the APC secondary antibody by flow cytometry. The intracellular ROS production by PMNLs was performed using the 2′,7′-dichlorofluorescein diacetate as a probe by flow cytometry.

Results: The percentage of PMNLs (CH138+ cells) was higher in the end of lactation (16.20 + 14.65%) compared to the early lactation (9.34 + 11.74%) (P = 0.16). The percentage of PMNLs that produce ROS was higher at the midlactating (65.94 + 18.41) and the end of lactation (65.43 + 20.16) compared to the early lactation (33.40 + 15.63) (P = 0.0001). Moreover, the intensity of ROS production by PMNLs was higher in the midlactating (2093 + 674.9) compared to the end of lactation (1293 + 412) (P = 0.01), although no difference was found among the early lactation (1588 + 863.7) and the other stages of lactation.

Conclusions: In face of, the microbicidal activity of PMNLs from different stages of lactation may be related to periods of higher susceptibility to intramammary infections during lactation cycle.

OC: 57
Influence of colostrum sucking in the lymphocyte subpopulations in the blood of neonate calves until 10 days of age
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Objectives: This study evaluated the influence of colostrum sucking in lymphocyte subpopulations in the blood of neonate calves until 10 days of age.

Materials and Methods: In order to achieve this aim, blood samples were collected in tubes containing heparin, and sent to the laboratory under refrigeration. Blood was collected in the following intervals: T0 – before colostrum intake; T1 – 1 to 2 days after birth (a,b), T2 - 5 to 6 days a,b, and T3 – 9 to 10 days a.b. After that, samples were lysed twice using hypotonic saline solution. Phenotyping was carried out by flow cytometry. Initially, lymphocytes were selected by size and granularity in the SSC X FSC graph. After that, subpopulations were identified by antibody expression.

Results: Results presented parametric distribution in the Kolmogorov-Smirnov test, and variance analysis was carried out. Significance between differences was determined by Tukey test. Proportion (%) of lymphocytes (LT) selected represented 6.47±2.82; 5.18±3.18; 6.23±4.99; and 8.77±3.57 (P=0.1445), respectively, at T0, T1, T2 and T3. From this population, the following proportions of LT CD3+ were observed: 63.97±27.20; 70.01±25.20; 72.43±24.53; 87.53±6.88 (P=0.1091); of LT CD3+ CD4+: 22.40±22.15; 6.78±6.71; 15.13±31.93; 2.68±3.65 (P=0.1965); and LT CD3+ CD8+: 11.46±18.42; 4.06±9.76; 2.41±3.11; 0.22±0.38 (P=0.1420), respectively, at T0, T1, T2 and T3. The proportions of CD21+ lymphocytes at T0, T1, T2 and T3 were 9.93±3.46; 10.03±3.40; 9.70±5.31; 9.31±5.22 (P=0.9698).

Conclusions: There was predominance in CD3+ lymphocytes in relation to CD21+. Besides, there was a greater proportion of LT CD4+ than CD8+, raising the suspicion that cell-mediated immune response is more important for neonate defense than humoral immune response. However, colostrum sucking did not influence the proportion of lymphocytes until the 10th day of life. The small proportion of B lymphocytes in this phase may contribute to the susceptibility of the calves to neonatal diseases, mainly those caused by extracellular microorganisms, which may be exacerbated by hypogammaglobulinemia.

OC: 58
Assessment of different sampling procedures to estimate the Immunoglobulin G content of colostrum in dairy cattle
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Objectives: The aim of the study was (i) to assess the influence of different colostrum sampling procedures on the assessment of IgG content and (ii) to evaluate the influence of controlling both distribution timing and colostrum quantity on the rate of passive transfer.

Materials and Methods: To assess the influence of the type of sample, colostrums from each quarter and a composite sample (mix of 4 quarters) were concomitantly collected after calving from 78 Holstein dairy cows. To assess the variation of IgG content during the first milking, 9 cows were also sampled every minute from the start of the milking. All these samples were tested using IQR. Between 2009 and 2010, colostrum administration was modified from no systematic control of colostrum intake to systematic records during the first 2 hours after birth. Calves were allowed to receive a maximum amount of 4 liters. The rate of passive transfer was investigated based on IgG content in the calves sera 48 hours after birth and the IgG content of the colostrums of their dams were also investigated (83 cows-70 calves in 2009 and 84 cows-79 calves in 2010). Qualitative and quantitative results were analysed using Student-Newmann-Keuls test.

Results: Regardless the threshold of IgG content to consider a colostrum to be good enough, the sensitivity and the specificity were similar regardless the type of sample (individual quarter or composite milk). The mean IgG content of hindquarters (56.3 g/L) was significantly higher than the value of forequarters (53.7 g/L) for a mean value of composite colostrum of 54.7 g/L. The IgG content in the colostrum did not change significantly during milking. The small variations observed were more likely due to the laboratory method (CV 15% also). Lastly, for similar IgG content in the colostrums of the dams in 2009 and 2010, mean IgG content in the sera of the calves increased from 10,1 g/L (just above the cut-off value to consider failure of passive transfer) in 2009 to 12.5 g/L in 2010. The spontaneous intake of the calves in 2010 varied from 0,2 to 4 liters in the first two hours (30% of calves above 3 liters intake).

Conclusions: The assessment of the colostrum quality can be performed either on individual of composite colostrums sample collected at any time of the first milking, without affecting the reliability of the measure. Given the spontaneous intake of colostrums of the calves, it should be recommended to give 2 to 4 liters in the two first hours after birth, preferably collected for the hind quarters.

OC: 59
A randomised, blinded and controlled trial, to investigate immunoglobulin uptake in neonatal calves fed colostrum supplemented with rennin (chymosin)
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Objectives: Failure of passive transfer is common in dairy calves and is associated with an increase in calf disease morbidity and mortality rates. The ingestion of colostrum by the calf followed by clot formation in the abomasum with the release of immunoglobulin rich whey into the small intestine is an important process in ensuring high serum globulin concentrations are at-
tained. The objective of this study was to determine whether the addition of rennin to colostrum feeds in neonatal dairy calves would result in the elevation of serum globulin concentrations.

**Materials and Methods:** The study was performed on a commercial 700 cow Holstein feedlot dairy farm in August 2011. As part of the Johnie’s control programme calves on this farm are removed as soon as practically possible after birth from their dam. They are given 3 feeds of colostrum by bottle and teat within 12 hours of separation from the dam. Twenty six calves were randomly allocated to one of two groups. All participants in the study were blinded to the identification of the groups. The protocol for the control group consisted of the addition of 1 ml of normal saline to each feed followed by mixing before allowing the calf to drink. The treatment group was identical apart from the addition of 1 ml of vegetarian rennin solution (200MCU/ml) instead of normal saline. The rennin solution consisted rennin dissolved in normal saline. A blood sample was taken by vein puncture of the jugular vein 48-72 hours after the separation from the dam. Serum globulin concentrations were computed from the difference between the serum total proteins and albumin concentrations. These were determined by automated blood biochemical analyser.

**Results:** The results were analysed using an unpaired t-test to compare the means. The calves with the rennin supplementation had a mean serum globulin concentration of 29.27 g/l (SD 10.13) and the calves without the rennin supplementation had a mean serum concentration of 25.54 g/l (SD 6.53). The treatment group with rennin supplementation did not have a significantly higher serum globulin concentration (p=0.13).

**Conclusions:** The power of the study was too low to demonstrate a statistically significant difference between the treatment and control group although there was a 14% increase in the mean serum globulin concentration when colostrum was supplemented with rennin. Vegetarian rennin is used in the cheese making industry. It is readily available and inexpensive. It can be stored for up to 12 months if refrigerated.

**OC: 166**

**Time to onset of protective immunity from an intranasal challenge with Bovine Herpes Virus 1 in young calves after administration of a modified live, non-adjuvanted vaccine**

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**Objectives:** To determine if subcutaneous administration of a pentavalent, modified live, non-adjuvanted vaccine containing Bovine Herpes Virus 1 (BHV-1) at five, three, or two days pre-challenge, would reduce clinical signs, rectal temperatures, and viral shedding, and enhance serological response of BHV-1.

**Materials and Methods:** Colostrum deprived, 8-20 day old Holstein bull calves (n = 48) were randomly assigned to six treatment groups, each containing eight calves. Treatment groups were based on subcutaneous administration of a commercial vaccine (Vaccinates) or saline (Controls) and also by day of administration (Day -5, -3 or -2) relative to intranasal BHV-1 challenge (Day 0). Following challenge, calves were monitored for clinical signs, rectal temperatures, seroconversion, and quantity of BHV-1 recovered by virus isolation (VI) from nasal swabs. Data for the evaluation period (days 4-14) were analyzed using multivariate statistics.

**Results:** Results - Day -5 and -3 Vaccinate groups had fewer (P < 0.05) days of clinical illness compared to Controls. Mean rectal temperatures were lower (P < 0.05) during Days 4-8 for all Vaccinate groups as compared to Controls. Controls shed BHV-1 for more days than calves vaccinated on Day -5 (P < 0.01), Day -3 (P = 0.06), and Day -2 (P = 0.06). Mean concentrations of nasal BHV-1 (VI) also differed (P < 0.05) between Controls and all Vaccinate groups during at least one study day. Vaccinates (median = 10 days) seroconverted to BHV-1 (P < 0.01) sooner than Controls (median = 14 days).

**Conclusions:** This study demonstrated that the subcutaneous use of a pentavalent, non-adjuvanted, modified live vaccine in neonatal calves can reduce the effects of BHV-1 challenge as soon as 2 days post vaccination (reduction of rectal temperatures) and reduce clinical signs as soon as three days post vaccination. The Vaccinates seroconverted more quickly, and all vaccinated groups shed less BHV-1 virus than the Controls. The clinical significance of this rapid vaccine response is that there may be early beneficial immunity offered by use of this subcutaneous MLV vaccine administered to clinically normal animals early in a respiratory outbreak.

**OC: 167**

**Efficacy of a new attenuated IBR live vaccine with double genetic deletion ge-/tk- in front of experimental BoHV1 infections. Four trials assaying minimum dose**

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**Objectives:** To test the efficacy of a new double deleted (ge-/tk-) live attenuated IBR vaccine (Hiprabovis IBR Marker Live, HIPRA), vaccinating with 2 minimum doses (10exp6.3 CCID50/calf) 21 days apart and challenging with a virulent BoHV-1 strain.

**Materials and Methods:** Vaccination scheme: Trial 1 (basic vaccination scheme): 5 seronegative vaccinated calves + 5 seronegative mock-vaccinated control calves Trial 2 (duration of immunity): 4 seronegative vaccinated calves + 4 seronegative mock-vaccinated control calves Trial 3 (booster dose): 5 seronegative vaccinated calves + 5 seronegative mock-vaccinated control calves Trial 4 (influence of maternally derived antibodies): 5 seronegative vaccinated calves + 5 seropositive vaccinated calves + 5 seropositive mock-vaccinated control calves Challenge scheme (10exp7 CCID50/calf, intranasal, BoHV-1 Iowa strain) Trial 1: 21 days post-vaccination Trial 2: 6 months post-vaccination Trial 3: 1 year post-vaccination (6 months after booster) Trial 4: when the seropositive control group got seronegative Follow-up after infection for all trials: monitoring for 21 days for clinical signs (general and respiratory) - rectal temperatures - viral nasal shedding.

**Results:** Trial 1 – Great, significant reduction in: respiratory and general clinical signs (72% reduction), increase in body temperature, and viral excretion after challenge (5 days shorter). Trial 2 - Still a clear, significant reduction in: clinical signs (48%), increase in body temperature, and viral excretion (5 days shorter) after challenge 6 months after vaccination. Trial 3 - Clear effect of the booster dose with results similar to the previous trial: significant reduction in: clinical signs, increase in body temperature, and viral excretion after challenge 4-6 days shorter), despite the presence or not of maternally derived antibodies at the time of vaccination.

**Conclusions:** - The efficacy of a new double deleted (ge-/tk-) attenuated live IBR vaccine (Hiprabovis IBR Marker Live, HIPRA) was demonstrated up to 6 months after the vaccination scheme was completed and up to 6 months after the booster dose. - The vaccine was also efficacious in the presence of maternally derived antibodies.

**OC: 168**

**Effect of pre-weaning concentrate supplementation on peripheral distribution of leukocytes, functional activity of neutrophils, acute phase protein and behavioural responses of abruptly weaned and housed beef calves**

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**Objectives:** Within seasonal, grassland-based suckler beef production systems in Ireland, calves are generally spring-born and reared with their dam at pasture for approximately 8 months until the end of the grazing season in autumn when they are weaned. The objectives of the study were to examine the effects of offering concentrate supplementation to beef calves (CS) for 26 days prior to abrupt weaning and housing on (i) peripheral distribution of leukocytes, (ii) functional activities of neutrophils, (iii) acute phase protein response and (iv) behavioural responses compared with calves that were not offered concentrate supplementation (NCS) prior to weaning.
Materials and Methods: Calves were grazed with their dams until the end of the grazing season when they were weaned and housed (day (d) 0) in a concrete slatted floor shed, and offered grass silage ad libitum plus supplementary concentrates. Twenty-six days prior to weaning and housing, 20 single suckled, pure-bred Simmental male (non-castrated), (n=10, m) and female (n=10, f) calves were assigned to one of two treatments (i) concentrate supplement (CS: n=10 (5 m and 5 f), mean age (s.d.) 201 (12.8) d, mean weight (s.d.) 258 (20.2) kg) or (ii) no concentrate supplement (controls) (NCS: n=10 (5 m and 5 f), mean age (s.d.) 201 (13.4) d, mean weight (s.d.) 257 (19.6) kg) pre-weaning.

Results: There was a treatment x sampling time interaction (P<0.05) for percentage CD4+ and WC1+ lymphocytes. On d 2, percentage CD4+ lymphocytes decreased (P<0.001) in both treatments. Subsequently on d 7, percentage of CD4+ lymphocytes increased (P<0.01) in CS compared with d 0, whereas percentage of CD4+ lymphocytes in NCS did not differ (P>0.05) from d 0. On d 2, WC1+ lymphocytes decreased (P<0.05) in both treatments but the decrease was greater (P<0.05) in NCS than CS. Subsequently, percentages did not differ (P>0.05) from pre-weaning baseline. Concentration of haptoglobin increased post-weaning, however significant differences were not realised (P>0.05) between supplemented and non-supplemented calves. Pre-weaning average daily gain (ADG) was 1.07 (s.e.) (0.26) kg and 0.99 (s.e.) (0.26) kg for supplemented calves. Pre-weaning average daily gain (ADG) was 1.07 (s.e.) (0.26) kg and 0.99 (s.e.) (0.26) kg for CS and NCS, respectively. Post-weaning, CS calves spent more time (P<0.05) lying compared with NCS calves.

Conclusions: Calves supplemented with concentrate prior to weaning had a lesser reduction in WC1+ lymphocytes, increased percentage CD4+ lymphocytes and concentration of total protein, and spent more time lying post-weaning, compared with non-supplemented calves.

OC: 169
Calf bronchopneumonia is accompanied by increased sialylation of immune complexes’ IgG
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Objectives: Enzootic calf bronchopneumonia (ECB) is a multifactorial disease that occurs as a result of the interaction of different infectious agents and calves’ immune system. The infectious agents associated with ECB are ubiquitous, and it is not completely clear why calves’ immune system is not able to adequately respond to pathogens. In humans, immune complexes (IC) are elevated in bronchopneumonia. IC are strong activators of complement and neutrophils and they can be responsible for both, protection from disease and pulmonary damage. IgG, as constituents of IC, are initiators of effector phase of immune response. Structural characteristics of these IgG molecules in pre-ruminant calves are not studied in detail. It is known that sialic glycan expressed on IgG modulate affinity to antigen and effector function. In this work we analyzed glycosylation profile of IgG from circulating IC of calves with ECB in order to determine whether their glycosylation profile differed from healthy control.

Materials and Methods: Three months old healthy calves and calves with clinical signs of ECB were included in the study. IC from calves’ sera were isolated by polyethylene glycol precipitation methods. IC IgG were isolated by Protein G affinity method. The expression of sialic acid, galactose, N-acetyl-glucosamine and fucose on isolated IgG was determined by lectin blot assay.

Results: ECB was followed by increasing of circulating IC level. IgG were found in IC of both, healthy and diseased calves. Heavy chains of IgG from healthy calves expressed N-acetylglucosamine, galactose, sialic acid, and fucose. Galactose was not detected on light chains. In diseased animals, galactose was detected on light chains, and both heavy and light chains were more heavily sialylated. Proteins in complex with IgG were also lectins reactive, and their glycosylation in infected animals was different compared to healthy controls.

Conclusions: The increased sialylation is a characteristic of anti-inflammatory IgG. The increased sialylation of circulating IC IgG from calves with ECB might be responsible for protection of tissues of against damages provoked by activated immune cells and secreted pro-inflammatory cytokines, and possible development of autoimmune reactions. At the same time, the increased IgG sialylation could explain the inability of calves’ immune system to initiate the process of antigen elimination by activation of Receptors and complement.

OC: 170
Initial host signals at the onset of mastitis in the teat and lobuloalveolar parenchyma
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Objectives: Staphylococcus aureus (S. aureus) and Escherichia coli (E. coli) are among the most important mastitis-causing agents, they do however mostly induce very different clinical patterns. E. coli mostly causes transient acute clinical mastitis, whereas intramammary S. aureus infections elicit subclinical inflammation and persistent infections. Mastitis research during the last decades closely examined the pathophysiology of the infected udder. Initial events after pathogen perception have not been examined in vivo up until now. The aim of this study was to establish an animal model to simulate the first 3 h after intramammary invasion of E. coli and S. aureus.

Materials and Methods: The main focus was laid on the examination of changes in the expression profiles of selected candidate-genes by qRT-PCR after short-time exposure to the pathogens in teat and lobuloalveolar parenchyma of the udder. Three of four quarters per animal were sequentially inoculated with either 5*10^6 CFU E. coli (n=6) or S. aureus (n=6) for 1, 2 and 3 h.

Results: It was found that E. coli induced a much stronger and more homogenous up-regulation of mRNA transcripts for the examined genes, while S. aureus elicited a weaker and to some extent retarded response. After 1 h of pathogen presence an increase in the expression of several genes could already be observed. This was true for the chemokines CCL20 and CXCL8, which were massively and sustainably up-regulated 1 h after inoculation of E. coli and S. aureus. The cytokines IL-6 and TNF-a were also strongly induced 1 h after intramammary inoculation of E. coli, while S. aureus inoculation only triggered a comparatively low regulation 2 h from pathogen-exposure on. The antimicrobial effector molecules S100A9 and LAP were only regulated after exposition with S. aureus and appeared to be downstream regulated genes compared to the mentioned chemokines and cytokines. In addition an invariantly stronger induction of examined genes could be observed in distal compartments of the udder (teat/gland cistern) compared to lobuloalveolar parenchyma.

Conclusions: By establishing a novel short-term mastitis model we were able to show for the first time early pathogen-specific and compartment-dependent regulation of immune-relevant genes in dairy cows. In the long run this shall clarify which mechanisms in host and pathogen lead to the development of acute and chronic mastitis and which factors may support or prevent infections of the mammary gland. Funded by Deutsche Forschungsgemeinschaft (FOR585)

OC: 171
Analysis of cellular and immune responses of dairy cows induced by intramammary infusion of lactic acid bacteria and therapeutic trials to quarters of cows with mastitis
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Objectives: Development of alternative therapeutic approaches to antibiotics is of increasing concern for control of mastitis. The objective of the study was to characterize the cellular and immune responses of mammary gland by intramammary infusion of lactic acid bacteria (LAB) in cows, and to evaluate the therapeutic effects of intramammary infusion of LAB to lactating cows with mastitis.

Materials and Methods: Twelve Holstein cows were used for analysis of cellular and immunological effects of LAB: Lactococcus spp. and Bifidobacterium spp. Thirty-two cows with subclinical mastitis were used for evaluation of therapeutic effects of Bifidobacterium spp. on bacteriological cure rates. Milk samples were collected from control and infected quarters prior to...
infusion and 24,28,72,96,120,168 hr and 14 days post LAB infusion. to evaluate the cellular and immunological responses of infused quarters, somatic cell counts (SCC), electrical conductivity (EC), NAGase activity, bacteria counts, lactoferrin (LF), IgG and A in milk were measured. Chemiluminescence response in milk and cytokine mRNA (IL-18,TNF-a, IL-6) on leukocytes from infused quarters were evaluated.

Results: Significant changes in SCC, EC, NAGase activity were found at 24-48 hr post infusion and their values decreased to pre-infused levels at 168 hr post infusion. Ten to 30 fold increases in SCC, largely neutrophiles, were found in milk from quarters at 24-48 hr post infusion. Significantly increased concentrations of LF, IgG and IgA, were found in milk from infused quarters at 24-96 hr post infusion. Increased mRNA expression of cytokines IL-18,TNF-a, IL-8 on milk leukocytes were found at 24-72 hr after infusion. The therapeutic trials of intramammary infusion of LAB were evaluated in dairy cows with mastitis: bacteriological cure rates (judged as <300cfu/ml) were measured from >115.5x10^4cells/ml to <16.6x10^4cells/ml at 14 days post infusion.

Conclusions: Intramammary infusion of LAB to quarters leads to a marked cellular and immune responses in mammary gland. The intramammary infusion of LAB may prove to be a possible approach for non-antibiotic treatment for mastitis.

OC: 172

Phagocytosis of Staphylococcus aureus by milk polymorphonuclear leukocytes CH138+ in healthy cows with different lactation stages
Blagitz Garcia, M.; Souza Nogueira F.; Batista Freitas C.; Santos Parapinski B.; Parra Cristina A.; Azvedo Fernandes L.; Gomes V.; Della Libera Maria Melville Paiva A.
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Objectives: The present study aimed to evaluate the phagocytosis of Staphylococcus aureus by milk PMNLs CH138+ from healthy Holstein dairy cows with different lactation stages.

Materials and Methods: We used 61 bacteriologically negative milk samples from quarters with milk somatic cell count lower than 2 x 105 cells/mL divided as follow: 27 milk samples in the early lactation (90 days), 11 milk samples in the midlactating (180 days) and 23 milk samples in the last third of lactation (270 days). The milk somatic cell count was performed using an automatic cell counter by the Fossomatic method. The PMNLs were identified using the monoclonal antibody CH138 and the APC secondary antibody by flow cytometry. The phagocytosis function was assessed by iodidium propidium labelled S. aureus by flow cytometry.

Results: The percentage of PMNLs that phagocytosed S. aureus was higher in the midlactation (70.15 + 9.43%) than in the early (48.57 + 17.52%) and in the end of lactation (54.02 + 17.48%) (P = 0.002). A tendency toward a higher intensity of phagocytosis (number of S. aureus phagocytosed by each PMNLs) among the early (196.5 + 104.7) (P = 0.06) and the middle (194.8 + 72.2) (P = 0.052) of lactation compared to the end of lactation (145.9 + 67.2) was observed.

Conclusions: In face of, changes in the phagocytosis function of PMNLs from different stages of lactation may contributed to periods of higher susceptibility to intramammary infections by S. aureus during lactation cycle.

OC: 173

Genetic regulation of the bovine immune system and its practical application in dairy health management
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Objectives: To identify and rank dairy cattle as high, average or low immune responders using a University of Guelph patented testing protocol. To evaluate health and productivity of animals with these diverse phenotypes. To use DNA to determine if unique SNPs patterns are associated with the various immune response phenotypes in Canadian and US dairy herds.

Materials and Methods: Dairy cattle (cows, calves and sires) are immunized using type 1 and type 2 test antigens according to a University of Guelph patented test system. Antibody and cell-mediated immune responses are determined by ELISA and cutaneous response, respectively. Breeding values of immune response traits are determined based on phenotypic and pedigree information. Animals are ranked using estimated breeding values as high, average or low immune responders. Health and production information is correlated with immune response rank using SAS models. FACS is used to evaluate leukocyte populations. DNA is collected from hair follicles and run on the Illumina 50K SNP chip to evaluate any patterns associated with the high, average or low immune responder profiles.

Results: Dairy cows, calves and bulls were successfully ranked as high, average or low immune responders using the University of Guelph (Ontario, Canada) patented test protocol. Individuals with both higher and optimally balanced antibody (AMIR) and cell-mediated immune responses (CMIR), are referred to as High Immune Responders, and the method of testing is referred to as the High Immune Response (HIR) technology. Heritability (h2) estimates for AMIR and CMIR used in the HIR testing are ~25% allowing for improvement via genetic selection. Most importantly the data demonstrates, health and production benefits of the High Immune Responders including lower occurrence of mastitis, metritis and retained placenta, as well as improved response to vaccination and colostrum quality. Additionally, High AMIR responders have more B-cells and High CMIR responders having greater proportions of specific T-cell subsets, including gamma-delta T-cells. The results of the Illumina SNP chip analysis is still pending.

Conclusions: Identifying dairy cows with superior breeding values for immune response (IR) traits has the potential to reduce disease, increase farm profit, improve milk quality and increase animal well-being. In Canada, it can cost the dairy producer as much as $320 to treat a single case of mastitis, and 1 out of every 5 dairy quarters in Canada is infected with a mastitis-causing pathogen at any given time. Therefore in keeping with the European Unions’ proactive thinking that “prevention is better than cure”, genetic methods to identify animals at lower risk of disease are being deliberately sought. One of the most appealing options available is to take advantage of the animal’s own immunogenetic potential by selecting the healthiest animals with the most robust immune system. To this end, we have identified and ranked dairy cows, calves and bulls as high, average or low immune responders. Animals classified as High Immune Responders have the lowest occurrence of disease. This approach is ideal for both conventional and organic dairy farms since it does not involve GMo and reduces the use of on-farm disease treatments.

OC: 174

Bovine neonatal pancytopenia is linked to vaccine-induced allo-antibodies against bovine leukocyte antigen (BoLA) major histocompatibility (MHC) class I
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Objectives: Since 2007, a hemorrhagic syndrome due to thrombocytopenia and designated as bovine neonatal pancytopenia (BNP) has been recognized in calves in several European countries. An inactivated BVDV vaccine is strongly suspected to induce development of the disease due to its highly frequent use in the dams of affected calves. Similarities are found with foetal/neonatal allo-immune thrombocytopenia (FNAIT) in human neonates, where allo-antibodies against platelet antigens lead to destruction of platelets and haemorrhage. The purpose of this study is i) to determine the role of allo-antibodies for inducing thrombocytopenia and hemorrhagic signs in neonatal calves, ii) to further identify the allo-response specificity, and iii) to solve questions about the BNP aetiology.

Materials and Methods: For the production of experimental BNP, immunoglobulin G (IgG) was purified from the sera of BNP dams and injected into neonatal healthy calves. IgG specificity was examined by flow cytometry on calf blood and bone-marrow cells. Immuno-precipitation by pathogenic IgG and peptide fingerprinting by nano-liquid chromatography coupled to mass spectrometry were used to identify the target protein. Frequency of allo-response and predisposing factors are further investigated.
OC: 175

Bovine Neonatal Pancytopenia: Is this alloimmune syndrome caused by vaccine-induced alloreactive antibodies?

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Objectives: Bovine neonatal pancytopenia (BVP) is a new emerging disease observed since 2007 in Germany and neighbouring countries. The syndrome affects newborn calves and is characterized by pancytopenia, severe bleeding and high lethality. So far, a causative role of infectious or toxic agents has been ruled out. Instead, the syndrome is induced after ingestion of colostrum, the first milk that supplies the calf with maternal antibodies. In analogy to similar diseases in humans it has therefore been postulated that BVP is caused by alloreactive, maternal antibodies. There is a striking association between BVP and the previous vaccination of the respective dams with PregSure®BV, a vaccine against Bovine Virus Diarrhoea (BVD). This association has led to a suspension of the marketing authorisation for the vaccine, by the European Commission. The current study investigates the role of this vaccine in the pathogenesis of BVP.

Materials and Methods: Sera were obtained from BVP dams (dams that gave birth to a BVP calf) and controls that had been vaccinated with different commercially available BVD vaccines and tested by flowcytometry.

Results: We were able to demonstrate that sera of BVP dams harbour alloreactive antibodies binding to surface antigens on bovine leukocytes. A significantly weaker alloreactivity was observed with sera of non-BVP dams that have been vaccinated with PregSure®BV but delivered healthy calves. No binding was seen with non-BVD-vaccinated control cows and animals that were vaccinated with other inactivated BVD vaccines so far not associated with BVP. To test whether the vaccine induces alloreactive antibodies two strategies were employed: Guinea pigs were vaccinated with a panel of commercially available BVD-vaccines. Only PregSure®BV induced antibodies binding surface antigens on bovine leukocytes. Additionally, calves were repeatedly vaccinated with the suspected vaccine and the development of alloreactivity was monitored. In dependence of the number of booster immunizations the induction of alloreactive antibodies could be observed. Finally, by affinity purification we were able to directly demonstrate that BVP associated alloantibodies cross react with the bovine kidney cell line used for vaccine production.

Conclusions: Together our results provide strong evidence that PregSure®BV has the potential to induce BVD associated alloantibodies.

OC: 176

Efficacy of a modified-live virus vaccine in 3 day old calves, with maternal antibodies, against strain 1373 bovine viral diarrhea virus challenge 7 months post vaccination

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Objectives: Objective – To determine the efficacy of using a non adjuvanted, pentavalent, modified live vaccine, given to 3 day old Holstein calves in the face of maternal antibodies, against a challenge at 7 months of age with strain 1373 BVD virus.

Materials and Methods: Materials and Methods – Holstein bull calves (n=26) from a commercial dairy were randomized by birth order prior to study. These non-suckled calves received 2.3L of pooled colostrum, containing 110 g of IgG with 1.3200 BVDV Type 1 and 1.1600 BVDV Type 2 antibodies (collected from another commercial herd) within 12 hours of birth. They were also ear notched for presence of BVDV (IHC). All calves were tested for presence of maternal antibodies. At 3 days of age all calves were either subcutaneously vaccinated (n=15) with a single dose of a non-adjuvanted, pentavalent, modified live vaccine containing BHV-1, BRSV, BVDV1a, BVDV-2, PI-3 or sham vaccinated subcutaneously with sterile saline (n=11). At approximately seven months post-vaccination, when vaccines and non-vaccines were seronegative to BVDV1a and BVDV2a (titers = 1:2), all calves were intranasally challenged with strain 1373 BVDV2a. Clinical signs common for BVD infection were monitored beginning 3 days prior to challenge and concluded 21 days post challenge.

Results: Results – No adverse vaccine reactions were noticed in any of the study calves, no calves were positive for BVDV (by IHC) prior to the study, and all calves showed presence of maternal antibodies. Calves that were vaccinated were less impacted by the challenge compared to the saline controls. Based on clinical parameters, vaccines had statistically significant reduction in clinical scores (P = 0.01), mean rectal temperatures (P = 0.05), and weight loss (P = 0.05) compared to sham vaccinated animals. A large difference in mortality was noted as 7/11 controls died compared to 3/15 vaccinates, with laboratory diagnosis confirming all mortality was consistent with BVDV. Further evidence that protection was conferred was based on hematological parameters. Specifically, vaccinated animals experienced less white blood cell suppression (P = 0.05) and fewer viereic animals (P = 0.01) than sham vaccinated animals.

Conclusions: Conclusion – This study demonstrated that a calf as young as three-days of age, when vaccinated once with this non-adjuvanted, modified live, pentavalent vaccine in the face of maternal antibodies, can be protected for at least 7 months against a virulent BVDV2a challenge.

OC: 60

BoHV2 is associated with epidemiologically non-feasible BoHV1-singleton reactors

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Objectives: Bavaria expects BoHV1-s – 2nd-gen-status (64/432/EC) in 2011. Surveillance of BoHV1-free dairy cattle farms is performed with quarterly bulk-milk (BM) testing and confirmation of non-negative results by blood tests. An increased regional rate of non-negative BM samples and the subsequent detection of epidemiologically non-feasible BoHV1-singleton reactors (BoHV1-SR) were observed in southwest Bavaria. Preliminary data from Interferon-γ-tests using antigens from BoHV1, BoHV2, BoHV4, CapHV1, EVH1 and FeHV1 indicated a possible involvement of BoHV2.

Materials and Methods: Nineteen case farms (734 animals) defined by BoHV1-SR, 23 negative control (NC I) farms (321 animals) from the same region, 11 farms (NC II: 423 animals) from an already-certified Article 10 region in northeast Bavaria and two BoHV1-infected farms (264 animals) were analysed using BoHV1-, BoHV2- and FeHV1-neutrallisation tests (NT), the CHEKIT Trachtest 2nd Gen test for milk/serum, and Herdchech QB - and gE-E-LISAs. Individual milk samples from BoHV1-SR (n = 56) and BoHV1-infected (n = 39) animals were titrated in CHEKIT Trachtest 2nd Gen in order to simulate BM-testing.

Results: Prevalence of positive animals in two BoHV1-infected farms was 83%. In contrast, 1-3 BoHV1-SR/herd were detected in 89% BM + farms with BoHV1-SRs. The rate of BoHV2-NT+ animals in case farms was significantly
higher than in NC I. NCL II farms were negative in BoHV2-N2. BoHV2-N2+ animals showed increased reactivity by Herdcheck bG and the CHEKIT Trachtest 2nd Gen and the risk to be positive was significantly higher. BoHV1-SR tested negative by eG-ELISA even if an elevated cut-off of 0.95 +/- 0.05 was applied. At this cut-off eG-ELISA is as sensitive as bG-ELISA (ROC analysis on BoHV2-N2 animals). Comparative titration of milk samples revealed that the slopes of BoHV1-infected animals and BoHV1-SR were distinct.

Conclusions: A regionally increased rate of BoHV2-infection in the south-west of Bavaria is at least one risk factor for BoHV1-SR. Economic losses due to prolonged animal hold orders due to BoHV1-SR might be reduced by (1) assessment of epidemiological feasibility of results and (2) retesting BoHV1-SR by eG-ELISA with an increased cut-off. Regarding BM surveillance an elevated cut-off to exclude BoHV2 cross-reactivity seems reasonable. Firstly, imported animals are controlled for latency and secondly, BoHV1 re-infection results in high serorelevance which is easily detected. However, current practice of quarterly BM-sampling facilitates BoHV1-detection.

OC: 61
A new diagnostic tool for bovine tuberculosis - IDEXX M. bovis Antibody Test Kit
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Objectives: The IDEXX M. bovis antibody test kit is an ELISA designed to detect the presence of antibody to M. bovis in bovine serum and plasma samples. This test could improve bTB detection of TB-infected animals in TB-infected herds or could be an easy, cost effective surveillance tool in TB-negative regions.

Materials and Methods: Characterized serum and plasma samples were obtained from worldwide sources and were used to validate the M. bovis ELISA. Two temporal series were produced from animals exposed to M. bovis and followed over time. Positive samples from 3 different countries were obtained from either culture positive animals (n = 307). Sample sets (n = 100) with varying skin or gamma interferon results were evaluated to demonstrate subsets of positive animals within TB-infected herds (n = 45) and the power of combining tests to increase overall sensitivity. Negative samples (n = 1473) were obtained from 4 different countries with samples originating from negative herds, states or regions. In addition, to understand potential cross-reactivity with other Mycobacteria, samples were obtained from animals exposed to large doses of M. paratuberculosis, M. avium and M. kansasi or from a herd with a high Johnes' antibody levels. All samples were evaluated on an M. bovis antibody kit manufactured at production scale, according to the standard kit protocol. Briefly, samples and kit controls were diluted 1:50 in a sample diluent and applied to microtiter plates. After a 60-minute incubation, the plates were washed, followed by the addition of an anti-bovine HRP conjugate (30-minute incubation). After another plate wash, TMB substrate was added. After color development of 15 minutes, plates were read on a spectrophotometer at 450nm. Sample optical densities were compared to those of the kit positive control to derive Sample-to-Positive (S/P) ratios. Samples with S/P ratios of >x = 0.30 were considered positive for M. bovis antibodies.

Results: Data from the M. bovis temporal series revealed that animals can develop antibody titers within weeks of exposure and that an antibody response can be boosted after the application of a skin test. The M. bovis ELISA detected 197/307 samples from culture positive animals resulting in a sensitivity of 64.2% . Using a single test method, between 71.1% and 75.6% of herds would have been detected. Combining tests resulted in an increase in herd sensitivity to between 86.7% (GIFN and ELISA) and 97.8% (GIFN, SICCT and ELISA). On negative sample sets, the M. bovis ELISA demonstrated a specificity of 98% with no cross reactivity observed on M. paratuberculosis (both experimental and field infected) or M. avium samples. Transient, low level reactivity was observed with animals inoculated with large doses of M. kansasi.

Conclusions: The strategic supplemental use of the IDEXX M. bovis antibody test represents a fast, easy, objective and cost effective option for use in bTB programs and can increase overall diagnostic power by detecting subsets of infected animals missed by current methods. This test’s high specificity allows for an application of this test in bTB-negative regions.

OC: 62
Unspecific titles in a bovine brucellosis free herd induced by a commercial vaccine against respiratory complex
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Objectives: In Argentina the control and eradication program of bovine brucellosis is based on compulsory Strain 19 vaccination of calves, and removal of positive animals.

Materials and Methods: The serological tests used are BPA as screening and SAT/2me, FPA, CELISA and FC as confirmatory. It is not uncommon to detect positive animals with confirmatory test in brucellosis free herds. Most of them are probably due to late response to S19 vaccine.

Results: However, we observed the increase of non-specific titers in a 649 Holstein herd free from brucellosis after the implementation of a commercial vaccine against respiratory complex composed of IBR virus, BVD and PIV3. Pasteurella multocida, P. haemolytica and Haemophilus sommus in oil adjuvant. 15 days post vaccination and with no evidence of symptoms of brucellosis, we found that 80.28% of the herd reacted to BPA. Due to this results, 50 animals taken at random were bled and SAT/2me was performed, resulting in 96% positive at 2ME and 15 to CELISA. Bacteriological cultures were performed on milk taken from cows and two flasks of the vaccine were cultured to rule out possible contamination with Brucella respectively. In all cases cultures were negative. At 58 days post vaccination, 172 pregnant heifers were bled; results showed that 81.98 react to 2ME and 67.79% and 83.72% react to CELISA and FPA respectively. The whole herd was sampled at 12, 18 and 24 months post vaccination, with persisting 2me titles in 28.22%, 3.85% and 2.04% of the animals, respectively. This data strongly support possible interference in the diagnosis of brucellosis in the herd due to cross reaction with a Gram negative bacterium other than Brucella. Due to these findings, a new experiment was done.

Conclusions: A brucellosis free herd of 70 cows was identified and were divided in 4 groups: 1 control with 10 cows without vaccination (group A) and 3 other groups of 20 cows each who were inoculated with the commercial vaccine with oil adjuvant (group B) and the other 2 groups with different commercial vaccines without oil adjuvant (group C and D respectively). No reactors were found from groups A, C and D; however, from group B at 70 days 44.45% of the animals were positives to 2ME and at 12 months after vaccination 15.38% of the animals still had titer to 2me. During this study there were no symptoms of brucellosis. These results confirm that, in time, a vaccine having oil adjuvant can induce rises titers in S19 vaccinated animals and confuse the status of brucellosis in the herd.

OC: 63
C. perfringens isolates from different origin induce typical hemorrhagic enteritis-like lesions in an in vivo jejunal loop assay in calves
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Objectives: Clostridium perfringens associated hemorrhagic enteritis is a highly fatal disease in fast growing suckler and veal calves. The causative factors are currently unknown. In the present study an intestinal loop model was developed to test a collection of Clostridium perfringens strains for their ability to induce the typical haemorrhagic enteritis lesions in calves.

Materials and Methods: Loops were injected with logarithmic C. perfringens cultures with or without commercial milk replacer. The test strains were isolated from bovine hemorrhagic enteritis cases and from healthy bovines. Human strains, NetB positive and negative chicken strains, Beta toxin positive porcine strains and mutant strains lacking the Virf, a and ? genes were also included. Additionally 2 time course experiments were conducted in the loop model using a hemorrhagic enteritis outbreak strain.

Results: All tested strains were capable of inducing hemorrhagic enteritis-like lesions provided they were injected in combination with milk replacer.
Histological examination of the time course loops indicated that the early pathogenesis was initiated by loss of the epithelium followed by congestion of the capillaries starting immediately after inoculation, resulting in hemorrhages and necrosis of the remaining mucosa starting from the tips of the villi after 3 to 4 hours.

**Conclusions:** These observations indicate that any C. perfringens strain, independent of the isolation source, may be capable of eliciting lesions resembling those seen in hemorrhagic enteritis, suggesting that the virulence factors of C. perfringens responsible for haemorrhagic enteritis are present in most C. perfringens isolates. In addition, the pathological process seems to be independent of α- or β-toxin or Vibrio-regulated mechanisms. Therefore this syndrome is not likely to be caused by specific C. perfringens strains.

**OC: 64**

**Diarrhea in buffalo calves in Minas Gerais, Brazil: the involvement of enterobacteria**

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**Objectives:** The aim of this study was to investigate the involvement of pathogenic Escherichia coli and Salmonella spp. in the etiology of diarrhea in buffalo calves up to 3 months old.

**Materials and Methods:** One hundred fifty-two fecal samples were collected from diarrheic and non-diarrheic calves aged one to 90 days from five dairy farms in the State of Minas Gerais, Brazil. Fecal samples were inoculated into buffered peptone water and incubated. The cultures were then plated onto MacConkey agar plates and inoculated into Tetrahionate Broth. The cultures from Tetrahionate Broth were plated onto Hektoen and XLT4 media plates and incubated. A multiplex PCR was performed to determine the presence of virulence factors of Escherichia coli strains, which were classified into four pathotypes according to the Results: enterotoxigenic E. coli (ETEC), enteropathogenic E. coli (EPEC), enterohemorrhagic E. coli (EHEC) and Shiga toxin-producing E. coli (STEC). Colonies of Salmonella spp. were tested by PCR for genus confirmation. Cultures were divided into three groups according to their age: animals aged one to 30 days (F1), 31 to 60 days (F2) and 61 to 90 days (F3).

**Results:** Of the 152 calves, 107 (70.4%) had diarrhea and 45 (29.6%) were asymptomatic. The frequency of diarrhea within each age group was 86%, 56% and 50% for F1, F2 and F3, respectively. E. coli pathotypes identified were EPEC (eaeA), STEC (Stx1+ and/or Stx2+), EHEC (eaeStx1+ and/or Stx2+) and ETEC (K99/F41/Sta+). Among animals with diarrhea, 5.6% (6/107) had EHEC isolated from feces, 13.1% (14/107) STEC, 4.7% (5/107) EPEC and 0.9% (1/107) ETEC. The frequency among feces from non-diarrheic animals was 8.9% (4/45) for EHEC, 13.3% (6/45) for STEC, 6.7% (3/45) for EPEC and ETEC wasn’t identified. Salmonella spp. was isolated from feces of three animals, of which two had diarrhea, one had concurrent infection with STEC and were in F1 and F2 groups. The third animal was asymptomatic and belonged to F1 group.

**Conclusions:** The presence of pathogenic E. coli and Salmonella spp. in feces of buffalo calves demonstrate that these agents may be involved in diarrhea of these animals and indicate that, similarly to cattle, buffaloes may also be a source of bacterial infection for humans.

**OC: 65**

**Risk factors associated with shedding of Campylobacter in dairy calves**

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**Objectives:** Little is known about the role of calves in the epidemiology of Campylobacter spp. The objective of this study was to evaluate farm characteristics and management practices associated with the appearance of Campylobacter spp., especially C. jejuni genotypes that occur in humans, in milk fed calves on Austrian dairy herds.

**Materials and Methods:** A total of 100 dairy farms were visited. Data concerning farm structure and management practices were evaluated by use of a questionnaire. Faecal samples were collected from milk fed calves up to the age of 10 weeks. Depending on herd size, between 1 and 5 calves were sampled on each farm. Faecal samples were examined for thermophilic Campylobacter spp. according to ISO-10272 (2002). Suspicious colonies were further identified and differentiated by full spectral matrix-associated laser desorption/ionization time of flight mass spectrometry (MALDI-TOF-MS) analysis as described by Alispahic et al. (2010). C. jejuni will further be typed by Multi-Locus Sequence Typing (MLST) to compare calf originated isolates with human ones. Farm data and their association with the appearance of Campylobacter in calves were tested by univariable logistic regression. Variables with a p-value = 0.2 were included in a multivariable logistic regression.

**Results:** Faecal samples of a total of 382 calves at the age of 1 to 69 days were collected and examined. Campylobacter spp. could be detected in 55 calves and on 33 of the 100 farms with 93 % of the Campylobacter isolates belonged to the species jejuni. Variables with a p-value of = 0.2 were other farm animals on the farm, esp. poultry, companion animals with access to the stable, animal care taker and if diarrhoea was present in the calves or not. In the multivariable analysis only the presence of other farm animals stayed significant (p = 0.04; OR 2.75, CI 95% 1.1; 6.8).

**Conclusions:** Only one farm characteristic, presence of other farm animals, could be associated with the shedding of Campylobacter in milk fed calves on Austrian dairy farms. This factor could be taken into account to reduce Campylobacter-shedding in calves. All in all Campylobacter spp. esp. C. jejuni were detected on 33 % of the examined farms. It will be tested if these calf originated genotypes are comparable to human genotypes. In conclusion we suggest that calves may play a role as a reservoir for Campylobacter spp. especially C. jejuni, which may lead to infections of other animals and humans. Further research is required to elucidate these interactions.

**OC: 66**

**Experimental infection of cattle with epizootic haemorrhagic disease virus serotype 6 strain from la Réunion island**

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**Objectives:** Epizootic Haemorrhagic Disease virus serotype 6 (EHDV-6) has caused serious outbreaks in adult cattle in la Réunion island in 2009. Moreover, EHDV (serotypes 6 and 7) is on the edges of Europe, in Turkey, Israel, Tunisia and Morocco and few data are available about the pathogenicity of this virus in European cattle. Recently, Batten and al. (2011) shown that 7 to 9 month old female Holstein-Friesian calves inoculated with EHDV-6 remained clinically unaffacted, but displayed high levels of viral RNA and virus in their blood, confirming that sub-clinical infection of cattle is likely to play an important role in EHDV transmission. In our study, we studied the clinical pattern of EHDV serotype 6 infection on older calves.

**Materials and Methods:** We inoculated 18 to 24 month old female Holstein-Friesian calves infected with EHDV-6 isolated from an outbreak in la Réunion Island (2009). EHDV-6 Virus was isolated on BHK21 cells from blood samples from cattle that were infected during the 2006 la Réunion island outbreak.

**Results:** Viral RNA was detected by real-time RT-PCR assay as early as 2 days post infection in the 5 infected cows, peaked in the blood between 3 and 8 dpi (1 day earlier than calves) and persisted for the course of the study. Antibodies against EHDV were strongly detected 7 dpi (2 days earlier than animals aged 7 to 9 months) by using an EHDV blocking ELISA and antibodies persisted up to the end of the study.

**Conclusions:** In this study carried out on 18 to 24 month animal, EHDV-6 in cattle has induced some discrete to moderate clinical signs (contrary to what was observed for animals 7 to 9 months) but without any fever. In this study, the EHDV-6 infection kinetics occurred earlier than in calves, with moderate clinical signs, suggesting that adult cattle could be more susceptible than calves.
OC: 177
Fertility, udder health and milk production in cows that have high milk antibodies to paratuberculosis
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Objectives: To indicate the effects of sub-clinical Paratuberculosis on high yielding dairy cows, this paper provides a case study examining the health effects in animals that consistently test positive to Paratuberculosis using the milk antibody ELISA, but show no clinical signs of the disease. The paper will expand on the production figures of test positive and test negative cows, and describe how these cows are managed within the herd health programme.

Materials and Methods: A herd comprising 500 high yielding Holstein Friesian cows is tested every three months for the presence of antibodies to Mycobacterium avium subspecies paratuberculosis (Map) as part of a Paratuberculosis disease management programme in a high prevalence herd. Fertility, udder health and milk production parameters of repeat test positive cows were compared to the lactation previous to the positive milk tests and to the herd in general to determine if sub-clinical Paratuberculosis has an effect on the health of the cows.

Results: The herd described is managed intensively on a total mixed ration. The average 305 day yield for the herd is 10,704kg excluding the 136 first lactation heifers. Forty eight cows in the herd have had at least three positive milk antibody tests. The average 305 day yield for completed lactations in this group is 10,156kg. When the cows with three consecutive positive milk antibody tests are compared with their own age cohorts, they have poorer fertility as indicated by calving interval (416 days compared to 386 days), higher somatic cell counts (238,000 cells/ml compared to 178,000 cells/ml), and lower milk yields than their contemporaries. But the major decline in health and productivity occurs in the lactation in which the milk ELISA test becomes positive. Cows testing positive for the first time in their current lactation are producing an average of 26kg of milk per day, compared to the rest of the herd producing 31kg per cow per day.

Conclusions: In conclusion, cows with significant milk antibody but showing no clinical signs of Paratuberculosis, suffer from poor health and productivity associated with sub-clinical disease. These are of significant economic consequence to the herd in addition to the economic losses suffered through clinical disease and excessive forced culling.

OC: 178
Calves infected with Mycobacterium avium subspecies paratuberculosis following intratracheal challenge
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Objectives: In previous studies we have shown the existence of bio-aerosols containing viable Mycobacterium avium subspecies paratuberculosis (Map) in dairy farms. Dust containing viable Map can easily spread within buildings housing several age groups of cattle including young animals susceptible to Map. It was investigated whether Map exposure via the respiratory route leads to intestinal MAP infection.

Materials and Methods: Twelve Holstein Friesian calves were used in a challenge study. Calves were randomly allocated to 3 groups. Six calves were infected with Map by transtracheal injection of bacteria; 3 orally infected calves served as a positive and 3 as a no challenge control. To mimic the real life situation the dosage chosen in this study is one of the lowest described to be infective when administered orally but with a plausible uptake by respiration based on information in literature about dust concentrations in cattle housings, the tidal volume of a calf and the amount of viable Map/mg dust. The challenge was performed with 1x10^7 as a 9 fold trickle dose. Faecal samples were collected every 3 weeks. Animals were euthanized 3 months after challenge and extensive tissue sampling was performed including lung and intestinal tissue and respiratory and intestinal tract lymph nodes. Faecal and tissue samples were cultured in a liquid culture system and presence of Map was confirmed by IS900 real-time PCR.

Results: Faecal samples of all groups were culture negative so no MAP shedding was detected. Tissue samples of negative controls were negative. Positive control animals had 1 or 2 positive tissue samples of the intestinal tract. MAP was detected in tissue samples of all calves of the transtracheal inoculated group with at least one positive sample of the intestinal tract (ileum, jejunum, adjacent lymph node). The number of positive samples of the intestinal tract varied between 1 and 3. Additionally, 3 animals of the transtracheal inoculated group had MAP positive tracheobronchial lymph node.

Conclusions: These findings indicate that repeated transtracheal MAP challenge can result in intestinal MAP infection in susceptible animals. The respiratory route seemed to be a more effective challenge compared to the oral infection route in this pilot study. These results indicate that future control programs should consider taking into account dust bioaerosols as a potential route of transmission between shedding dairy cattle and susceptible calves.

OC: 179
Lymphatic vessel puncture at the bovine udder: feasibility and detection of Mycobacterium avium subsp. paratuberculosis in the lymphatic fluid by PCR
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Objectives: Paratuberculosis or Johnne’s disease (JD) is caused by Mycobacterium avium subsp. paratuberculosis (MAP) and is seen as one of the most costly and important diseases of ruminants in developed countries today. Diagnosis of paratuberculosis is challenging in the early stages of the disease and laboratory tests available today do not show satisfactory efficacy when applied before the onset of clinical symptoms. The lymphatic system plays a major role in the defence of infection and is an important part of the immune system. The superficial lymph vessels of the bovine udder are accessible for collection of lymphatic fluid in lactating cows by lymph vessel puncture. The first objective of this study was to evaluate the feasibility of lymph collection from the bovine udder under field conditions. The second objective was to investigate whether MAP can be detected in lymphatic fluid of cows infected with JD and thereby be of diagnostic value in these animals.

Materials and Methods: Lymph fluid collection was attempted in 58 cows with varying MAP-infection status. The reactions of the cows as well as the level of difficulty of the procedure were recorded in 56 animals. Lymph samples (n=51) were tested for the presence of MAP by nested polymerase chain reaction (PCR). Additionally, cows were tested for specific antibodies in blood by a commercial enzyme-linked immunosorbent assay (ELISA).

Results: Puncture of the lymph vessels caused no or mild signs of discomfort in 94.6% of the cows. Lymphatic fluid was gained on the first attempt in 51.8% of the animals, while sample collection was unsuccessful in 12.1%. Overall, MAP was detected in 43.1% of the lymph samples, with 66.7% positive samples in cows with clinical JD, 42.8% positive results in asymptomatic cows with a positive or suspicious ELISA result in blood, and 38.7% positive samples in cows with a negative ELISA result in blood.

Conclusions: The results of the present study show that the puncture of lymphatic vessels at the bovine udder was well tolerated by the majority of cows and can easily be performed on the farm. The isolation of MAP from lymph fluid by PCR indicates that this approach might be of use for the early detection of JD in cattle.

OC: 180
Paratuberculosis: Within herd prevalence dependent identification of infected dairy herds by environmental sampling
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Objectives: Identification of infected herds is a critical issue in voluntary paratuberculosis control programmes due to the fact that it is necessary to convince farmers to take part. Since clinical disease is frequently undiagnosed, a cost saving but effective diagnostic tool is needed to identify infected herds. Use of environmental sampling (ES) was proved to detect Mycobacterium avium spp. paratuberculosis (MAP) in free stall dairy herds.
with known status of infection.

Materials and Methods: A total of 34 877 individual fecal samples from 15 non-infected and 31 MAP-infected herds were tested by fecal culture to define within herd prevalence of MAP shedders (P). In each herd the cows were sampled twice in two years. A mean number of nine environmental samples per herd were collected from the floor of lactating cows, milking, calving and sick cow areas and crossover alleyways to the calf area. After cultivation on HEYM-medium with mycobactin positive samples were further characterized by subcultivation without mycobactin and by PCR.

Results: Eight infected herds had a very low (P > 0.2 %), 14 a low (2 – 5 %), four a medium (5 > 10 %), and five a high P (> 10%). All non-infected herds (100%) showed negative and 22 (71%) of the infected herds positive results in ES. All nine infected herds with medium and high P were detected (100 %), while only 11 of the 14 herds with low P (79 %) and 2 of 8 herds with very low P (25 %) were identified. The proportion of positive ES depended significantly on P (r = 0.783, p < 0.01). Most frequent positive samples were collected from lactating cow areas (53.3 %) and milking areas (45.2 %). For P > 5 %, ES in only these two areas would have led to a positive herd status.

Conclusions: ES in an effective tool to identify MAP infected dairy herds with P > 5 %, it is less effective in herds with lower P and not useful in very low prevalent herds. Samples from the floor of lactating cow areas and the milking area should be taken always, additional sampling areas are calving areas, sick cow areas and alleyways.

OC: 181
Sero-logical response to Coxiella burnetii infection in dairy cows shedding the bacteria in milk
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Objectives: In dairy cows, the shedding of C. burnetii (CB) occurs mainly through milk and can last up to 32 months postpartum. PCR testing of individual milk samples is the most efficient way to detect the shedders, but also very expensive. An affordable approach could be a preliminary serological investigation of the herd, to further select which cows should be further tested by PCR. The aim of this study was to evaluate the relation between the serological status of the cows in infected herds and the occurrence of CB shedding in milk.

Materials and Methods: The study involved 4 dairy farms in North-east of Italy (herd size: 100 to 270 cows) with previous history of Q fever abortions. Serum and milk samples were collected from all the lactating cows of each farm. Sera were tested using a manual complement fixation test (CFT) with a cut-off titre of 1:10, and a commercial indirect ELISA kit (LSI). Milk samples were subjected to a commercial real-time PCR kit (ADIVET® CDX REALTIME) for bacterial DNA detection. The relation between serological response to CB infection and bacteria milk shedding was evaluated by means of the chi-squared test (p-value < 0.001) and the calculation of the odds ratio.

Results: Among 577 sera collected 137 (24%) tested positive to the ELISA, while 55 (10%) were positive to CFT. ELISA seropositive cows ranged in the herds from 8 to 39 %. The cows with PCR positive milk were 36 (6%), ranging from 4 to 13% of lactating cows in 3 herds, while in the farm with the lowest number of ELISA seropositive animals (8%), no milk shedders were found. Out of the 36 cows with PCR positive milk, 11 had no antibodies detectable by ELISA and CFT, 10 were ELISA positive but CFT negative, and 15 were positive to both the serological tests. The probability of seropositive cows to shed CB in milk was 9 time higher than in seronegative cows using either ELISA test or CFT to detect the antibodies. If the ELISA cut-off is increased to a S/P value > 2, the probability of seropositive cows to have PCR positive milk is 12 time higher than seronegative ones.

Conclusions: This survey showed that, in infected herds, the number of cows shedding CB in milk is relatively low compared to the number of seropositive animals. ELISA test, especially using a higher cut-off value, could be a useful tool to identify the cows to be further tested by means of PCR. As previously described, it should be noticed that shedding of CB in milk occurred also in seronegative cows. *Research funded by the Italian Ministry of Health

OC: 182
Excretion of Coxiella burnetii in 33 dairy cattle farms in Northern-Belgium
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Objectives: In a previous survey (Ribbens et al., 2010), an estimated 74.3% of dairy herds in Northern-Belgium showed antibodies against Q-fever in bulk-milk. Because of the recent emergence of Q-fever in ruminants, a follow-up study was conducted to describe antibodies against, and shedding of Coxiella burnetii in 33 Northern-Belgian dairy herds.

Materials and Methods: Herds were selected based on their known bulk-milk antibody history (Ribbens et al., 2010) and equally divided into negative, positive and highly positive. Both individual milk samples and bulk-milk samples were collected from these herds to calculate within-herd prevalence of Q-fever antibodies and shedding. Milk samples were analyzed using a commercial ELISA test (LSI) and a homemade RT-PCR (Coda, 2010).

Results: The average number of cows analyzed was 26.4 and the average number of lactating cows present was 49.4. Bulk-milk antibodies were detected in 22/33 herds (66.6%). In 7 bulk-milk samples (21.2%), C. burnetii was detected using RT-PCR (all bulk-milk antibody positive herds). At the cow-level, 214/871 animals (24.6%) tested antibody positive and 91 animals (10.44%) were detected as milk-shedders. Shedding was clearly related to the serological status of the animals. The average within-herd prevalence for the 33 participating herds was 24.0% (min.=0.0%; max.=64.7%) and 10.2% (min.=0.0%; max.=64.0%) for shedding.

Conclusions: This study demonstrated 25% of antibodies and 10% of Coxiella shedding at the animal level. S/P ratio of the bulk-milk ELISA was related with the within-herd prevalence of Q-fever antibodies, and to a lesser extent the within-herd prevalence of milk-shedders. A positive PCR bulk-milk sample was related with a higher within-herd prevalence of shedding. Further studies have to focus on clinical importance in cattle and the zoonotic potential of infected herds. This study was funded by Veepeiler Rund.

OC: 183
Detection of Coxiella burnetii in milk samples of ruminant farms from the Center of Portugal
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Objectives: Q fever is a worldwide zoonotic disease caused by Coxiella burnetii that affects animals and humans. Infected animals shed bacteria by secretions, excreta, and at parturition. Recently, several outbreaks occurred in European countries, which led to a concern of European health authorities on the impact in public health. In Portugal, the knowledge of the prevalence of C. burnetii in animals is scarce. The aim of our study was to screen for C. burnetii in ruminant herds, and to evaluate the degree of excretion in positive samples.

Materials and Methods: Dairy farms with clinical reports of abortion or other reproductive disorders within 3 months before sample collection were selected for the study. Between Feb 2009 and Jul 2009, Bulk Tank Milk samples (BTMs) were collected from sheep (n=10) and goats farms (n=6) in the counties of Condeixa-a-Nova and Penela. BTM samples of dairy cattle farms (n=12) were collected in the county of Mira, between Nov 2010 and Apr 2011. BTMs from dairy cattle were tested for the presence of antibodies by the Enzyme-Linked Immunosorbert Assay, using the Chek® Q Fever ELISA Test kit® (Idexx, Switzerland). C. burnetii detection was performed in all of non-negative samples for Ab detection, using the commercial kit Taeljet Coxiella burnetii® (LSI, France), as well as, in the BTMs from small ruminants. Quantification analysis in positive samples was done with the program Quantsoft® (LSI, France) provided by the manufacturer.

Results: Three positive (18.8%) samples for C. burnetii were obtained in small ruminant samples, 2 (20%) from sheep farms and 1 (16.7%) from a
goat farm. No positive results were obtained in antibody test in dairy cattle, but 3 (27.3%) showed an intermediate result, confirmed by qPCR to be positive for C. burnetii. The quantification assay revealed that in sheep and dairy cattle herds, bacteria milk excretion was high (> 10000 bacteria/mL), while in goat herd milk excretion was moderate (355 bacteria/mL).

Conclusions: We found an active infection in a considerable percentage in small ruminants and dairy cattle farms located in the Center of Portugal. Our study indicates that the screen for C. burnetii must be done in all non-nega-
tive samples to antibody test, with the risk of underestimate the prevalence of C. burnetii. Moreover, the study highlights the exposed risk of farmers and veterinarians. A better understanding of the epidemiology of Q Fever is sorely needed to delineate and implement a control program at herd level.

OC: 184
Consequences of Border Disease Virus infection transmitted from sheep to pregnant heifers and their progeny
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Objectives: The aim of this study was to investigate the effects of Border disease virus (BDV) infection from naturally persistently infected sheep on susceptible pregnant cattle and their progeny.

Materials and Methods: The study included eight heifers tested negative for pestivirus and pestivirus antibodies. At a gestation stage between 47 and 73 days the heifers were exposed to sheep which were persistently infected with BDV. Blood samples and swabs (nasal and conjunctival swabs) of the heifers were collected every third day until seroconversion was recognized. Blood samples were tested for pestivirus antibodies using two commercial ELISA test kits and for pestivirus specific RNA using RT-PCR. Detection of pestivirus specific RNA was performed on nasal and conjunctival swabs using RT-PCR. Routine clinical examination and monitoring of the pregnancy was done repeatedly. Routine necropsy and histological examination as well as RT-PCR for pestivirus specific RNA was performed on aborted material. Blood and swab samples (nasal and conjunctival swabs) were repeatedly taken of live born calves during the first week of life for RT-PCR. Moreover, all blood samples were also tested for pestivirus antibodies.

Results: During the entire study, clinically signs typically for pestivirus infection were not recognized in the heifers. Seroconversion was seen by day 38 after exposure in all heifers. Pestivirus specific RNA was not found in any of the blood or swab samples. Abortion was recognized in 5 heifers between day 54 and day 202 after exposure to the PI sheep. Pestivirus specific RNA was detected in all aborted materials. In three heifers a normal pregnancy and a normal parturition were seen. The three live born calves were clinically healthy. Preclolstral antibodies to pestivirus were only detected in one calf. This calf and another calf were pestivirus negative in all samples investigated. The third calf was in all samples taken during the first week of life pestivirus positive.

Conclusions: In this study the effects of a BDV infection transmitted from persistently infected sheep to susceptible pregnant heifers and their progeny were described. The fact that the contact with sheep naturally and persistently infected with BDV resulted in seroconversion and abortion is of major importance for the BDV control program in Austria.

OC: 185
Serologic and virologic investigations of Pestivirus infection in Pyrenean Chamois in the Pyrenees (France)
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Objectives: since 2000, an increase of the mortality rate has been reported in Pyrenean Chamois (Rupicapra pyrenaica pyrenaica) in French and Spanish Eastern Pyrenees. Infection with Pestivirus closely related to Border Disease Virus was evidenced. The aims of our study were to investigate the prevalence of the disease and its potential role in the decrease of population stocks. We were also interested in studying the genetic diversity of implicated Pestivirus and their potential links with known Pestivirus in domestic ruminants.

Materials and Methods: a serological and virological survey in clinically suspect and healthy hunted Pyrenean Chamois in the West and East Pyrenean chain was conducted between 2003 and 2007. Blood were analyzed for the presence of Anti-NS2/3 antibodies with a commercial ELISA and spleen samples were submitted to RT-qPCR. After isolation on cells culture, virus isolates from all positive spleen samples were analyzed by 5’UTR, Npro and E2 sequencing. Sequence alignments and phylogenetic trees were calculated with the CLUSTAL X (Version 1.81) analysis program.

Results: the overall prevalence of NS2/3 antibodies, estimated on 911 serum samples, was 27.22% (95% confidence interval 0.95% = 34.34 – 30.11). Strong geographical and annual variations were evidenced with high seroprevalence observed in areas with high mortality rates but also in areas with no disease history. NS2/3 antibodies were also present in a high proportion of younger than 2 years animals, indicating an active viral circulation within the hunted population. On the 534 spleen samples tested, 21 (3.9%) were found positive in RT-qPCR. All were from areas where a high mortality rate was reported. Sequence analysis revealed that all were of BDV-4 subtype but with some genetic diversity within it.

Conclusions: an active Pestivirus circulation within Pyrenean Chamois populations was evidenced with a strong annual and geographical heterogenei-
ty. Based on serological results this circulation was also evidenced in areas with no disease history. Virus sequencing suggests that different Pestivirus strains, related to BDV-4 subtype are involved that are not linked to domestic ruminants.

OC: 186
Surveillance of Mycoplasma bovis and Mycoplasma spp by Real Time PCR in bulk tank milk samples from all Danish dairy herds in 2011
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Objectives: The objective of this study is to evaluate the use of results from real-time PCR on BTM samples for surveillance of Mycoplasma bovis and Mycoplasma spp. in Denmark. For the first time since 1987 reports of clinical problems with Mycoplasma bovis in adult cattle in Denmark were reported from veterinarians.

Materials and Methods: BTM samples from all Danish dairy herds has been tested once annually in fourth quarter (Q4) of the year in 4258 herds in 2009 and 4093 herds in 2010 with PathoProof 12 kit real-Time PCR. In 2011 this annual testing has been extended to a 16-kit PathoProof Real-Time PCR including test for Mycoplasma bovis and Mycoplasma spp. (around 4000 herds).

Results: Preliminary results from testing of 372 herds show that 4 herds were positive for Mycoplasma bovis and 29 herds were positive for Mycoplasma spp. The herd with the lowest Ct reaction for Mycoplasma bovis had a BTM Ct value of 26, this herd also had experienced clinical problems with Mycoplasma in 2011. Conclusions: Result from BTM screening will be evaluated in relation herds with clinical symptoms. For herds with low Ct value of the BTM a possibility for individual cow screening will be presented to the advisor and farmer as suggestion for an eradication program within the herd. Final results for 2011 will be available in January 2012.

OC: 187
Molecular epidemiology of Mycoplasma bovis during bovine respiratory disease outbreaks in newly-received beef bulls at fattening operations
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Objectives: Mycoplasma bovis is an important cause of bovine respiratory disease (BRD) in fattening operations of beef cattle. However, little information on its transmission dynamic within pen is available. Such information is nevertheless crucial to adapt control measures during M.bovis-associated BRD outbreaks. The objective of this study was therefore to determine whe-
ther a single or multiple clones of M. bovis are present within a pen during a BRD outbreak.

**Materials and Methods:** Twelve pens of eight to 12 beef bulls (n=112; bodyweight = 346 ± 36 kg) were studied throughout 40 days after arrival at 3 French fattening operations. Bulls were purchased at auction markets and came from 43 different farms of origins. As soon as a BRD-affected bull was detected in a pen, a trans-tracheal aspiration (TTA) was performed on each bull of the pen to isolate M. bovis. TTA samples were then repeated every 3 days on non-treated animals until no new BRD-affected bull was detected. M. bovis isolates were then characterized by pulsed-field gel electrophoresis using Smal restriction enzyme.

**Results:** M. bovis isolates were recovered during 8 BRD outbreaks which occurred in 7 pens. The within-pen prevalence of bulls positive for M. bovis ranged from 8% to 100% (median = 54%). Even if bulls came from multiple origins, only one PFGE clone was recovered during five of the six BRD outbreaks, whereas in the other case, two bulls were positive for M. bovis. During the remaining BRD outbreak, two clones were recovered. However, this BRD outbreak was followed by a second one, in the same pen, during which only one of the clone previously isolated was recovered.

**Conclusions:** This study shows that a clonal transmission of M. bovis within pens of beef cattle could occur very early during the fattening period.

**OC: 188**

**Antimicrobial resistance and virulence characterization of methicillin-resistant staphylococci from bovine mastitis**

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**Objectives:** Staphylococcus aureus is a recognised major pathogen of bovine mastitis, and Staphylococcus epidermidis is becoming increasingly isolated from clinical and subclinical mastitis. Both methicillin-resistant S. aureus (MRSA) and methicillin-resistant S. epidermidis (MRSE) have already been reported among mastitis isolates. Such strains are a public health concern, and the characterisation of their antimicrobial resistance and virulence profile is important to better control their dissemination.

**Materials and Methods:** The present work evaluated the distribution of methicillin–resistance among 204 staphylococci from clinical (n=50) and subclinical (n=154) bovine mastitis isolated by conventional microbiological procedures and identified using biochemical galleries and Multiplex PCR. Methicillin resistance was screened by the Disc Diffusion (DD) method using oxacillin as recommended by the Clinical and Laboratory Standards Institute guidelines (CLSI M2-A9, 2006) and the presence of meca in resistant isolates was evaluated by PCR as described by Pereira et al. 2010. Twenty one (10.3%) methicillin-resistant staphylococci were identified [2 S. aureus, 15 S. epidermidis, 4 S. spp (1 S. haemolyticus, 2 S. simulans, 1 S. chromogenes)] from which only 1 S.aureus and 1 S.simulans were mecA-negative. Anti-microbial resistance of the 21 methicillin-resistant isolates was tested for aminoglycosides, glycopeptides, lincomasides, macrolides, fluorquinolones, oxazolidinones, penicils, sulphonamides, tetracyclines and fusidic acid (CLSI M31-A3, 2008). Expression of virulence factors such as biofilm, deoxyribonuclease, lipase, gelatinsase and haemolytic enzymes was screened by plate assays.

**Results:** Antimicrobial resistance (AR) ranged from 0% (phenicols, glyco-peptides, fluorquinolones) to 90.5% (nalidixic acid). Resistance to NA, S, TE and É was the most common AR profile. Haemolysis was produced by 14 isolates (66.7%), DNase by 3 (14.3%), 20 were gelatinsase-positive (95.2%), 14 were lipase-positive (66.7%) and 8 were able to produce biofilm (38.1%).

**Conclusions:** These results suggest that methicillin-resistant staphylococci frequently express other virulence traits that may represent a challenge to clinicians. If the dissemination of such strains is not adequately controlled, methicillin resistance may be spread between staphylococci communities by horizontal transfer.
are conflicting data, from low levels of herds detected with MAP by bulk milk ELISA (around 3-5%), and subsequent estimates of within-herd prevalence of around 2%; to reports suggesting up to 65% of affected herds may be detected with MAP. In sheep, flock prevalence of MAP is not dissimilar to deer, being around 68%. However, recent work suggests that the prevalence of MAP-positive flocks is higher in the North Island than in the South Island, in contrast to deer and dairy, both of which have a higher prevalence of MAP-infected herds in the North Island.

Conclusions: MAP prevalence in deer certainly, and in sheep probably, is more common than otherwise (non-detection). In dairy cattle, this situation is less understood. Mean herd/flock prevalence of clinical JD is not a particularly helpful concept, because a small number of deer farms certainly, and dairy and sheep farms probably, are severely affected with a high prevalence and incidence of clinical JD and of MAP infection and for these farms there is likely a high economic impact. Any effect of control strategies requires a clear understanding of what outcomes are being sought and measured.

OC: 191
Haemoplasma infections in cattle
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Objectives: Haemotrophic mycoplasmas were formerly classified within the order Rickettsiales as Haemobartonella and Eperythrozoon species. Until relatively recently detection was only possible with a subjective and insensitive microscopy test. Here we describe the use of PCR/DGGE to detect and identify Mycoplasma wenyonii and ‘Candidatus M. hyaemobos’ from UK cattle blood samples.

Materials and Methods: Farm visits, veterinary observations and questionnaires were used to obtain as much information as possible from these cases. The PCR/DGGE method was shown to be effective at detecting haemoplasma infections in DNA from EDTA blood samples. Initially the distinct PCR/DGGE profiles were confirmed by 16S rDNA sequencing of the PCR product.

Results: M. wenyonii was shown to give two PCR/DGGE profiles indicating possible nucleotide polymorphisms within the 16S rDNA region being tested. PCR/DGGE was also able to detect and identify ‘Candidatus M. haemobos’ sometimes with concurrent infections of Anaplasma phagocytophilum the cause of tick borne fever. Cattle were generally failing to thrive, had hind limb and udder oedema with prefemoral and mammary lymphadenopathy, and incidence of clinical JD and of MAP infection and for these farms there is likely a high economic impact. Any effect of control strategies requires a clear understanding of what outcomes are being sought and measured.

Conclusions: The prognosis for animals with a bladder rupture is extremely bad. Deportment of obstruction or leakage of urine through the bladder rupture, only 3% of the patients could return to the farm. Resulted in 60% short term survival, surgery on pre-perforative obstructive urolithiasis in cattle.

OC: 192
Association between virulence factors of Escherichia coli, Fusobacterium necrophorum, and Arcanobacterium pyogenes and uterine diseases of dairy cows
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Objectives: The objective of this study was to evaluate the relationship between bacterial species-specific virulence factors (VF’s) present at 3 different stages of lactation (1-3, 8-10, and 34-36 DIM) and the incidence of metritis and clinical endometritis. The following VF genes were investigated: in Arcanobacterium pyogenes – plo (pyolysin, a hemolytic exotoxin that promotes lysis of red blood cells and immune cells), cbpA (collage-binding protein, necessary to infect collagen-rich tissue), and fimA (fimbriation, a key component in cell-to-cell or cell-to-surface adherence); in Escherichia coli – fimH (a type 1 plus component); and in Fusobacterium necrophorum – lktA (leukotoxin).

Materials and Methods: Uterine swab samples were collected from 111 postpartum dairy cows housed on a commercial dairy farm located near Ithaca, New York. Samples were collected from April 2010 through June 2010. Isolation of total DNA was performed using a QIAmp DNA minikit (Qiagen, Santa Clara, CA) according to the manufacturer’s recommendation. PCR was used to detect the presence of plo, cbpA, fimA, fimH, and lktA. Cows were classified as VF positive when the appropriate amplicon size was observed by gel electrophoresis and negative when no amplicons were visible in the gel.

Results: A. pyogenes cbpA was detected in only 5 samples and therefore was not subjected to further analysis. E. coli (fimH) was significantly associated with metritis and endometritis detected at 1-3 DIM; F. necrophorum was significantly associated with metritis detected at 1-3 and 8-12 DIM and with endometritis when detected at 34-36 DIM; and A. pyogenes (fimA and plo) was associated with metritis (fimA) when detected at 1-3 DIM and endometritis (fimA and plo) when detected at 8-10 and 34-36 DIM.

Conclusions: These findings support the hypothesis that the bacterial etiology of uterine infections is dynamic and multifactorial. Our data provide further evidence of the pathogenic role of E. coli, A. pyogenes and F. necrophorum in uterine diseases.

OC: 102
Retrospective case series on the short term prognosis of obstructive urolithiasis in cattle
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Objectives: Obstructive urolithiasis in cattle is a life-threatening condition and in most cases the only treatment option is surgery. Advice to the owner concerning treatment should be based on a correct knowledge of the prognosis. Therefore a retrospective study was done to determine the prevalence, the characteristics and the short term prognosis of obstructive urolithiasis.

Materials and Methods: Patient records of all cattle with obstructive urolithiasis presented at the faculty of veterinary medicine (Ghent University) between January 2001 and December 2010 were collected and analysed.

Results: On a total of 4680 bovine patients between 2001 and 2010, 222 cases (4.74%) of obstructive urolithiasis were found. All animals were intact males and all but one (Holstein Friesian bull) belonged to the Belgian Blue breed. The age varied between less than a month old and 5 years of age, with 60% of the animals being younger than 6 months. Urethral rupture, bladder rupture or pre-perforative obstruction was diagnosed in respectively 43%, 32% and 25% of the cases. Surgical treatment was attempted in 61% of the cases. In 16.3% of these cases peroperative euthanasia was necessary, 42.2% of the animals died or were euthanized shortly after surgery and 41.5% could return to the farm. Surgical treatment of urethral rupture resulted in 60% short term survival, surgery on pre-perforative obstructive lesions in 25% short term survival and from the cases presented with bladder rupture, only 3% of the patients could return to the farm. The major reasons for the poor surgical results were persistent post-surgical loss of bladder contractility, repeat obstruction or leakage of urine through the bladder or urethral wall.

Conclusions: Of the total of 222 steers with obstructive urolithiasis, only 25% had a positive short term evolution, implying an overall poor prognosis. The results of surgical treatment are largely determined by the underlying lesion: the prognosis for animals with a bladder rupture is extremely bad.
while approximately 60% of the steers with urethral rupture and treated with a penis transposition, could return to the farm. The main conclusion of this retrospective study is that surgical treatment of obstructive urolithiasis should mainly be restricted to animals with urethral rupture and only after a complete clinical examination, including ultrasonographic examination, whereby the integrity of the bladder wall and the presence of additional calculi in the bladder or kidney should be inspected.

**OC: 103**

**Outbreak of dystrophic epidermolysis bullosa in an endangered cattle breed caused by a collagen VII mutation**

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**Objectives:** A congenital mechano-bullous skin disorder was identified in six calves on a single farm of a local German cattle breed (Rüotes Höhenvei) in 2010. The condition presented as a large loss of skin distal to the fetlock and at the mucosa of the muzzle. All affected calves were euthanized on humane grounds due to the severity, extent and progression of the skin and oral lesions.

**Materials and Methods:** Examination of skin samples under light microscopy revealed separation of the epidermis from the dermis, failing epidermis and adnexal structures. The observed phenotype resembled cases of epidermolysis bullosa and epidermolysis imperfecta reported in different breeds of cattle. Analysis of the pedigree data revealed that all affected individuals could be traced back to a single founder. The pedigree was consistent with monogenic autosomal recessive inheritance. Three affected and 10 unrelated control cattle were genotyped using a bovine high density SNP chip.

**Results:** This allowed us to localize the causative mutation to a 18 Mb interval on chromosome 22 by homozygosity mapping. The COL7A1 gene encoding collagen type VII alpha 1 is located within this interval and the affected calves were homozygous for a point mutation (c.7509G>A). The encoded protein consisted of 2518 amino acids instead of 2534. The result was a premature stop codon which leads to a truncated collagen VII protein representing a complete loss of COL7A1 function. We thus have identified a candidate causative mutation for this genetic disorder using only 3 cases to unravel the molecular basis of the disease. Analysis of the pedigree data revealed that all affected individuals could be traced back to a single founder. The pedigree was consistent with monogenic autosomal recessive inheritance. Three affected and 10 unrelated control cattle were genotyped using a bovine high density SNP chip.

**Conclusion:** The mutation causes a premature stop codon which leads to a truncated collagen VII protein representing a complete loss of COL7A1 function. We thus have identified a candidate causative mutation for this genetic disorder using only 3 cases to unravel the molecular basis. Selection against this mutation can now be used to eliminate this genetic defect from the affected breed.

**OC: 104**

**Subclinical rumen acidosis - diagnostic value of indirect parameters in blood and urine**

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**Objectives:** Subclinical rumen acidosis (SARA) is considered a frequent pathological condition in dairy cows. The diagnosis is based on pH measurement in rumen fluid which must be obtained using a stomach tube or by rumenocentesis. For simplification efforts have been made to estimate the rumen pH indirectly via parameters in urine or blood. The aims of the present study were to assess the diagnostic value of biochemical parameters in urine and blood to diagnose subclinical rumen acidosis in cattle during in the first third of lactation and to calculate associations between rumen pH and all biochemical parameters which were measured in simultaneously obtained rumen fluid, venous blood and urine samples.

**Materials and Methods:** Rumen fluid samples were obtained using a long stomach tube from von 286 dairy cows within 100 d after calving. Simultaneously venous blood and urine samples were taken. The rumen pH, urine pH, urine net-acid-base-excretion (NAVE) and the biochemical parameters in venous blood: total protein, albumin, bilirubin, urea, creatinin, glucose, volatile fatty acids, betahydroxybutyrate, lactate, cholesterol, Na, K, Cl, Ca, P, Mg, ALP, ASAT, GLDH, CK were measured. Animals with rumen pH = 5.8 were compared to cows with rumen pH <5.8, which were considered SARA cases. Values for sensitivity and specificity and area under the curve (ROC curves) were calculated for all parameters.

**Results:** Of the 286 cows 28 had a rumen pH <5.8 (9.8%). The associations between rumen pH and all biochemical parameters were characterized by low correlation coefficients (<0.3). Sensitivity to indicate SARA was generally low (<50%), however specificity varied between 70 and 97%. The areas under the curve (ROC curves) for all parameters were between 0.45 and 0.65. Parameters such as L-Lactate, Ca, GLDH and ketone bodies in blood and NABE in urine which had been reported in other studies to be useful parameters to indicate SARA could not be confirmed in the present study.

**Conclusions:** The results of the study indicate that the measured biochemical parameters in venous blood and urine pH and NABE are not suitable to identify animals with SARA. The diagnosis of rumen acidosis requires the measurement of pH in rumen fluid. However, it seems possible that intraruminal devices which measure rumen pH constantly but also cow side measurement of blood acid base status result in improvement of diagnosis.

**OC: 105**

**Cattle diseases: clinical profile comparisons using sign frequency pattern recognition**

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**Objectives:** An important step in the formation of a list of differential diagnosis in clinical practice is the identification of diseases that are similar in clinical profile to the leading hypothesis. The objective of this study was to generate a similarity chart and an ordered list based upon sign profiles and frequencies within cattle diseases.

**Materials and Methods:** The data contained within the diagnostic expert system Bovid 3 was used as the source data. This data was derived from expert opinion and contained the sign frequencies for over 11000 cattle diseases across a comprehensive range of clinical signs. The data was entered into a software program which used a simple linear nearest neighbour comparison based upon the differences between the disease sign frequencies to compute the similarities.

**Results:** The output was a chart indicating the similarity of the diseases in a hierarchy and an ordered list with adjacent diseases being the most similar to each other.

**Conclusions:** This study has provided a useful resource for differential diagnosis in clinical practice and a useful classification of diseases for problem based learning.

**OC: 106**

**Bovine neonatal pancytopenia (BNP) in young calves in Germany – cases in the Clinic for Ruminants, Munich**

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**Objectives:** The objective of the study was to evaluate the clinical signs, laboratory values and outcome of 102 calves with bovine neonatal pancytopenia (BNP), admitted to the Clinic for Ruminants, Munich, Germany.

**Materials and Methods:** BNP is a new emerging calf disease, characterized by multiple haemorrhages, thrombocytopenia and leucocytopenia as a result of bone marrow depletion. It occurred sporadically before 2006, but an increase in incidence was observed in 2006 in Bavaria, Germany, and the disease is seen now in most European countries. From the very beginning (2006), cases have been examined in the Clinic for Ruminants. Clinical signs of these calves were recorded and blood samples taken several times from these animals. All euthanized and dead animals were confirmed by patho logical investigation.

**Results:** In total 102 BNP cases had been admitted to the clinic between September 2006 and September 2011. Of these 18 died while being transported to the clinic. Most cases were admitted in 2009 (n=44), with decreasing numbers since then. 15 of the calves survived and were returning home, while...
the majority (n=69) had to be euthanized while in the clinic. There was no difference in the proportion of survivors in any of the years between 2006 and 2011. The average age of calves when the clinical signs were observed for the first time was 11 days (SD: 4.1 days). The majority of calves were of the breed German Fleckvieh (n=93). 55 of the calves were female, 47 male. More calves were admitted during summer months than in other months of the year (p=0.001). Skin bleedings were mostly seen during the summer months (p=0.001). Petechia in the mucous membranes of the mouth and blood in faeces were in all, except one, cases present. Fever was observed in about half the number of cases (n=45). Haematological results of the calves are presented. There was no statistically significant association between the level of thrombocytopenia and leucocytopenia and the survival of calves. Blood transfusions did not have a statistically significant effect on outcome (p=0.42). 

**Conclusions:** To our knowledge, this is the most extensive description of BNP cases admitted to a clinic. Haematological results show great variation between the calves, but they did not allow any prediction of outcome.

**OC: 107**

Photosensitization due to enterolobium contortisiliquum fruits ingestion in cattle

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**Objectives:** The Enterolobium contortisiliquum or Tamboril is a native Brazilian tree which bears shaped fruits, black when ripe. Fruits ingestion may lead to abortion and photosensitization in bovines. The dermatitis occurs when sunlight attains the sensitized skin. The disease presents a primary form after ingestion of preformed exogenous photodynamic agents, may be secondary to hepatic lesions or presents unknown etiology. The biologically active compound present in Enterolobium contortisiliquum fruits is a sapo- nin that induces cholangiohepatitis leading to secondary photosensitization. Clinical signs includes tearing, cutaneous lesion as erythema followed by edema, exudation with tangled hairs and gangrene. Skin lesions are initially observed at depigmented skin exposed to sunlight. The aim of this paper is describe a case of photosensitization due to Enterolobium contortisiliquum fruits ingestion in cattle.

**Materials and Methods:** Twenty three Nelore breed cows, from Jardinópolis, SP, Brazil, presented skin lesions at ears, eyelids, muzzle, udder lateral aspect, vulva and perineum. The lesions increased very fast compromising a large amount of skin surface in some cases. The signs appear one week after the transfer of these animals to a Brachiaria brizanta pasture containing two Tamboril trees. The treatment began eight days after disease manifestation, including immediate animals removal from direct sunlight, penicillin and dexamethasone systemic administration, and oral cathartics aiming toxic material elimination.

**Results:** Ten cows died and necropsy was performed. Macroscopic eva- luation revealed generalized jaundice, increase in liver size, intense yellow -green color of the liver parenchyma, and a distended gallbladder containing two ilia. Results were in the initial phase of photosensitization, showing that the treatment is effective when started immediately after onset of symptoms.

**OC: 108**

Outbreaks of acquired hepatopathy in young calves – a novel disease?


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**Objectives:** Beginning in September 2010, jaundice was noticed in young calves on 35 dairy farms in Bavaria. The underlying hepatic disease became apparent in calves between seven and ten days of age. They drank less, some had fever, and they became progressively weaker. After two to three days, some became recumbent, and convulsions and loud bawling occurred. At this stage, they either died relatively quickly, or were euthanized for huma- ne reasons. Surviving calves were reported to show stunted growth.

**Materials and Methods:** 21 calves in different stages of the disease from 13 farms were admitted to the Clinic. In early cases, clinical pathology reve- aled rapid rises in the activity of “liver enzymes” in serum (maximal values recorded were 814 U/L for AST, 635 U/L for GGT, and 2213 U/L for GLDH). Concentration of total bilirubin rose as high as 332 μmol/L in one case. Copper, iron and zinc concentrations in serum didn’t exceed upper limits of reference ranges. Post-mortem examinations of 41 calves revealed a severe generalized hepatopathy. The histologic lesions consisted of massive disruption of liver architecture including necrosis of hepatocytes and extensive bile duct proliferation in most of the affected animals. Examinations of liver sam- ples of two calves from different farms were unremarkable for mycotoxins as well as a toxicological screening by chromatography.

**Results:** A survey among dairy farmers of affected farms showed that in some cases morbidity rate reached almost 100 % and case fatality rate almost 80 % in several cases. All affected calves, except for three, had received one particular commercial product for prevention and therapy of calf diarrhea. Investigations of the relevant animal feed for mycotoxins, pesticid- es, pyrrolizidine alkaloids and ricine were unremarkable, as well as bacterial culture. Based on the preliminary results a feeding trial was carried out. Eight newborn calves were enrolled in this trial. Four experimental calves received 2 g/kg of body weight of the relevant commercial product per day for five consecutive days, according to the manufacturer’s recommendation. The four calves of the control group received only whole milk. None of the four experimental calves showed any signs of severe disturbance of the general condition. However, the changes concerning the blood parameters indicate a hepatotoxic effect of the commercial product.

**Conclusions:** So far, the pathophysiology of this disease has not been eluci- dated. For this purpose further investigations will be carried out.

**OC: 109**

Cardiovascular effects of intravenous tilmicosin in Holstein-Friesian calves

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**Objectives:** Tilmicosin is a macrolide antibiotic that is an effective treatment of respiratory disease in cattle when administered once at 10 mg/kg, SC. Cardiovascular toxicity has been reported following IV administration of a number of macrolides. The aim of this study was to characterize the cardio- vascular effects of IV tilmicosin in calves.

**Materials and Methods:** Six male Holstein-Friesian calves were adminis- tered butorphanol (0.5 mg/kg, IM) and anesthesia was induced 15 min later by diazepam (0.25 mg/kg, IV) and ketamine (4 mg/kg, IV). Calves were orotracheally intubated, placed in left lateral recumbency and ventilated with 100% O2 at a tidal volume of 15 ml/kg. Anesthesia was maintained by chloralose (50 mg/kg then 8 mg/kg/h, IV) and butorphanol every 3 h. A 7-F thermocatheter (Swan-Ganz) catheter was advanced to the pulmonary artery to measure cardiac output and pulmonary artery pressure. A 7-F high fidelity catheter-tipped pressure transducer (Millar) was inserted in the right carotid artery and advanced into the left ventricle. A base-apex ECG was obtained to monitor heart rate and rhythm. Tilmicosin (Micotil 300 injection, 300 mg/ml) was diluted with 0.9% NaCl to produce a final concentration of 20 mg/ml for IV injection. Tilmicosin was injected IV in sequential doses of 0.5, 1, 2, 3, 4, and 5 mg/kg over 4 minutes. Cardiovascular measurements were obtained 5 and 15 min after the start of each IV injection.

**Results:** Intravenous tilmicosin induced dose-dependent cardiac toxicity. Administration at 2 mg/kg IV resulted in increased left ventricular end dia- stolic pressure (LVEDP), decreased maximal rate of change of left ventricular pressure (LV dp/dtmax), and prolonged rate of left ventricular relaxation. Se- vere cardiovascular toxicity was evident at 5 mg/kg IV, with marked decrease in cardiac output, LV dp/dtmax, and mean arterial pressure, and increased...
LVEDP and excessively prolonged LV relaxation. Electrocardiographic abnormalities of marked ST segment depression were evident only at 5 mg/kg IV. Cardiac depression was transient and marked improvement in cardiac performance was evident within 15 to 30 minutes.

Conclusions: Tilmicosin produced slight cardiac depression at 2 mg/kg IV and profound cardiac depression at 5 mg/kg IV; these effects approximate calculated plasma tilmicosin concentrations of 5 and 12 µg/ml, respectively. The dose-dependent cardiac toxicity is transient and consistent with impaired intracellular cycling of calcium.

OC: 110
Snake bite envenomation in cattle – a review of six clinical cases
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Objectives: The present study was undertaken to analyze the snake bite envenomation and its therapeutic management in cattle.

Materials and Methods: In this study veterinary medical records of six cattle admitted to the Medical Unit of Veterinary College and Research Institute Teaching Hospital, Namakkal during 2009 - 2011 with the patient history of snake bite were analyzed. During this study the history from the animal owner related to farming conditions, vulnerability to snake bite, site of bite, clinical symptoms, laboratory findings, diagnosis, response to therapeutic management with the regimen consisted of Irj Snake venom antiserum with intravenous Normal Saline, Inj Chlorpheniramine maleate, Inj Dexamethasone & Inj Tetanus Toxoid (TT) were recorded and analyzed as per the standard procedure.

Results: In the present study, higher incidence of snake bite envenomation was found in cattle reared in free range system (66.60%). Face (50.00%), fore legs (33.33%) and neck (16.67%) were the most common regions of snake bite. The prominent clinical findings were swelling & formation of oedema at the site of bite & dependent parts (100.00%), cessation of rumination (83.30%), anorexia (66.60%) and dyspnoea & bradycardia (50.00%). Hematological parameters were within the normal limits except mild leukocytosis and neutrophilia. In all the six patients the buccal mucosal bleeding time were more than 10 minutes. Cattle with snake bite at the face region responded well to repeating the therapeutic regimen except Inj TT for 3 consecutive days (50.00%), neck region for 2 days and cattle with snake bite at the leg region responded to treatment regimen in one day and did not require repeating the treatment.

Conclusions: Cattle reared in free range system were more affected. Face, fore legs and neck were the most common regions of snake bite. The prominent clinical findings were swelling & formation of oedema at the site of bite & dependent parts, cessation of rumination, anorexia, dyspnoea and bradycardia. Results of hematological examination were unRewarding. Therapeutic management with the regimen consisted of Inj Snake venom antiserum with intravenous Normal Saline, Inj Chlorpheniramine maleate, Inj Dexamethasone & Inj TT were very useful and regimen of choice. Site of bite, buccal mucosal bleeding time and repetition of therapeutic regimen decided the speed of recovery.

OC: 111
An evaluation of relative efficacy of hypertonic saline solution as an adjunct to ceftiofur HCl and flunixin meglumine for the treatment of Bovine
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Objectives: A field trial was performed to assess the relative efficacy of hypertonic saline (HSS) to isotonic saline (ISS) solution as an adjunct to ceftiofur HCl and flunixin meglumine for the treatment of pneumonia pustuleosis in cattle.

Materials and Methods: Fifty cows that met the study-specific case definition of pneumonia pustuleosis were randomly divided into two equal groups as follow; group A, which received ISS intravenously (IV) at the rate of 60 mL/kg body weight (BW) in combination with ceftiofur HCl and flunixin meglumine administered intramuscularly at the rate of 6 and 2.2 mg/kg BW, respectively; or group B, which received HSS at the rate of 4 mL/kg BW IV along with ceftiofur HCl and flunixin meglumine administered intramuscularly at the rate of 6 and 2.2 mg/kg BW, respectively. Both saline solutions were administered once at the time of initiation of treatment, while ceftiofur HCl and flunixin meglumine were repeated after 12, 24 and 48 hours in both groups. Animals were then monitored for 72 hours after initiation of treatment. Relative efficacy of treatment protocols were measured by comparing survival percent, severity index of disease and hematological parameters.

Results: The survival percent was 50 and 75 amongst animals treated with protocol A and B, respectively. In terms of reduction of severity index of disease, group B showed significant difference (P < 0.05) over group A. There were no significant (P = 0.05) differences between the both groups for the other variables measured. The treatment protocol B exploiting the use of HSS in combination with cephalosporin (ceftiofur HCl) plus a non-steroidal anti-inflammatory drug (flunixin meglumine) was more effective than the conventional treatment i.e. ISS along with ceftiofur HCl and flunixin meglumine for the treatment of pneumonia pustuleosis.

Conclusions: It was concluded from the study that it is more effective to use hypertonic saline solution in combination with ceftiofur HCl and flunixin meglumine for the treatment of pneumonia pustuleosis in cattle because it gives better therapeutic approach.

OC: 112
Are jugular distension and pulsation signs of heart diseases in cattle?
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Objectives: Dairy cattle especially high producing type is very important in providing animal proteins. Therefore the health of this animal is in high priority. The cardiovascular system is under stress in high producing cattle for providing enough circulation for the mammary glands for producing milk. So, clinical signs of heart diseases should be taken into consideration seriously in this type of cattle. Jugular distension (JD) and jugular pulsation (JP) are mentioned as the clinical signs of cardiac diseases in veterinary text books. This study was undertaken to provide information about the prevalence of jugular distension and pulsation among clinically healthy dairy cattle.

Materials and Methods: Three hundred dairy cows from 12 dairy farms were chosen randomly for this study. Following proper restraining and holding the head and neck in a normal position the jugular area on both sides of the neck were checked by two clinicians independently. Extend of the distension was classified into three degrees (that is 1, 2, 3)

Results: Forty cases had JD and 29 cow showed JP. Twenty eight of these cows had concomitant JD and JP. Then positive jugular pulsation was taken into consideration in the same animals. The prevalence of JD and JP was 13.3 ± 3.8% and 9.7 ± 3.3%, respectively. All the jugular distension in this study was either 2nd degree. Jugular pulsation was either with distension or without distension of the jugular veins. Only bilateral JD and JP were taken into consideration in this study. There was positive relationship between the amount of milk production, age, phase of milk production, prevalence of cardiac murmurs and point of maximum intensity of murmurs (tricuspid valve) and the incidence of JD and JP.

Conclusions: So, the findings of this study showed that JD and JP are not the only and major clinical signs of heart disease without considering other clinical signs.

OC: 113
Electrocardiographic profile of the Holstein-Friesian calves during their first three months of live
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Objectives: This study intends to establish the electrocardiographic profile
of Holstein-Friesian calves during the first three months of their lives. **Materials and Methods:** Ten healthy black and white Holstein-Friesian calves were evaluated during the first three months of their lives. During each data collection eight electrocardiographic tests were realized, using an electrocardiograph Ecafix® model ECG G. The derivations used were I, II, AVR, AVL e AVL with a 10mm/s sensitivity and a speed of 25mm/s to determine the cardiac axis. The derivation II was executed at 50mm/s to analyze the amplitude of the P, Q, R, S and T waves and the duration of the P, Q, R, S and T waves, QRS complex, PR and ST intervals and QT segments. These parameters were evaluated by the mean, standard deviation and the non-parametric test of Friedman.

**Results:** The mean amplitude and duration of P wave was 0.141mV (±0.044) and 0.050s (±0.011), of Q wave was 0.514mV (±0.347) and 0.029s (±0.013), of R wave was 0.197mV (±0.161) and 0.020s (±0.012), of S wave was 0.043mV (±0.286) and 0.027s (±0.010) and of T wave was 0.364mV (±0.206) and 0.089s (±0.023) respectively. The mean duration of QRS complex was 0.043s (±0.011), of PR interval was 0.085s (±0.019), of ST interval was 0.152s (±0.043) and QT segment was 0.287s (±0.037) respectively. Approximately half of the plots showed sinus arrhythmia and the other half normal sinus rhythm. The age factor did not influence amplitude or duration of the waves, however the duration of the intervals and segments increased and the cardiac frequency lowered during the development of the animals.

**Conclusions:** The P wave demonstrated being monophasic positive with the presence of wandering pacemaker. There was a greater occurrence of the QRS complex in its monophasic form (QS) or biphasic negative (QR). The T wave was mostly monophasic positive with opposite polarity of the QRS. The electric cardiac axis was concentrated between -60° and -90°.

**OC: 114**

**Effect of different doses of catosal in dairy cattle with subclinical ketosis**

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**Objectives:** The purpose of the study was to assess the efficiency of different doses of 10 % Butaphosphan and Cyancobalamin combination (Catosal 10%) on general and metabolic health status, milk production and reproductive parameters in cows with subclinical ketosis. **Materials and Methods:** Lactating fifty three holstein cows during 1-2 weeks of the postpartum were checked by using Precision Xceed for the beta-hydroxybutyrate (BHB) concentration of the blood collected from V. coccygea. Cows with BHB concentration between 1000-3000 µmol/L without clinical signs were selected and random allocation performed as treatment group 1 (n=18), treatment group 2 (n=17) and control group (n=18). Cows in group 1, 2 and control group received intramuscularly for 4 consecutive days 5 ml, 10 ml of Catosal and 10 ml of 0,9 % saline solution for 100 kg BW respectively. Blood BHB level of cows was tested by using Precision Xceed before treatment, 7th and 15th days after treatment. Milk yield for 30 days and reproductive parameters for following 60 days and body condition score (BCS) after treatment were also documented respectively. **Results:** Total milk yield for 30-day in group 1, group 2 and control group was 863 kg., 779 kg and 640 kg respectively. The difference between group 1 and control (p<0.01) and group 2 and control group (p<0.05) was significantly different. The BHB concentrations of treatment group 1, group 2 and control group were 1.76±0.74 µmol/L, 2.15±0.62 µmol/L and 1.25±0.40 µmol/L before treatment. On day 7 and 15 after treatment, the BHB concentrations of group 1 and 2 were fallen significantly to 1.07±0.85 and 1.01±0.48 µmol/L and 0.85±0.78 and 0.64±0.51 µmol/L respectively. The BHB concentration of control group on day 7 and 15 were 1.11±0.75 and 1.18±0.88 µmol/L respectively. On the day 15 after treatment, the absolute BHB of group 2 was significantly different from control group (p<0.05). Changes from baseline BHB concentrations in group 1 and 2 on day 7 and 15 were significantly different compared to baseline changes of control group (p<0.05, p<0.01). A significant decrease of BCS was found in cows within control group as compared group 2 (P<0.05, P<0.01, P<0.001). Interval from calving to first insemination in group 2 is shorter than control group (P<0.05). A significant decrease in morphological involution interval of uterus tissue in treatment groups as compared with control group (P<0.05, P<0.01) was observed.

**Conclusions:** Catosal application in cows between first and second week postpartum had substantial positive effects to decrease the blood BHB concentration and on the improvement of metabolic health, reproductive performance and milk yield.

**OC: 115**

**Clinical disorders observed during the first 30 days of life of cloned Zebu calf**

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**Objectives:** Report the experience resulted from studies related to the offspring cloned Nellore calves from performed at Universidade de São Paulo between years 2005 and 2010. **Materials and Methods:** Clinical examination on Nellore breed calves originated from the somatic cell nuclear transfer technique (SCNT). **Results:** The occurrence of several cardiopulmonary abnormalities characterized by tachycardia with episodes of arrhythmia and bradycardia, hypophenese of the first cardiac sound, diastolic and systolic cardiac murmurs associated with dyspnea and crackling lung sounds were demonstrated. In cloned calves the ultrasonography exam showed congenital concentric ventricle hypertrophy, interstitial communication and turbulent flow in the foramen ovale, flowing from the right to the left heart indicating the reversion of blood circulation to the fetal life pattern. In consequence, it is observed the mixture of arterial and venous blood, compromising thus the oxygenation capacity of the cloned calves. The occurrence of macroomia was observed in Nellore cloned calves. It is believed that such syndrome is associated with placental or fetal carbohydrate metabolism disturbance, simulating the fetal gigantism as described in diabetic pregnant women. It has been reported the occurrence of moderate to severe normocytic and normochromic anemia. Anemia observed in cloned calves was caused by iron deficiency. Umbilical abnormalities were frequently observed in the delivered cloned calves. It was noticed the increase on the umbilical cord thickness. The umbilical arteries did not undergo retraction into the abdominal cavity, and remnants of umbilical cord were exposed to the environment. In the first three days after birth, strong artery pulsation was evident, thus the use of umbilical clamps were necessary to prevent bleeding. Approximately 75% of the calves showed alopecia within 15 to 20 days old, probably related to disturbances on the synthesis and absorption of vitamins, since the treatment of these calves with supplemental ADE vitamin reduced the symptoms. **Conclusions:** Despite great efforts over the past 5 years, the mortality of offspring cloned calves is still high, presented by a 50% rate, approximately. The occurrence of several cardiopulmonary abnormalities were demonstrated. Cloned calf could also present increased birthweight, hypoglycemia, hypothermia, umbilical cord abnormalities, anemia, and alopecia

**OC: 116**

**Age dependent changes of bovine serum chemistry and mineral concentrations**

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**Objectives:** Variable commercial diagnostic devices have been developed and some portable devices are applicable in field of large animal medicines. The reference ranges are essential factors in the analysis of serum chemistry results. However, large animal veterinarians are troubled with analysis of serum chemistry results, because of lack of detailed reference ranges such as ages, sexes, seasons and breeds. The aim of this study is a presentation of reference range in bovine serum chemistry according to ages. **Materials and Methods:** This study was carried out in 75 healthy Holstein...
cows aged from 3 days to 4 years and raised in National Research Farm, Cheonan, Republic of Korea. The cows were divided into seven groups; group 1 (n=7, aged under 7 days), group 2 (n=10, aged 1 month), group 3 (n=13, aged 3 months), group 4 (n=14, aged 6 months), group 5 (n=11, aged 1 year), group 6 (n=12, aged 2–3 yr, 1 parity), and group 7 (n=8, aged 3–4 yr, 2 parity). Fresh blood samples were obtained from the jugular vein between 10 and 12 AM at period from December to January. The serum chemistry was performed by the Hitachi 7180 Automatic Analyzer as following; albumin (ALB), alkaline phosphatase (ALP), calcium (Ca), creatinine phosphokinase (CPK), creatinine (CRE), gamma-glutamyl transpeptidase (GGT), glucose, aspartate aminotransferase (AST=GOT), alanine aminotransferase (ALT=GPT), lactate dehydrogenase (LDH), magnesium (Mg), phosphorus (P), total bilirubin (IBIL), total cholesterol (TCO), total protein (TPRO), triglyceride (TG), blood urea nitrogen (BUN), non-esterified fatty acid (NEFA), beta-hydroxybutyric acid (b-H), and C-reactive protein (CRP). Statistical comparisons were made with the one-way ANOVA test (p<0.05).

**Results:** The concentrations of IBIL, gGTP were increased in group 1 and ALP was indicated high level in group 1, 2, 3, 4 and 5. Glucose was showed a decreasing tendency through the ages of cows. ICHO was increased, but TG was decreased in group 6 and 7. The concentration of AST, ALT, LDH and b-B were presented low level in group 1 and 2. The highest BUN level was found in group 3.

**Conclusions:** The results of serum chemistry were significantly different according to ages. These observations suggest that age dependent variations should consider for interpretation of serum biochemistry in cows. Thus, this study would be useful in serum chemistry in cows.

**OC: 117**

**Impact of environmental pollution on general health of cattle sheep and goats in Egypt**

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**Objectives:** This study was directed to study the impact of different forms of environmental pollution on general health of Cattle, Sheep and Goats. Special attention has been focused on improper management of environmental pollutants especially solid pollutants (Sharp foreign objects in the form nails, needles, wires and plant solid objects) and non-solid materials as plastic bags, rugs and ropes and their effect on the function of the ruminate stomachs. Further more to throw some light on relationship between Pica and some trace materials of pollutants e.g wires, needles and wires serum analysis indicated marked decrease of serum Zinc and Copper. Anaemia and Leucocytosis were also encountered in different cases.

**Conclusions:** This study revealed that environmental pollutants of different sources exerted its effect on the general health of Cattle, Sheep and Goats, which causes severe illness in the form of emaciation anemia. Loss of body condition and decrease in milk and meat production, and consequently causes severe economic losses and reflect their effect on national economy.

**NUTRITION AND METABOLIC DISEASES**

**OC: 28**

**Hypokalemiast and insulin imbalances as possible causes of abomasal atony**

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**Objectives:** Hypokalemiast, insulin imbalances and ketosis can be frequently observed in high yielding dairy cows that show abomasal displacement. In principal, there might be a causal as well as a pure accidental relationship between these observations.

**Materials and Methods:** To study a possible causal relationship, we isolated muscle strips from the abomasal wall of slaughtered cows (N=74) and goats (N=22) and incubated them in a buffer solution that mimicked the extracellular fluid. In addition, we looked for effects of insulin or glucose infusions on the potassium homeostasis of the whole animal in 12 cows.

**Results:** Muscle strips isolated from the corpus or pylorus region of the abomasum showed rhythmic contractions under in vitro conditions. Decreasing the extracellular K concentration between 6 and 1 mmol/l decreased contraction amplitudes by about 50% in tissues from cows (p<0.05) and showed similar results in goats. Control measurements could exclude time, osmotic and chloride effects as underlying causes of this observation. Increasing insulin concentrations likewise decreased the contraction activity of the abomasal corpus. This effect was significant at 21 mU/l insulin for cows and at 80 mU/l for goats. In vivo infusions of insulin at a rate of 1 µU/kg BW/ min increased plasma insulin from a mean of 19 (SD15) to 160 (SD45) mU/l and decreased serum K from 4.0 (SD0.2) to 3.4 (SD0.2) mmol/l after 90 min (p<0.05). A rapid infusion of glucose (500ml, 40%) increased plasma insulin 2 hours with peak values around 290 mU/l and likewise decreased plasma K by 0.6 mmol/l (mean) with maximal decreases of 1 mmol/l after 30 min. The plasma K values reached normal levels within 1.5 to 2 hours after a single glucose infusion in healthy cows.

**Conclusions:** The results show a direct link between hypokalemia, hyperinsulinemia and abomasal motility. Hypokalemiast and changes in glucose homeostasis might thus contribute to the pathogenesis of abomasal displacement.

**OC: 29**

**Prevalence of clinical and subclinical ketosis in UK dairy herds: 2006 – 2011**

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**Objectives:** There is now an increasing body of research evidence showing the deleterious effects of negative energy balance on milk production, cow health and reproductive performance. This study presents results for the assessment of energy balance in commercial dairy herds in the UK as determined by metabolic profile analysis, revealing the extent of both clinical and subclinical ketosis.

**Materials and Methods:** During the period April 2006 to March 2011, blood samples were received from 42,734 individual dairy cows in the UK as part of 2,980 metabolic profile blood tests. These samples were from 1,203 separate dairy farms. Blood samples were analysed for a range of biochemical parameters including β-hydroxybutyrate (βOHβ), glucose and NEFA. Subclincal ketosis (SCK) was defined as βOHβ levels of 1.0 - 2.9 mmol/l in a milking cow, and 0.6 - 2.9 mmol/l in a dry cow. Clinical ketosis (CK) was defined as βOHβ levels ≥ 3.0 mmol/l. Glucose values = 3.0 mmol/l, and NEFA values = 0.7 mmol/l (milking cow) and 0.5 mmol/l (dry cow) were also considered to be evidence of negative energy balance.

**Results:** The results were stratified by day of lactation or days to predicted calving date in dry cows. There were 6784 samples from dry cows within 10 days of their predicted calving date, of which 51.2% had βOHβ between 0.6 – 2.9 mmol/l, 0.1% had βOHβ = 3.0mmol/l, 21.8% had plasma glucose values = 3.0 mmol/l and 27.6% had NEFA values = 0.5mmol/l. There were 8344 samples from milking cows 10-20 days calved, of which 27.1% had βOHβ values between 1.0 – 2.9 mmol/l (SCK), 3.2% had βOHβ =
3.0mmol/l (CK). 46.9% had plasma glucose values = 3.0 mmol/l and 43.7% had NEFA values = 0.7 mmol/l. Of the 8,112 samples from cows at peak lactation (51 – 120 days calved), the corresponding values were 15.8% for SCK and 0.27% for CK.

**Conclusions:** These results show that although CK was relatively rare (1.4% of samples received), SCK was present in around 30% of cows sampled in the first 50 days of lactation. However there was less evidence of SCK in cows at peak lactation illustrating that it is not solely high levels of milk production that result in negative energy balance, rather the gap between DM intake and energy requirements in early lactation. These results also highlight the importance of transition cow nutrition. Improved nutritional management around calving can help to reduce such effects of negative energy balance on cow performance and future fertility.

**OC: 30**

**The efficacy of different combinations of ketosis treatments in israeli dairy cows**

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**Objectives:** The objectives were to compare the efficacy of different treatments commonly used in Israel, and their effect on recovery, reproduction, and cumulative 305 day lactation yields.

**Materials and Methods:** 1847 cows that calved between July 2005 and June 2006 in the ambulatory clinic of the KSVM were included in the study. The cows were divided to 3 main groups: healthy cows, cows with mild ketosis, and cows with severe ketosis. Mild ketosis was defined as urine acetate levels of 1-4 mmol/L. The affected cows were treated by oral propylene glycol for 3 consecutive days. Severe ketosis was defined as urine AcAc levels higher than 4 mmol/L. 115 cows were found to have severe ketosis and were assigned to 4 treatment groups according to the brand number, even or odd, and the farm. The control group, treatment group no. 1, received 500 ml intravenous bolus of 50% dextrose, an intra-muscular methasone injection, treatment no. 2 included IV dextrose and oral propylene glycol for 3 consecutive days. Treatment no. 2 included the dextrose IV bolus and dexa-methasone injection, treatment no. 3 included IV dextrose and oral propylene glycol and treatment no. 4 included a dexamethasone and propylene glycol. Recovery was defined as absence of acetocacetate in the urine in the following veterinarian visit, 3-4 days after the treatment.

**Results:** Healing was significantly affected by the treatment. IV dextrose and oral propylene glycol administration was significantly less effective than the control group (OR=0.039, P=0.004). No significant difference was found between the different treatment groups in 1st Al conception rate, cows empty at 150 DIM, anestrous, inactive ovaries, empty days and pregnancy rates. An interesting finding was a difference between the mild ketosis group and the rest of the cows as mild ketosis cows showed lower 1st Al conception rate and higher not pregnant at 150 DIM rates. There was a significant influence of the treatment on 305 day corrected lactation milk yield but not on Economy Corrected Milk yield. Group 3 produced 1,070 kg milk less than the control group (P=0.05). Groups 2 and 4 produced 1060 and 300 kg milk then the control group respectively, but the difference was not significant.

**Conclusions:** Ketosis treatments should contain glucomannano tools to improve healing and milk production. Treating mild ketosis with only oral propylene glycol is not effective. It may be that all levels of ketosis should be regarded and treated as one.

**OC: 31**

**Grass silages undergo extensive proteolysis cause health problems in dairy herds**

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**Objectives:** In general, protein breakdown is highest during the first day after ensiling and decreases rapidly as the pH decreases with little protein breakdown occurring after one week of proper ensiling (Muck et al., 1993). The protein breakdown can occur through plant enzymes or by clostridia. Silage that goes through clostridial fermentation smells badly (Stone et al., 2004).


**Results:** Comparing the situations on farms concerned, the only common finding is a reduced content of true protein and an increased amount of NPN in the grass silages. (Heimbeck et al., 2002, Coenen et al., 2004, Eicken, 2005a). In several samples, the percentage of true protein in crude protein is less than 30%, mainly in first cut silages. In fresh grass, wilted grass and hay, the percentage of true protein in crude protein is normally about 80%. So good quality grass silages have a percentage of true protein in crude protein of about 60 to 70%. Looking for more details in the chemical composition of these silages with extensive proteolysis, an enormous increase of free AA was detected (Evonik Degussa, Hanau). Since free AA can be the source of biogenic amines (by decarboxylation), further investigations were done. Following the idea that large amounts of free glutamate released during fermentation are decarboxylated to gamma amino butyric acid (GABA), especially this compound was determined. Having analyzed 108 samples of grass, hay and grass silage (more than 90% first cut), out of farms with health problems, a tremendously increased content of GABA in first cut silages was found. Accounting for these results, dairy cattle may consume up to 120g GABA/day or even more. Under such circumstances, a big part of the herd becomes ill. According to current experience, it is assumed that 40 g GABA/day will be tolerated by the cows.

**Conclusions:** In conclusion: if the GABA intake of cows exceeds 40 g/day, a severe risk for health problems in the herd is to be expected.

**OC: 32**

**The effect of dietary supplementation with live yeast Saccharomyces cerevisiae on serum and rumen fluid parameters in dairy cows under field conditions**

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**Objectives:** The aim of the study was to investigate the dose effect of live yeast Saccharomyces cerevisiae (ACTISAF® Sc-47, Lesaffre Feed Additives, France) on serum and rumen fluid parameters in lactating Holstein dairy cows under field conditions.

**Materials and Methods:** The study included 30 high-producing Holstein cows allocated into 3 treatments (n=10): 1. C (Control) – basal diet. 2. LY1 - basal diet plus 1 g live yeast (1x1010 CFU/g S. cerevisiaeNCYC Sc 47) per cow per day. 3. LY5 –basal diet with 5 g LY per cow per day. The diets were fed 21-122 days postpartum. At one month intervals, samples for serum analysis were taken from v. coccygea, and rumen fluid samples were taken by oesophageal probe. Data were analysed by ANOVA for repeated measures by means of GLM of SPSS (SPSS Version 13.0 for Windows, SPSS Inc., Chicago, Illinois) and differences were assessed by Tukey’s pairwise comparisons.

**Results:** Rumen milieu parameters Live yeast supplementation resulted in a significantly (P < 0.001) increased ruminal pH and significantly decreased lactate content (P < 0.001). The LV dose effect was not significant. Other parameters (total VFA, acetate, propionate, butyrate, NH3) were not significantly influenced. pH: Control pH 6.13a; LY1 pH 6.36b; LY5 pH 6.30b; SEM 0.28, P < 0.001. Lactate: Control 1.39b mmol/l; LY1 0.51a mmol/l; LY5 0.56a mmol/l; SEM 0.09; P < 0.001. Serum parameters There was a significant difference in serum NEFA and BHE levels and creatinine kinase activities between the two LY doses and the high LV dose and Control. A sig- nificant increase in cholesterol levels was observed in the LY cows, as compared with the Control. NEFA: Control 0.514b mmol/l; LY2 0.497b mmol/l; LY5 0.453a mmol/l; SEM 0.018; P < 0.01. BHB: Control 0.598b mmol/l; LY2 0.529b mmol/l; LY5 0.461a mmol/l; SEM 0.02; P < 0.01 Cholesterol:
Control 4.71a mmol/l; LY2 5.0b mmol/l; LY5 5.06b mmol/l; SEM 0.058; P <0.01 CK: Control 3.19b ukat/l; LY2 2.92b ukat/l; LY5 2.44a ukat/l; SEM 0.176; P <0.05 Other serum parameters measured (TP, albumin, urea, ALT, GGT, AST, bilirubin, triglycerides, Ca, Vt,E) were not significantly influenced.

Conclusions: The daily supplementation with live yeast Saccharomyces cerevisiae to high-producing dairy cows resulted in stabilization of the rumen milieu. The results indicate a dose-dependent mitigation of negative energy balance and a tendency to improved liver function. This study was performed within the project QH 81309 (NAZY C2) and supported by Lesaffre Feed Additives, France. Key words: live yeast, rumen milieu, serum parameters

OC: 33
Effect of supplementing regulators of hepatic metabolism and gluconeogenic precursors on the performance of rbST-treated dairy cows
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Objectives: The objective of this experiment was to evaluate the effects of supplementary regulators of hepatic metabolism and gluconeogenic precursors on the performance of rbST-treated dairy cows.

Materials and Methods: Thirty multiparous Holstein cows (9,000 L; Mature equivalent of milk yield) were used in a completely randomized design with 6 treatments: 1) T1 (no supplement + no rbST); 2) T2 (no supplement + rbST at 60 d postpartum); 3) T3 (no supplement + rbST at 90 d postpartum); 4) T4 (supplement + no rbST); 5) T5 (supplement + rbST at 60 d postpartum); and 6) T6 (supplement + rbST at 90 d postpartum). Supplement was based on choline chloride 100 g/kg; methionine 50 g/kg; propylene glycol 435 g/kg; niacin 15 g/kg; Biotin 2.5 g/kg (Stephanon, Bayhem). Cows were supplemented between 21 d (200 g/d/cow) before parturition and 45 d (400 g/d/cow) postpartum. Milk yield was measured daily from 7 d to 120 d postpartum. Milk samples were taken weekly and analyzed for fat, protein, lactose, milk urea N (MUN) and somatic cell count (SCC). Blood samples were taken weekly and analyzed for non-esterified fatty acids (NEFA), ß-hydroxybutyrate (ß-HB), triglycerides (TG), very low density lipoprotein (VLDL), total cholesterol (TC) aspartate aminotransferase (AST), blood urea N (BUN), and albumin.

Results: Compared with non-supplemented cows (T1, T2 and T3); T4, T5 and T6 increased (P < 0.05) milk yield, milk fat and milk protein concentrations and reduced (P < 0.05) somatic cell counts. Concentration of NEFA in plasma was not affected by treatments. Compared with supplemented cows (T4, T5 and T6); T1, T2 and T3 increased (P < 0.05) concentrations of ß-HB, TG, VLDL, TC, AST, BUN in plasma and reduced (P < 0.05) plasma albumin.

Conclusions: Overall, regulators of hepatic metabolism and gluconeogenic precursors supplemented in this study may be used to reduce negative energy balance in transition dairy cows avoiding metabolic problems (i.e., fatty liver and ketosis) as reflected by plasma concentrations of ß-HB, TG, VLDL, TC, AST, BUN, and albumin found in those cows with supplement. Also, data from this study suggests that both regulators of hepatic metabolism and gluconeogenic precursors can enhance the effect of rbST on dairy cows by increasing milk yield regardless of the day (either 60 d or 90 d postpartum) of application and increase immune response as showed by reduction in SCC in supplemented cows.

OC: 34
Is the ruminal activity connected with the oxidative status of dairy cows?
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Objectives: The aim of this study was to evaluate, under field conditions, the relationship between oxidative stress biomarkers and the levels of D and L lactic acid enantiomers, as markers of ruminal activity, during the transition period in dairy cattle.

Materials and Methods: 57 HF multiparous cows from the same herd were used. The control group was composed by 40 animals between the 4th and 5th month of gestation, when neither lactation nor pregnancy were major metabolic burdens. The experimental group consisted in 17 gestation animals. In order to relate our results with the physiological status of the animals, the data of these experimental animals were divided ex-post into two stages: i) prepartum (-1 month until parturition) and ii) postpartum (delivery to +1 month). Reactive Oxygen Metabolites (ROM), Plasma Barrier to Oxygen (OXY) and D and L lactate were measured in serum samples spectrophotometrically. The Oxidative Stress index (OSI) was calculated as ROM/OXY. Correlations between parameters were established using the Pearson correlation coefficient.

Results: In the prepartum stage, levels of D-lactate were correlated with the levels of ROM (r=0.510, P<0.05), whereas in postpartum L-lactate was correlated with OXY (r=-0.553, P<0.05). The discrepancies among correlations of both enantiomers may be attributable to the different metabolic pathways of them within the organism, since L-lactate is rapidly hydrogenated through the action of L-LDH, generating piruvate, an endogenous antioxidant; whilst the D-LDH activity in mammals is relatively low, therefore D-lactate is not so easily removed, it accumulates and causes more reactions that could generate more ROMs.

Conclusions: In the best of our knowledge, there are not previous reports that studied the relationship of ruminal activity with the oxidative stress of dairy cattle in the transition period. And in light of our results, the ruminal activity is related to the oxidative status of dairy cattle during the transition period, although with different role for each enantiomer, pro-oxidant for D-lactate and antioxidant in case of L-lactate.

OC: 35
Long-term measurement of rumen pH in dairy cows under practical conditions by an indwelling and wireless data transmitting unit
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Objectives: Subacute rumen acidosis (SARA) is a significant production disease of dairy cattle. The objective of this study was the continuous and long term measurement of the ruminal pH in high yielding dairy cows under practical conditions.

Materials and Methods: Therefore, an indwelling system for monitoring ruminal pH and temperature, already described and evaluated by Gasteiner et al. (2009), Veterinary Medicine Austria 96, 188-194, was applied on 4 dairy farms. Data were collected in an internal memory chip and sent via radio transmission to an external receiver. The indwelling system was orally given to 16 dairy cows out of 4 herds. Ruminal pH was measured at intervals of 600 sec over a period of first 60 days of lactation, starting 7 d prior to calving date. Daily mean, minima, maxima and time ruminal pH (min/d) below 6.3; 6.0; 5.8 and 5.5 were calculated. Individual milk yield and milk composition, feeding conditions and ration composition in terms of roughage and concentrate sources were determined and nutrient components were analysed. Statistical analysis was conducted by GLM (Statgraphic Plus 5.1).

Results: Radio transmission of data (twice daily) was functioning without any difficulties. Mean ruminal pH for all cows in all herds was 6.6, ranging from pH 6.7 during dry period to pH 6.1 on day 80 of lactation. A significant decline of ruminal pH was seen immediately after parturition, explainable by an increasing dry matter intake, and a second decline occurred 25 to 30 days postpartum due to the increasing amount of fed concentrates. There was also a significant relationship between roughage composition (ratio grass silage : corn silage ranging from 30:60 to 60:30) and ruminal acid-base status. Ruminal pH continuously decreased from pH 6.8 to pH 6.4 with an increasing percentage of corn silage in the ration.

Conclusions: Results were significantly influenced by the ration composition, by the day of lactation and by the milk yield, and show that the presented method is a very useful and proper tool for both, scientific and practical applications.
OC: 36
The effect of metabolic diseases on the shape of the lactation curve in high yielding dairy cows
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Objectives: The effects of metabolic diseases occurring during the transition period on milk production of dairy cows have been evaluated in many different ways, all too often with conflicting conclusions. The present study proposes a fitted lactation model to analyze specific aspects of lactation curve shape and magnitude.

Materials and Methods: Production and health records of 1,946 lactations in a one year follow up study design within a transition management facility were collected in order to evaluate both short and long term effects of metabolic diseases (MD) on milk production. Milk production data were fitted with the novel nonlinear MilkBot lactation model while health records were used to classify cows as healthy (H), affected by one MD (MD+), or by multiple MD (MD++).

Results: The final dataset contained 1,148 H, 333 MD+ and 119 MD++ cows with distinct incidences of 3.6 % twinning, 4.8 % milk fever, 3.4 % retained placenta, 15.3 % metritis, 8.4 % ketosis and 2.0 % displaced abomasum. The model containing all MD showed that lactations classified as H have greater scale of production that rises faster (lower ramp) and also declines faster (lower persistence) in comparison with cows which encounter one or more metabolic problems. As a result of this change, time to peak milk production increased (50-52 d vs 53-56 d vs 59-65 d), while peak milk (44.16 ± 0.19 kg vs 43.21 ± 0.37 kg vs 40.64 ± 0.59 kg) and 60-d milk production increased (50-52 d vs 53-56 d vs 59-65 d), while peak milk (44.16 ± 0.19 kg vs 43.21 ± 0.37 kg vs 40.64 ± 0.59 kg) and 60-d milk production decreased (2407 ± 10 kg vs 2345 ± 21 kg vs 2177 ± 33 kg) when cows encountered no, one MD or complicated MD+, respectively. The overall 305-d milk production tended only to differ significantly between H and MD+, especially in second-parity cows. Though the shape of the lactation curve is changed when cows encounter uncomplicated or complicated MD, a slower rise to a lower peak seems to be compensated for by better persistency. In the individual MD models, 305-d milk production was decreased compared to H in both complicated twinning (10610 ± 49 kg vs 9711 ± 285 kg) and complicated metritis (10610 ± 49 kg vs 10133 ± 182 kg) but not milk fever, retained placenta, ketosis or displaced abomasum.

Conclusions: Though care should be taken in generalizing conclusions from a highly specialized transition management facility, the current study demonstrates that lactation curve analysis may contribute substantially to the evaluation of both short and long term effects of metabolic diseases on milk production by detecting changes in the distribution of production that are not apparent when only totals are analyzed.

OC: 37
Is the buffering capacity of NaHCO3 improved by glucose when both compounds are administered orally to healthy neonatal calves?
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Objectives: Glucose and NaHCO3 are commonly administered together in oral electrolyte solutions to diarrheic neonatal calves to correct dehydration and acidemia. Oral electrolyte solutions contain glucose to provide a source of energy and to improve intestinal Na and water absorption, but enhanced Na absorption by activation of the Na-glucose co transport could also enhance the buffering effect or oral NaHCO3 according to Stewart’s strong ion concept. Our objective was to determine the buffering effect of oral NaHCO3 with and without concomitant oral glucose administration in healthy calves.

Materials and Methods: Nine healthy neonatal calves fitted with arterial and jugular venous catheters as well as with a urine collection device were treated with 2 L of a solution of either glucose (300 mMol/L), NaHCO3 (300 mMol/L) or glucose (300 mMol/L) and NaHCO3 (300 mMol/L) in randomized order. Arterial and venous blood was sampled repeatedly over 8 h after each treatment. Urine was collected volumetrically. Differences over time and between groups for parameters characterizing acid-base homeostasis were determined by means of repeated measures ANOVA.

Results: The oral administration of NaHCO3 increased the venous BE by approximately 5 mmol/L within 4 h. This effect lasted for over 8 h and was not altered by addition of oral glucose. The plasma glucose concentration curve was identical after administration of oral glucose with and without NaHCO3. Furthermore neither plasma volume expansion nor plasma Na concentration or urine production differed between calves given oral NaHCO3 with and without glucose.

Conclusions: The combination of oral glucose and NaHCO3 administered as hypertonic solution did not result in improved buffering capacity when compared to oral administration of NaHCO3 alone given as isotonic solution. No clinically relevant effect of the Na-glucose cotransport on glucose absorption or plasma volume could be indentified after feeding the hypertonic glucose/NaHCO3 solution when compared to administration of isotonic glucose or NaHCO3 solution. It is possible that the hypertonicity of the combined glucose / NaHCO3 solution neutralized the effect of the intestinal Na-glucose co-transport. Further investigation of the effect of the Na-glucose co-transport after feeding hypertonic electrolyte solutions commonly used in veterinary but not in human medicine is warranted.

OC: 38
Influence of grain processing (grinding or pelleting) on serum metabolites and enzymes in finishing bull calves
Pereira , V.; Hernández J.; Benedito J.; Vázquez P.; Abuelo A.; García-vaquero M.; Muñoz R.; Castillo C.
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Objectives: The aim of this study was to compare the effect of two different methods of grain processing, grinding and steam pelleting, on different serum metabolic parameters (glucose, non-esterified fatty acids (NEFA), serum urea nitrogen (SUN), Total Serum Protein (TSP), albumin, creatinine, L-lactate, aspartate aminotransferase (AST), γ-glutamyl transferase (GGT) and amylnase in finishing bull calves.

Materials and Methods: A 77-day feedlot metabolic study was conducted using twenty Belgian Blue bull calves. Animals were allotted randomly into each of two experimental groups: PF (n=10), fed steam-pelleted concentrate; and GF (n=10), fed ground concentrate. All metabolic parameters were measured spectrophotometrically in serum samples. All statistical analyses were performed using SPSS 12.1. The criterion for statistical significance was P = 0.05; P values between 0.05 and 0.1 were considered trend to significant.

Results: Groups PF and GF did not differ significantly in regard to either glucose, NEFA levels, albumin, TSP, and serum enzymes AST, GGT and amylnase, although these variables varied significantly throughout the time. SUN and serum creatinine showed statistical differences between group x time interaction, finding the highest values of both in PF group (unless sample corresponding to day 51 for SUN value). Only serum L-lactate didn’t show any change associated to grain processing, even though PF group showed numerically the highest values, in relation to GP.

Conclusions: In our fields conditions, surprisingly only two parameters (SUN and creatinine values) showed a direct influence by grain processing, and taking into account that grain processing, at least from a theoretically point of view, increases the structural disruption of grain, it should increase the availability of glucose precursors and change protein solubility within the rumen, modifying many metabolites. The lack of effect may be derived to other nutritional factors, such as fibre source or crude protein of the ration.

OC: 39
Cell morphology of adipocytes in periparturient cows with or without lipolysis
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Objectives: The aim of the study was to compare cell morphology of adipocytes and the number of makedrophages in fat tissue of different fat storages in periparturient dairy cows with or without lipolysis.
**Materials and Methods:** 12 healthy, multiparous dairy cows in late gestation with a Body Condition Score (BCS) > 2.5 were included in the study. Blood samples were taken 4 weeks ante partum (a.p.) and 3 days post partum (p.p.) to measure concentrations of free fatty acids (FFA), beta-hydroxybutyrate (BHb), bilirubin, cholesterol, insulin and glucose. At the same time point samples of subcutaneous and retroperitoneal fat tissues were taken in the right flank. On the basis of FFA-concentrations on the third day p.p. cows were divided into two groups (lipolysis: FFA > 550 µmol/l, non-lipolysis: FFA < 550 µmol/l). Repeated quantitative insulin sensitivity check index (ROQUICKI) was calculated, even. The fat samples were histologically analysed regarding diameter, perimeter and area of adipocytes as well as the number of macrophages.

**Results:** In cows with lipolysis a significant decrease of diameter, perimeter and area of adipocytes in subcutaneous fat tissue could be detected whereas the number of macrophages increased significantly in retroperitoneal fat tissue of these cows p.p. The adipocytes in retroperitoneal fat tissue of cows with lipolysis showed significant greater diameter, perimeter and area a.p. than adipocytes of cows without lipolysis. In all cows, p.p. serum concentrations of FFA increased significantly and the serum concentrations of cholesterol decreased significantly. ROQUICKI in cows with lipolysis decreased significantly p.p. Cows with lipolysis had p.p. higher concentrations of FFAs, lower concentrations of insulin as well as a lower ROQUICKI then cows without lipolysis.

**Conclusions:** In cows with lipolysis main alterations of cell morphology of adipocytes can be detected in subcutaneous fat tissue. Though, the high increase in the number of macrophages in retroperitoneal fat tissue in cows with lipolysis confirm its particular importance in the pathogenesis of fat mobilisation syndrome.

**OC: 40**

**Effects of vitamin e and selenium on surgical stress and lipid peroxidation in dairy cows**

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**Objectives:** The present trial was aimed to study the effects of vitamin E and selenium treatment on thioarbituric acid reactive substances (TBARS) and plasma total antioxidative capacity (TAC) in dairy cows stressed by omentopexy.

**Materials and Methods:** Twenty Holstein-Frisian dairy cows, admitted for treatment of left abomasal displacement, were randomly divided into two groups. Ten hours before surgery 6 g of DL-a-tocopheryl acetate and 67 mg of sodium selenite (Vitasel®) were administered subcutaneously to 10 cows; the control animals (n=10) received an equivalent volume of injectable water (40 ml). Abdominal surgery (omentopexy) was performed in a standing position 16 – 24 hours after admission. Blood samples were drawn: before vitamin E/Se injection, just prior to surgery, immediately after surgery, then 15, 30, 60 minutes, and 2, 5, 10, and 24 hours after surgery. The plasma a-tocopherol was determined by HPLC using a fluorescent detector. The plasma selenium levels were determined by fluorometric detection, plasma TAC was analysed spectrophotometrically, and TBARS spectrophotometrically. The serum cortisol was determined by chemiluminiscent enzyme immunoassay. Statistical analysis was carried out by a two-factorial analysis of variance (one repeated factor: time, one grouping factor: treatment).

**Results:** The injection of vitamin E and selenium produced a rapid rise (p<0.05) in blood a-tocopherol and selenium concentrations. Two-way ANOVA did not show significant treatment effect on plasma TBARS and TAC in our trial. In contrast, a certain effect of the treatment could be found on serum glucose and WBC count (p<0.05). Serum cortisol concentrations increased in both groups after surgery (p<0.05) and two-way ANOVA revealed significant effect of treatment on cortisol levels (p<0.05).

**Conclusions:** In conclusion, the administration of Vitamin E and selenium resulted in weaker cortisol response in experimental animals, however, no significant effects of a single vitamin E/Se injection on blood TBARS were found.

**OC: 41**

**Increasing selenium intake and milk selenium concentration of dairy cattle under commercial conditions through selenium-enhancement of forage and soybeans**

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**Objectives:** We wished to test the efficacy of producing and feeding Se-enhanced round bale grass silage (RBS) and soybeans (SB) for increasing the Se content of milk and for correction of sub-optimal Se intake in a commercial tie-stall dairy herd.

**Materials and Methods:** Twenty-four similar plots and treated with either Se (Selcoete Ultra® mixed with annual spring fertilizer application to deliver 10 g Se per ha) or not treated (fertilizer only). Fertilizer was applied May 20, and forage was cut and round-baled June 18. A SB field at first flower was divided into 2 similar plots. Foliar application of a solution of sodium selenate was applied at 50 g Se/ha to one plot; the other plot did not receive any application. Feeds from different plots were harvested and stored separately. Cows were divided into 4 groups (n=12 per group) balanced for lactation number and days in milk. Cows were fed either Se-supplemented SB and/or Se in a 2x2 design. RBS was fed free choice and SB were fed at between 1 and 3 kg per head per day according to production and days in milk. Milk Se concentration was measured before the feeding trial, and at 30 and 40 days on trial. Milk and Se concentrations were measured using the fluorometric method while Se in SB was measured using ICP-MS.

**Results:** Comparing (mean ± SE) pooled pre-harvest with pooled post-harvest forage samples, treated forage contained significantly more Se than untreated (0.37±0.02 ppm compared to 0.44±0.01 ppm, P<0.001) on a dry matter basis. Treated and untreated SB contained 0.12 ppm Se and 2.35 ppm Se, respectively. Milk Se concentrations for cows receiving no enhanced feeds remained < 20 ppb. Feeding SB or RBS led to similar increases in milk Se (40 ppb), while feeding both together led to the highest milk Se values by the end of the feeding trial (57 ppb Se, P<0.01).

**Conclusions:** Enhancing the Se content of pastures, ensiled pasture and SB was practical under commercial conditions. Feeding of these Se-fortified feeds, alone or in combination, will provide Se intakes that more than meet the recommended dietary requirements of dairy cattle (0.3 ppm). Feeding Se-supplemented forage and soybeans provided a practical means to boost the Se content of milk and provides a useful mechanism to improve the organic Se content of milk products.

**OC: 42**

**Soybean oil and vitamin E: effects on production parameters and meat quality of Friesian calves**

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**Objectives:** In order to obtain a product with added value for consumer health, intensive work has been done in order to manipulate the fatty acid composition of intramuscular fat of beef through the use of polyunsaturated oils in food. Yet little is known about its impact on the organoleptic characteristics of the final product.

**Materials and Methods:** In this work we tested the effect of supplementing feed for finishing calves with soybean oil and vitamin E on growth parameters and sensory quality of meat. We used 63 Friesian castrated male calves with 6 months of age, randomly assigned to three treatments (a pen per treatment with three replicates) fed with compound feed and straw ad libitum for 60 days before slaughter. The compound feed included a supplement of 4% saponified palm oil (T1), 4% soybean oil (T2) and soybean oil 50mg/kg + Vitamin E (T3). Experimental feeds were formulated to be isenergetic and isonitrogenous.

**Results:** The animals of the various groups had a similar conversion rate, but the treatments T2 and T3 showed a higher average daily gain (1.35 vs. 1.49 and 1.53 kg / day for T1, T2 and T3, respectively). The meat of animals of T3 had the greatest percentage of fatty acids C18:1trans (4.62 vs. 3.58 and
3.25 in T3, T1 and T2, respectively), C18:3 (0.24 vs. 0.19 and 0.22 in T3, T1 and T2, respectively) and C18:2trans10cis12 (0.03 vs. 0.01 and 0.02 in T3, T1 and T2, respectively). The evaluation by tasting panel found that the meat of the T2 group had lower tenderness (4.96 vs. 5.70 and 5.76 in the T2, T1 and T3, respectively), lower juiciness (3.50 vs. 4.25 and 3.90 in the T2, T1 and T3, respectively), and therefore less overall acceptability (4.67 vs. 5.25 and 5.34 in the T2, T1 and T3, respectively).

Conclusions: The results obtained showed that, in terms of growth rate, soybean oil is a viable alternative in feeding finishing calves, but its use leads to decreased acceptance of meat. However, the combination of soybean oil and vitamin E is able to solve this problem. It would be interesting to evaluate the impact of increasing concentrations of vitamin E for these animals during this period.

OC: 43

The effects of increased sulfur level supplied through inorganic source with or without organic source in close-up diets of Holstein dairy cows on blood metabolites and liver function
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Objectives: Sulfur (S) has been considered as a tool to manipulate the dietary anion-cation balance in dairy cows close-up diets. Previous studies revealed that inorganic S supplement had negative effects on performance in dairy cows. As explained before, contributing S in manipulating the close-up diets dietary cation-anion difference (DCAD), it is one the main micro minerals which have been considered in transition period of dairy cows which might have effects on cow blood metabolites. In this study blood parameters and liver function were evaluated by S supplementation through inorganic source (magnesium sulfate) with/without organic source (Mepron; Evonik Industries, Hanau, Germany) in close-up diets.

Materials and Methods: Materials and methods; The twenty four multiparous close-up Holstein cows with 21d expected until calving date were allocated in three different treatments (8 cows/each) in a completely randomized design. T1 has contained 0.21% S, T2 has contained 0.41% S which the extra S (i.e. 0.2%) supplied entirely through magnesium sulfate and T3 has contained 0.41% S which extra S supplied through combination of magnesium sulfate and Mepron. Blood samples were collected 4 d before expected calving, on 3 h after calving, and also on 12 h after calving. The plasma concentrations of glucose, non-esterified fatty acids (NEFA), β-hydroxybutyric acid (BHBA), creatinine phosphokinase (CPK) and aspartam amino transferase (AST) were measured. The last two enzymes were considered as liver function indices.

Results: Results; The inorganic source of S was decreased glucose and increased NEFA and BHBA concentrations in blood. Inorganic supplementaion decreased glucose concentration in both pre- and post-calving periods. The inorganic S supplement produces high levels of H2S which interfere to microbes function in rumen and cause to lower efficiency. The lowest concentrations of liver enzymes were for un-supplemented treatment (the liver enzymes concentrations were 159, 213 and 189 IU/L for CPK and 83.09, 111.9 and 92.15 IU/L for AST for treatments 1, 2 and 3, respectively).

Conclusions: Conclusion; The results indicate that although a combination of inorganic and organic S supplements could have positive effects on blood parameters, but this combination had no favorable effect on liver enzymes responses.

OC: 138

Cyanogenic potential of various sorghum fodder species
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Objectives: Many plants contain a cyanide compound, cyanogenic glycoside, and also an enzyme beta-glycosidase which hydrolyses the cyanogenic glycoside to hydrogen cyanide which is highly toxic to the livestock. In this study cyanide levels and factors affecting cyanide levels in various sorghum fodder plants were determined.

Materials and Methods: A total of 500 samples of various plant species used as livestock fodder were collected from the crop fields of different areas of Tehsil Burewala, Pakistan. They included 100 samples each of Sorghum bicolor, S. Sudanese, Jumbo grass (S. bicolor x S. sudanense hybrid), S. halepense and maize. An estimation of cyanide levels in the samples was performed spectrophotometrically using the picrate kit method. Data for each sample were incorporated in a data capture form. Entries included type and species of plant, local and botanical name, height, part of plant material, age, growth stage etc.

Results: The cyanide content of S. bicolor (192.8±9.051 mg/kg) and S. sudanense (198.7±9.50 mg/kg) were not significantly different from each other (P>0.05). A significant difference (P<0.05) was observed between CN? contents of Jumbo grass (211.7±9.086 mg/kg) and S. halepense (244.9±9.659 mg/kg). Jumbo grass and S. halepense have significantly higher (P<0.05) CN? concentrations than S. bicolor or S. sudanense but the CN? contents of S. halepense were significantly higher than Jumbo grass. Maize has significantly lower (P<0.05) values of CN? contents (6.6±0.529 mg/kg) than any of S. bicolor, S. sudanense, Jumbo grass or S. halepense. All plant species showed a gradual increase in CN? contents with increase in height of the plants that reached maximum level at height of 91-100 cm. The CN? contents in leaves of all plants species were significantly higher (P<0.05) than CN? contents of stem.

Conclusions: Jumbo grass and S. halepense possess higher cyanogenic potential compared to S. bicolor or S. Sudanese, and cyanide content increases gradually with increasing height of plants up to 91-100 cm. At greater heights, CN? content gradually decreases in all plant species.

OC: 139

Evaluation of portal blood flow using transcutaneous and intraoperative Doppler ultrasonography in dairy cows with fatty liver
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Objectives: The objective of the study was to investigate portal blood flow (PBF) in dairy cows with different liver fat content by means of Doppler ultrasonograpy.

Materials and Methods: Eighty lactating German Holstein cows less than 100 DIM were used (mean ± SEM; body weight: 583 ± 9 kg, age: 5 ± 0.2 yr, withers height: 145.4 ± 0.5 cm, milk yield: 9 ± 0.6 kg). All cows had left abomasal displacement and underwent omentopexy via right flank laparotomy. Transcutaneous ultrasound examination (Power Vision 6000, Toshiba Inc., Tokyo, Japan) was carried out before surgery in nonseparated, standing animals according to Braun (1990, 2009). The size of the liver and the thickness over the portal vein were measured transcutaneously by B-mode ultrasonography (Haudum et al., 2011). Doppler ultrasonographic examinations of PBF were carried out transcutaneously, and intraoperatively directly via liver surface, PBF velocities (peak maximum (vmax), peak minimum (vmin), mean maximum (vmean) velocity) were recorded. Venous pulsatility index (VPI) was calculated. Because transcutaneous Doppler ultrasonography revealed images of very poor quality in 58 of the 80 cows, only data obtained intraoperatively were presented. Liver biopsies were used for hepatic triacylglycerol (TAG) determination and histological examination. Based on histopathologic and ultrasonographic examinations, none of the cows suffered from hepatic disorders other than hepatic lipidosis. Hepatic TAG content ranged from 5 to 292 mg/g of liver fresh weight (FW). Cows were allocated to one of four groups according to their hepatic TAG content (TAG >500 mg/g FW, n = 27; >100 – 150 mg/g FW, n = 18; 750 – 100 mg/g FW, n = 19; <50 mg/g FW, n = 16).

Results: None of the cows had clinical evidence of heart disease, and ultrasonographic examination of the caudal vena cava revealed no abnormalities. The VPI decreased with increasing TAG content (r = -0.55). The VPI did not differ between cows with severe and very severe fatty liver but it differed between cows of these two groups and cows with mild and moderate fatty liver. Velocities of PBF (vmean, vmin, vmax) correlated negatively with hepatic TAG content (r = -0.26 to -0.37). Mean PBF velocity of the cows with very severe fatty liver differed from cows with severe, moderate and mild fatty liver.
liver. Variables of PBF were inversely related to hepatic size and thickness (r = -0.06 to -0.35).

Conclusions: In conclusion, the lower VPI and PBF velocities in cows with fatty liver and the negative correlations with the degree of hepatosteatosis may be explained by a reduction of vascular compliance in the liver because of fatty infiltration. These changes, which are believed to result from parenchymal swelling, were particularly pronounced when hepatic TAG content exceeded 150 mg/g FW.

OC: 140

Diurnal variation of trans fatty acids in plasma lipoproteins and ruminal fermentation parameters of cows subjected to ruminal pulses of vegetable oils

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Objectives: The objective of this experiment was to evaluate the effects of supplementary lipids on 18:1 trans fatty acid (TFA) concentrations of plasma, lipoprotein fractions, and ruminal fermentation parameters.

Materials and Methods: Three non-lactating Holstein cows, each with a rumen cannula, were utilized in a 3 x 3 factorial design with 3-d pulsing periods and 4-d washout intervals between treatments. Cows were treated with single ruminal pulses of: 1) skim milk (250 g/d in 500 ml of SM); 2) soy oil (250 g/d in 500 ml of SM), and 3) partially-hydrogenated vegetable oil (250 g/d in 500 ml of SM). Ruminal fluid and blood samples were obtained 0, 1, 2, 3, and 6 h after pulsing.

Results: Results are presented for the combined effects of treatments 2 and 3. Concentrations of the following increased linearly and were higher on Day 3 than on Days 1 and 2: all plasma 18:1 TFA; high density lipoprotein (HDL) 18:1 t-9, 1-11, and t-12; low density lipoprotein (LDL) 18:1 t-9, 1-10, 1-11 and t-12. Concentrations of the following were higher at times after pulsing: plasma 18:1 t-4 (1 h) and t-5 (2 and 6 h); HDL 18:1 t-4 (2 h), and t-9 (3 and 6 h). Time of sampling did not affect concentrations of LDL 18:1 TFA. Ruminal pH, NH3-N and total VFA did not differ between days. Relative to time of pulsing, ruminal pH decreased and was lowest at 6 h; NH3-N increased and was highest at 2 h; acetate decreased and was lowest at 2 h; propionate increased and was highest at 2h; butyrate increased and was highest at 1 h; and isovalerate decreased and was highest at 1 h.

Conclusions: Overall, variations in plasma and lipoprotein TFA and in ruminal fermentation parameters, suggest that ruminal microflora may be adapting to treatments across days and sampling times, supporting a cyclic control mechanism to balance rates of lipid entry and removal in the circulatory system. This is possibly related to regulation of lipid supply (diet and synthesis) and utilization by peripheral tissues.

OC: 141

Therapy aimed at protecting the liver: obsolete or still up to date? Part 1: Aetiology and character of liver diseases in cows

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Objectives: An analysis in ill slaughtered cows and cows with left side abomasal dis-placement (IDA) shows that the simple fatty liver is the biggest liver deviation. Highest liver lipid content and bad exit occur specially in cows with stronger inflammatory diseases (retained placenta, endometritis), partly caused by cytokine mediated insulin resistance.

Materials and Methods: Therapy aimed at protecting the liver (glucose, glucoplastic substances) is an important part of complete therapy.

Results: a) From 236 IDA cows with standard therapy (100 mg glucose/h/kg/d in 0.9% NaCl; 2x200 g/d glycerol glycol, 3 d chemotherapy, antiphlogistics); b) in 40 of 408 selected cows with strong liver damages (GLDH >100 U/l, bilirubin >50 µmol/l, AST >200 U/l) and standard therapy; c) in 50 cows with septicemia puerperea, standard therapy and in 25 cows additional dexamethasone; d) blood clotting analysis in 60 cows with SIRS.

Conclusions: a) Results: From 236 IDA cows were 211 cured and 25 died. After standard therapy normalized ketone bodies and bilirubin (p<0.05); GLDH, GGT, LDH, AP, and AST remained low. Cholesterol, pH-value, bilirubin (p<0.05) as well as potassium and thrombocytes referred to bad exit. b) 26 (65%) of 40 cows with strong liver damages were cured unproblematic. Ketone bodies, bilirubine and GLDH were decreased every time. 35% of died cows had a primary diseases with hopeless prognosis. c) In cows with septicpemia puerpereals with additional dexamethasone therapy were in contrast to standard therapy a quickly heart rate, respiratory rate, rumen movies, bilirubine, FFA, AST, GGT and GLDH (p<0.05) improved. Monocyctic phagocytosis as well as the oxidative burst of monocytes and granulocytes increased significantly. d) Cows with puerperal disorders had clotting disturbances. Fibrin, factor XIII, D-dimers, procalcitonin and thrombocytes referred to a bad exit. Heparin (180 IE/kg bw) can be used for treatment resp. prevention of clotting disturbances.

Conclusions: Therapy aimed at protecting the liver (glucose, glucoplastic substances) is an important part of complete therapy. Glucocorticoids (Voren®, vitamin-B12 (Catalos®, vitamin C/E, mbenutol (Genabili®), carnitine, niacin und cis-linolic acid (CLA) can be supportive. Deciding are a quickly diagnosis of additional diseases and a consequent aetologically therapy with acting antibiotics, maximal inflammatory inhibition, enzymatic as well as plasmatic antioxidaints, circulatory stabilisation, electrolyte substitution as well as inhibition of thrombosis.
OC: 143
Periparturient disorders and its relation to subclinical ketosis in Iranian Holstein cows
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Objectives: The objectives of this study were (i) to determine the incidence of ketosis in dairy herds under study using serum β-hydroxybutyrate (BHB) concentrations, and (ii) to investigate its relationship with periparturient disorders and its economic loss.

Materials and Methods: A total of 203 multiparous Holstein cow (parity 2-9) were randomly selected from 10 commercial dairy herds. Since the likely risk time for occurrence of ketosis is during 2-5 weeks after parturition, the samples were taken in 1 wk before calving and at wk 2 and 3 after parturition. From 3 weeks before calving to 2 months after calving, β-hydroxybutyrate and glucose were measured by commercial kits (Ranbut, Randox,UK and Parsazm, Iran respectively) using automated analyser. peripartum disease information including milk fever, metritis, mastitis, clinical ketosis, displaced abomasum, retained placenta, pneumonia and lameness was captured in farm data sheet. Statistical analyses were measured by descriptive analysis, Analysis of variance for significance and chi-square test for relationship of diseases.

Results: Statistical analysis revealed the prevalence of 13.79 percent for subclinical ketosis (cut off point 1.2 mmol/L). There was a significant correlation between SCK and LDA (odds ratio 0.974) metritis (odds ratio 4.280 and mastitis (odds ratio 6.64). Economic loss for SCK alone was about 41.45 per case and with related metritis, mastitis and LDA, were 320 $, 150 $ and 190 $ respectively. There was significant correlation between subclinical ketosis and LDA, Metritis and Mastitis.

Conclusions: Limited informations are available regarding the prevalence of subclinical ketosis in dairy herds and related diseases in Iran. There is considerable rate of subclinical ketosis and significant correlation with periparturient disorders in this study suggests an important alarm and more investigations for economic losses go to improve the nutritional management systems is neccassary. Actual economic loss would be more than estimation because loss of milk and weight loss due to related diseases and also medical monetary losses could be added.

ORGANIC FARMING AND ENVIRONMENTAL ISSUES
OC: 244
Health improvement following interdisciplinary intervention in organic dairy farms
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Objectives: A nationwide interdisciplinary intervention study was carried out between 2007 and 2010 in 106 German organic dairy farms in order to develop preventive animal health management strategies for mastitis and metabolic disorders and to validate this concept.

Materials and Methods: The average herd size in 2007/08 was 57 (18-252) cows and the average milk yield 6,053 kg per cow and year (3,424-8,917). After an initial farm visit focussing on the health situation and a range of potential risk factors including housing, herd management, feeding and forage production, individual evidence-based advice was provided by the project team. Intervention measures to improve udder and metabolic health were implemented within one year and their effectiveness was monitored for one respectively two years. Mixed models for repeated measures were used to analyse the outcome on farm level.

Results: In 102 farms measures regarding udder health improvement were implemented. In these intervention-farms treatment incidence for mastitis decreased significantly from 17.4 to 13.7% (2007/08 -> 2009, p=0.0008). Somatic Cell Score (SCS) improved significantly from 3.39 to 2.22 to 3.14 (2007/08 -> 2010, p<0.0001). Antibiotic dry-off-treatments significantly increased in the same period (17.5 -> 27.8%, p<0.0001). In all farms which had implemented some measures within the intervention study (regarding udder or metabolic health; n=105), daily milk yield increased significantly (19.8 -> 20.7 -> 20.8 kg/d, p<0.001); the average herd age did not change (5.4 years). Considering the group of 22 farms, which had implemented measures to reduce milk-fever incidence, treatment incidence of hypocalcaemia significantly decreased from 2007/08 to 2009 (9.7 -> 5.2%, p=0.0008) whilst metaphylactic measures, e. g. applying calcium-boli a.p. increased (5.5 -> 11.6%, p=0.027).

Conclusions: In conclusion, these findings provide evidence for improvements of the health situation in commercial organic dairy farms in response to farm-individual intervention measures. Further data analysis is necessary in order to evaluate the effectiveness of the intervention approach, i. e. with regard to the degree of implementation.

OC: 245
Health status of Swedish organic and conventional dairy herds
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Objectives: The aim of this study was to investigate health status in organic and conventional dairy herds. The study also investigated possible health effects of changes in organic legislation, such as 100% organic feed (EEC 889/2008).

Materials and Methods: The study was based on a 5-year longitudinal study (2005-2010) in 20 organic and 20 conventional herds. Data on 18,756 lactations, comprising health indicators, such as veterinary treatment records, longevity traits, culling reasons and condemnations at the slaughterhouse were available for analysis. A questionnaire regarding general farm data was also distributed to farmers. All statistical analyses were done using STATA Software v. 11 (Stata Corporation, College Station, TX, USA). Mixed models, with random herd effects, were used to compare organic and conventional herds in the statistical analyses.

Results: Preliminary results showed significantly lower veterinary treatment frequencies for displaced abomasum, clinical ketosis and calving disorders under organic management. Infertility and paresis puerperalis were more frequent during the period 2008-2010. Length of life was significantly higher in organic cows compared to those of conventional management and the two main culling reasons (poor udder health and infertility) only differed in the period 2005-2007.

Conclusions: There is a need for a critical assessment on areas where organic regulations may have most impact such as the prevention of diseases rather than the elimination of treatments. This assessment will contribute to study the relationships between risk factors and disease occurrence in order to optimize health status at herd level in organic herds.

OC: 246
Australia has legislated for a carbon tax - The possible impact on cattle emissions and the farming sector
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Objectives: To assess the impact on the cattle producer either now or in the future after the introduction of a carbon tax.

Materials and Methods: The Australian government has decided to remove agriculture from a carbon tax impost until 2015 at the earliest. This only relates to the actual farm sector and not to the processing units associated with the farming sector. This means that ruminant emissions will not be taxed at this stage. All other sectors associated with the farm will have flow on effects from the tax. The biggest effect will be on the emissions from the milk processing plant and from abattoirs during the slaughtering process. There will also be some effects from fuel and fertiliser used on farm related to crop production and transport logistics. Targets will be set for reductions of emissions and if they are unable to be met, then credits must be obtained from alternative sources. There are limited conditions under which the farm sector can gain credits for carbon storage on farm. These include timber on farm and carbon sequestration in the soil. The difficulty with both of these options
is the audit process. If timber is to be included then it can not be removed from the property, this means that a section of the farm is basically removed from production. The carbon sequestration has to be audited on a regular basis and is difficult to ascertain carbon levels accurately in a particular cropping or grazing system and therefore difficult to gain the carbon credits for which you can be paid.

Results: The introduction of the tax is anticipated to be on the first of July 2012. The price is set at $23 AUD per tonne of carbon dioxide produced. It is difficult to see if the increased cost of production will be reflected in an increase in return to the producer.

Conclusions: The Bulatrics group and other agricultural industries need to put together reviewed material so that the grazing sector in any country can gain carbon credits from all areas of farming and redefine the term “carbon sink” from the Kyoto protocol.

OC: 247
Seroprevalence of Mycobacterium avium subsp. paratuberculosis, Neospora caninum, bovine viral diarrhea and infectious bovine rhinotracheitis viruses in Québec organic herds.

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Objectives: Mycobacterium avium subspecies paratuberculosis (MAP), Neospora caninum (NC), bovine viral diarrhea virus (BVDV) and infectious bovine rhinotracheitis virus (IBR) infections are known to have major economical impact on dairy production. However, no data on the prevalence of these pathogens in organic dairy herds exists. The objective of this study was to evaluate the seroprevalence of these pathogens in Québec organic herds.

Materials and Methods: Among the 106 registered organic herds in Québec, a region-stratified random sample of 60 herds was selected. Each herd was visited once between November 2009 and January 2010. In each herd, 30 adult cows were randomly selected and bled to estimate NC and MAP seroprevalence. Five unvaccinated animals of older than 6 months were randomly selected to estimate BVDV and IBR seroprevalence. Serological analyses were performed using a commercial ELISA for MAP and NC, and seroneutralization techniques for BVDV-1, BVDV-2 and IBR. Apparent individual seroprevalence and herd prevalence and 95% exact confidence interval (CI) were calculated using SAS9.1.

Results: Fifty-nine herds were included in the study for MAP, NC and BVDV seroreivalence determination and 58 for IBR. A total of 1747 animals were tested for NC and MAP, 295 for BVDV-1 and BVDV-2 and 290 for IBR. Apparent individual seroreivalence of MAP and NC were 0.8% (CI:0.0-1.3%) and 4.1% (CI:3.2-5.1%), respectively. Herd level prevalence of MAP, NC, and IBR based on a herd test cut point of 1 positive animal were 20.3% (CI:10.0-32.8%), 50.8% (CI:38.0-63.6), and 31.0% (CI:19.1-42.9%) respectively. Based on a herd-test cut point of 2 positive animals, these prevalence were 3.4% (CI:0.0-8.0%), 28.8% (CI:17.8-42.1%), and 18.9 % (CI:8.9-29) respectively. Based on a herd test cut point of 1 positive animal, herd level prevalence of BVDV-1, BVDV-2 and BVDV (defined as seropositive for BVDV-1 or BVDV-2) were 35.6% (CI:23.4-47.8%), 32.2% (CI:20.3-44.1%) and 37.3% (CI:24.9-49.6%) respectively. Based on a herd test cut point of 2 positive animals, herd level prevalence of BVDV-1, BVDV-2 and BVDV were 23.8% (CI:12.9-34.6%), 23.8% (CI:12.9-34.6%) and 28.8% (CI:17.2-40.4%) respectively.

Conclusions: These pathogens are present in organic dairy herds in Québec. However, NC and MAP prevalence appear to be less important than those previously reported in conventional dairy herds in Québec and other Canadian provinces. Acknowledgment: Funded by Programme de soutien au développement de l'agriculture biologique.

OC: 264
Vaccine development to control bovine neosporosis
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Objectives: Bovine neosporosis is a major cause of reproductive failure in dairy and beef cattle worldwide. The disease is caused by the protozoan parasite Neospora caninum which may be transmitted through consumption of infective oocysts shed by dogs or vertically from dam to fetus in utero. This disease is responsible for significant losses to livestock producers and there are very few effective control options to help prevent disease or treat affected animals. The objective of this study is to look at the feasibility of controlling the disease through vaccination of naïve cattle.

Materials and Methods: Immunisation of Neospora-naïve cattle prior to mating with live N.caninum tachyzoites induced both humoral and cell-mediated immune responses and induced protective immunity against an exogenous challenge at mid-pregnancy.

Results: To further develop a live vaccine candidate, Neospora tachyzoites were passaged for differing lengths of time in vitro resulting in attenuation of their virulence in vivo. Using a small animal model of neosporosis, immunization using live attenuated tachyzoites afforded significant protective immunity. As Neospora caninum invades and multiplies within host cells, cell mediated immune responses in particular CD4+ T-cells and IFN7 are thought to be important in protective immunity. Therefore to obtain Neospora candidate antigens for a killed vaccination approach we used short-term CD4+ T-cell lines from Neospora infected cattle to select immunodominant tachyzoite antigens separated using size exclusion HPLC. These candidate antigens will be tested in different antigen delivery systems for their ability to induce protective immune responses in vivo.

Conclusions: This study has looked at both live and killed vaccine approaches to help control bovine neosporosis a major cause of reproductive failure in cattle worldwide.

OC: 265
Coccidiosis under field conditions: the importance of immunity
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Objectives: In addition to general management measurements, metaphylactic treatment with anticoccidial products is an additional tool to manage coccidiosis on the farm. With these treatments it is of importance to allow the natural build-up of immunity against pathogenic Eimeria species.

Materials and Methods: In Germany, a randomized double blinded field study was conducted. In total 27, 29 and 30 animals were assigned to the control, diclazuril and toltrazuril group, respectively. All groups were housed in a single pen under equal conditions. Control animals were used as sentinels to monitor Eimeria challenges. Once infection was confirmed, the calves were treated on average ten days later (day1). Calves were treated according to label, while the control animals were not treated. Faecal scores and oocyst counts were recorded twice weekly.

Results: During the first 41 days of the trial, shedding of oocysts in the toltrazuril group is close to zero. Pathogenic oocysts are recorded again in the toltrazuril group from day 42 onwards. The diclazuril group shows initially a low level of shedding and practically no shedding post 42 days. The control group has a similar shedding pattern as the diclazuril group, but at a higher level. Of the days that animals were sampled, the toltrazuril group recorded 34% more days with a faecal score of 2 or higher when compared to the diclazuril group. The difference diarrhoea becomes most apparent after the 42nd study day where in 5.3% of the samples for the toltrazuril group diarrhoea was observed, compared to only 0.5% for the diclazuril group. This difference is statistically different.

Conclusions: The results of this study show that metaphylactic treatment with diclazuril supports the build up of natural immunity against coccidiosis and causes less diarrhoea than the toltrazuril group post 42 days.
OC: 266
Epidemiological investigations on the occurrence of parafilariosis in cattle in one veterinary practice in the region of Allgäu, South Germany
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Objectives: The objective of the study was to describe the occurrence, distribution, signs and treatment of parafilariosis in an area in South Germany and to identify differences in farm management related to prophylactic measures.

Materials and Methods: Parafilariosis in cattle is a parasitic disease, caused by the filarial nematode Parafilaria boviciola. A characteristic sign of this disease is the seasonal occurrence of serous bleeding in the area of neck and shoulders of cattle. The assumed vector, responsible for transmitting the disease in Europe, is the head fly (M. autumnalis). The present study collected epidemiological data from 41 case farms and 41 control farms related to the occurrence of parafilariosis in cattle in the region of one veterinary practice between August and November 2010.

Results: No statistically significant differences were found in the altitude of the farm and paddocks, farm type, holding of animals, pasturing, prophylactic use of anthelmintics and fly infestation between case and control farms. The affected cattle on case farms were not bought in from countries or regions, where parafilariosis is endemic. Main locations for the ‘bleeding spots’ were neck and shoulders, additional signs were not observed. The time period, during which the exudations occurred most frequently was April to August. Treatment of parafilariosis was not conducted in all affected cows. There was no clear evidence for the effectiveness of treatment. Pasturing animals, which was considered a potential risk factor in the published literature, could not be confirmed in the present study. In the investigated case and control farms in total 69 pastured their cows, whereby the proportion in 41 case farms and 41 control farms were statistically significant differences were found in the altitude of the farm and paddocks, farm type, holding of animals, pasturing, prophylactic use of anthelmintics and fly infestation between case and control farms.

Conclusions: The results of this study did not reveal any differences between case and control farms. However, it showed that the majority of the farmers did not recognize the ‘bleeding spots’ as signs of parafilariosis, but deemed them as injuries of insect bites. Better education would possibly show the endemic distribution of the disease.

OC: 267
Verification of an interactive map assessing the potential spread of Galba truncatula and the free-living stages of Fasciola hepatica in Switzerland
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Objectives: The intermediate host of Fasciola hepatica is Galba truncatula in Switzerland. The snail and the free-living stages of the parasite require a moderate climate and moisture for survival, reproduction, and transmission. In Switzerland, these conditions are present in many regions, resulting in a mean prevalence of bovine fasciolosis from 8.4 to 21.4% (Rapsch et al., 2006). Based on temperature and rainfall data, soil conditions including ground water and forest cover in Switzerland, an interactive map with six risk classes was created in order to demonstrate the relative risk of transmission by modelling the environmental conditions that promote the survival and re-production of the larval stages of the parasite and the parasite’s intermediate host (Rapsch et al., 2008). As the map is based on a theoretical model, the aim of this study was, to verify the map by means of a field survey.

Materials and Methods: 80 randomly chosen fields (50 meters x 50 meters) from the north-east of Switzerland were searched for potential habitats. If potential habitats were found, they were searched for snails for 30 minutes.

Furthermore, other Galba truncatula findings from all over Switzerland were taken into account. The results of the field survey (no wetlands, wetlands without snails, wetlands with snails of a known population density) and the data of about 700 findings from other surveys were then compared to the interactive map.

Results: Preliminary results of the field survey: Of risk class 0 (no risk) and 1 (very low risk), 40.9 % of the fields were classified wrongly by the model. In 59.1 % of the fields from risk classes 0 and 1 no wetlands were found. In 54.7 % of the fields from risk groups 2 to 5 (low to very high risk) wetlands with or without snails were found.

Conclusions: Based on the preliminary results from the field survey, it is concluded, that the monthly risk modelled by the interactive risk map is not very accurate. The accuracy in modelling “no risk” and “very low risk” regions, respectively, is due to small findings especially in September and October. From the preliminary results it is assumed, that the accuracy of the map can be enhanced by implementing a transmission model in a next step.

OC: 268
A changing of the status quo amongst the helmint parasites of cattle and indications relative to anthelmintic treatment
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Objectives: Since 1980, nematode burdens of local replacement and stocker cattle have been determined on a periodic basis to monitor parasite prevalence and magnitudes. Nematode burdens found in naturally-infected calves in the summer of 2011 have not been seen before and might reflect a shift in the status quo of helminths which parasitize our younger cattle.

Materials and Methods: Ten naturally-infected Holstein calves, obtained from local farms, were grazed as a group for two months followed by housing in challenge-free conditions for 4 weeks prior to animal sacrifice and parasite quantifications (according to WAAVP and VICH guidelines). All nematodes were identified and counted from 2-5% content aliquots and 20-100% digest aliquots of the abomasum, small intestine and large intestine.

Results: For the ten animals sacrificed in 2011, mean (arithmetic) burdens by nematode were Cooperia spp (27,984), Nematodirus helvetianus (7,754), Haemonchus placei (2,631), adult Ostertagia ostertagi (2,090) and O. ostertagi EL4 (951). In fact, there was a larger mean population of arrested larvae for Nematodirus than there was Ostertagia (1,211 versus 951). Haemonchus, Nematodirus and Moniezia infections were greater than any previously observed in our area.

Conclusions: Up to the early 2000’s, the consensus amongst parasitologists was that O. ostertagi was the most important helminth parasite of cattle in temperate latitudes, a distinction due to its ability to infect all cattle regardless of age, disengage an effective immune response by the host, and employ hypobiosis to span adverse environmental conditions. Since that time however, extensive use of macrocyclic lactones for parasite control has evidently reduced Ostertagia populations while causing the proliferation of other nematodes more capable of developing or expanding on resistance, i.e. Haemonchus, Cooperia and Nematodirus. It can also be speculated that global warming has fueled the expansion of Haemonchus populations in cattle, a nematode that is ambiently thermophilic. With this shift of nematode parasitisms in younger cattle away from Ostertagia to the more ML-resistant populations of Nematodirus, Cooperia and Haemonchus, care should be exercised that chemical intervention with products unrelated to the MLs be utilized in order to provide effective remission from commonly-acquired parasitisms. Farm specific fecal egg count reduction tests combined with coprocultures are recommended.
OC: 269
Re-emergence of bovine trichomonosis and genital campilobacteriosis in beef cattle kept in extensive conditions in spain
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Objectives: Bovine trichomonosis (BT) and bovine genital campilobacteriosis (BGC) are two venereal diseases considered as important cause of early reproductive failure. In Europe, the advent of artificial insemination and effective control programmes has greatly reduced the incidence of the two diseases. However, reform of the Common Agricultural Policy and increased emphasis on environmentally friendly land management has encouraged the expansion of extensively managed beef herds in Europe. These systems usually use natural breeding and commonly have cattle grazing and communal pastures, which are significant risk factors for both BT and BGC. Thus, these changes in farming practice could lead to the re-emergence of these two diseases. The purpose of this study was to investigate the prevalence and risk factors associated to BT and BGC in Spanish beef bulls from: i) one representative Spanish beef cattle breeds usually managed in mountain areas: Asturiana de la Montaña (AM) and ii) bulls from beef herds with early reproductive failure.

Materials and Methods: Preputial smegma samples were collected with a plastic scraper prior to mating season. Samples were cultured in InPouchTM medium and in Lander’s transport medium for detection of Trichomonas foetus and Campylobacter fetus subsp. venerealis, respectively. All suspect cultures were confirmed by a PCR test. In addition, epidemiological data were collected by means of a standard questionnaire.

Results: In AM, T. foetus infection was demonstrated in 31.1% (32/103) bulls and 41.5% (27/65) herds. In infected herds, a significant deleterious effect on reproductive efficiency was found. When the age of infected animals was analyzed, AM bulls older than 3 years (39.7%) were more likely to be infected than young bulls (16%) (P<0.05; OR=3.5; CI=1.1, 11.2), indicating that older bulls increased the likelihood of infection. Control measures were accomplished by removing infected AM bulls and the herd prevalence decreased to 17.5% (14/80) (P<0.01) in the next season. In herds showing early reproductive failure, T. foetus and C. fetus venerealis were detected in 22.4% (39/174) and 6.93% (12/173) bulls, respectively. Dual infections were observed in 3.97% bulls.

Conclusions: The results reported here indicate a re-emergence of venereal diseases and highlight the importance of implementing testing programmes to evaluate the real importance of these diseases in European countries and the need for including these pathogens in the differential diagnosis of early reproductive failure.

OC: 270
Granulomatous meningo-encephalitis caused by Toxoplasma gondii in three bulls, a possible explanation for unexplained sporadic bovine meningo-encephalitis
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Objectives: Toxoplasma gondii is a protozoan, responsible for abortion and congenital abnormalities, 20 percent of cattle could be seropositive in Europe. It is known to cause encephalitis in domestic animals but there no evidence for the bovine species. Between 2009 and 2011, three Blonde d’Aquitaine bulls were referred for normothermic sporadic encephalitis. Two reproduction bulls and one fattening bull, have shown head pressing, head tilt and circling on the left. They were all housed in different buildings, fed without siage, and did not have the same nutrition.

Materials and Methods: General examination revealed normothermia, normal cardiac and respiratory rate, pulse and mucous membranes. Nervous propedeutic brought conserved vision, slow pupilar reflexes and permanent mydriasis. Other exams only revealed atone rumen with impacted content, dead protozoa and inactive flora. Lab exams showed decreased glutaraldehyde test coagulation time, increased protein concentration with hypergammaglobulinemia, lymphopenia, increased neutrophils and macrophages. The first two animals were referred more than 5 days after the beginning of the symptoms, one already in left lateral recumbency. Though they were given atropine 0.05mg/kg (IV, BID), micronized coal (1g/kg, PO, SID), Cefotiof 1g (IV, BID), Lactate-Ringer (3ml/kg/h), Thiamine (10mg/kg, IM, SID), they died within 4 days. The last one was referred only one day after showing head tilt; he only received natrium penicillin (60.000 U/kg, IV, TID, 6 days) and Fluixin-r-meglumin (1.1mg/kg, IV, SID, 2 days) and survived. At that time, routine tests for known encephalitis agent were negatives.

Results: After the death of the first two bulls, necropsy showed mild meningitis. Slides from the brain revealed granulomatous encephalitis, with perivascular mononuclear cells, and giant cells. It was found out some unknown cysts in gut, lung and brain. Protozoa were sought and seroconversion was positive on indirect immunofluorescence IgM and IgG (Day 2 versus day 22) for T. gondii. Immuno-histochemistry revealed the presence of tachyzoits in large number in several organs, including the brain.

Conclusions: However T. gondii has been described as an agent of diseases in bovine species, these are the first described cases of meningo-encephalitis in adults. Diagnosis is not easy; tachyzoits could be confounded with other structures during routine histopathology. A major clinical sign could be the mydriasis, observed in other species. That result could bring explanation for unexplained sporadic granulomatous meningo-encephalitis.
OC: 272

Preliminary results on the efficacy of Toltrazuril and/or Sulphadiazine/Trimethoprim treatment in Neospora caninum infected newborn calves

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Objectives: The main objectives of the study are to evaluate the efficacy of toltrazuril alone and of toltrazuril/sulphadiazine-Trimethoprim combination in Neospora caninum seropositive newborn calves and to determine whether such treatments reduce the abortion rate and infection incidence in their next generations.

Materials and Methods: This study was conducted on 2 dairy cattle farms having N. caninum prevalence of 15 to 30% with an abortion rate of over 10%. A total of 60 N. caninum seropositive female calves, which were determined by seropositivity in precolostral sera, were allocated into 3 different groups: Toltrazuril alone treatment (Group 1), Toltrazuril and Sulphadiazine/Trimethoprim combination (Group 2), and control (Group 3). In Group 1 (n=20), calves were given orally 5% toltrazuril (Baycox 5%) at a dose of 20 mg/kg only for 4 times once every week starting from the 5th day of the birth. In Group 2/S, calves (n=20) were orally given 5% solution of toltrazuril at a dose of 20 mg/kg only for 3 times once every weeks as well as Sulphadiazine/Trimethoprin were given intravenously for 4 consequent days within the first week of age. In Group 3 (n=20), calves were given placebo orally and intravenously. Blood samples of each calf were collected on the day of birth (Day 0) and the 3th, 6th, 12th months of their lives. The first pregnancy of these calves was monitored, the viability of the fetuses were examined periodically. The abortion rate in all groups was recorded. In the next generation calves, Neospora caninum seropositivity were analyzed, as well. If occurred, tissue samples of aborted fetuses and placenta were tested for N. caninum DNA with PCR.

Results: Unlike in control group, N. caninum specific antibody seroconversion from positive to negative occurred, starting from the 6th month of the treatment to the 12th month of the treatment in treated animals. The seroconversion rate was 15% (3 out of 20) in Group 1 and 20% (4 out of 20) in Group 2/S. In Group 3, 3 incidences of abortion were observed during the first pregnancy period of all examined heifers. On the other hand, only one incidence of abortion occurred in Group 1 while no incidence was recorded in Group 2/S. Prevalence of N. caninum in tissues of all aborted fetuses was confirmed by PCR and immunoperoxidase test. Up to now, 2 out of 9 calves in Group T, 2 out of 8 calves in Group 2/S and 2 out of 17 calves in Group C were detected precolostrally seronegative in the next generation births.

Conclusions: * This study was supported by Bayer animal health, Germany in terms of proof and concept.

OC: 273

Molecular evaluation of indirect TaSP-ELISA for diagnosis of tropical theileriosis in baladi cattle (Bos Taurus) and water buffaloes (Bubalus bubalis)

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Objectives: The aim of the present study was to evaluate the validity of Theileria annulata surface protein (TaSP)-ELISA, in comparison with traditional microscopic test, for the diagnosis of T. annulata infection among Egyptian baladi cattle (Bos taurus) and water buffaloes (Bubalus bubalis). Molecular confirmation of infection using T. annulata merozoite surface (Tams-1) target amplification by PCR was used as a gold standard.

Materials and Methods: A total of 76 clinically suspected animals including 64 baladi cattle and 12 water buffaloes were investigated in the current study. Blood and lymph node specimens were collected from all investigated animals. Whole blood and lymph node specimens were used for conducting microscopic as well as molecular diagnostic assays. Separated sera were used for serological diagnosis.

Results: The study revealed that out of the clinically suspected cases, 43.7% and 57.8% of cattle and 16.7% and 66.7% of buffaloes were positive for T. annulata infection by microscopic and TaSP-ELISA diagnostic methods, respectively. Based on the results obtained by PCR, the evaluation study revealed higher sensitivity of TaSP-ELISA (72.9% and 75%) as compared to microscopic examination (58.3% and 50%) among cattle and buffaloes, respectively. On the other hand, the specificity of TaSP-ELISA in diagnosis of T. annulata infection was higher (87.5%) in cattle as compared to buffaloes (37.5%).

Conclusions: TaSP-ELISA was shown to be suitable for the diagnosis of T. annulata infection in cattle under field conditions. However, in buffaloes, in spite of its good sensitivity as compared to conventional methods, its considerably low specificity denotes the requirement for including another confirmatory test for diagnosis of tropical theileriosis in water buffaloes.

OC: 274

Cryptosporidiosis in Scottish beef suckler herds

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Objectives: Conduct a pilot study to indicate the extent of the problem, identify species of Cryptosporidium present in different classes of cattle on beef suckler farms during a calving season and describe the strategies used by farmers to manage neonatal diarrhoea.

Materials and Methods: Four veterinary practices in Aberdeenshire and Caithness were each asked to identify 10 participating farmers in spring 2011. Farmers were personally administered a questionnaire relating to general husbandry practice, husbandry practices suspected of being associated with disease, calf disease preventive strategies, curative treatments, calf mortality and morbidity, from the previous year’s calving season. Observations were made on the cleanliness of animals and the bedding system. Faecal samples were submitted from calves 7–14 d old, from cows and heifers immediately prepartum and at the time of weaning, and from calves with diarrhoea, for PCR for Cryptosporidia spp., to determine species and genotype. A follow-up questionnaire was conducted after the spring calving season in July 2011 to obtain accurate morbidity and mortality data and determine whether farmers had changed their management practices. Work is in progress but data from the questionnaires and some PCR results from calves are presented here.

Results: Both questionnaires were completed by 39 of 41 farmers enrolled, with 28 farms submitting 191 faecal samples from calves. There were no significant differences in management or other characteristics when farms associated with each of the practices were compared, so data were pooled. The median incidence of diarrhoea in calves was 6% (0 to 80%) of all calves born. Median mortality was 0.7% (0 to 10.5%). Farmers who identified a problem with cryptosporidiosis on farm had median morbidity and mortality estimates of 8.5 and 2% of calves born respectively. Two farmers indicated that ongoing problems with the disease might force them out of farming. No farm characteristics or management strategies were significantly associated with the diarrhoea-associated morbidity or mortality on farms. Cryptosporidium parvum was confirmed by 18S RNA sequencing on 19/23 farms. The dominant GP60 genotype was Ila1562R1, which was found in samples from all 17 farms on which GP60 was sequenced.

Conclusions: There is inadequate evidence to support commonly made recommendations for the control of cryptosporidiosis in beef calves in the UK.

OC: 275

Assessing viability and infectivity of Cryptosporidium parvum strains isolated from neonatal calves

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Objectives: Cryptosporidium parvum is an intestinal protozoan parasite that causes diarrhoea in humans and animals. In calves, C. parvum infection is of clinical and economic concern for producers. Because the faeces of calves
are a recognized source of Cryptosporidium oocysts, faecal contamination of drinking water is a potential means of transmission of this protozoan. Assessing the viability and the infectivity of isolates recovered from infected animals is necessary to assess their zoonotic potential. Objectives - Molecular identification of the isolates - Evaluate in vitro the viability and infectivity of Cryptosporidium isolates collected in cattle farms.

Materials and Methods: Fresh faecal specimens were collected from calves. The faeces were analysed for the presence of oocysts (Ziehl-Neelsen staining). The conditions necessary for the culture of Cryptosporidium were determined. The viability of oocysts was assessed by flow cytometry using propidium iodide. In vitro development was assessed by immunofluorescence and flow cytometry. This allowed a comparative study of the in vitro development of 5 isolates of C. parvum coming from cattle farms. Human ileocecal adenocarcinoma (HCT-8), and human colonic adenocarcinoma (Caco-2) cells were selected to this study. The molecular identification of Cryptosporidium species was based on the 18rRNA gene (nested-PCR and sequencing).

Results: Molecular identification showed that the 5 isolates belonged to the species C. parvum. Propidium iodide showed similar viability rates (80% to 99%) among the different isolates. The in vitro models set up in the laboratory using a reference strain (C. parvum IOWA, Waterborne, CA, USA) were used to cultivate the wild isolates. Only one isolate (Champi 2) showed an in vitro behavior similar to the one of C. parvum IOWA in the two cell lines.

Conclusions: In this study we tried to set up in our research veterinary laboratory, Cryptosporidium molecular identification assays and basic culture methods, including techniques allowing a current assessing of parasite viability. Both HCT-8 and Caco-2 cell lines revealed able to support the development of a referenced isolate of C. parvum (IOWA strain) and of one wild isolate of the same species (Champi 2).

OC: 276
Prevalence of Strongyloides papillosus and coccidia in young calves in France: concurrent infections are a serious threat for the health.

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Objectives: It is now well known that T helper (Th) cells produce signature cytokine patterns induced largely by intracellular (bacterial, viral, and protozoa) versus extracellular pathogens that provide the cellular and molecular basis for counter regulatory expression of protective immunity during concurrent infections. Th2-cells expressing IL-4-dependent immunity to extra-cellular helminth parasites induce an alteration of the Th1-derived protective responses (and production of IL-12 and IFN-gamma). In a similar manner, concurrent helminth infection alters optimal vaccine-induced responses in humans and livestock. The main objective of this trial was to demonstrate that a very early infection by Strongyloides papillosus may facilitate concurrent infection by pathogen coccidian mainly E. zuerni, E. bovis and E. alabamensis in young calves.

Materials and Methods: A multicentric study was conducted by six bovine practitioners in several areas of France, including 14 dairy and beef farms where 53 groups of 5 calves were randomly selected. Individual faecal samples were collected, twice a week, from Week 2 to Week 6. Epg counts were done on pooled samples (5 calves together) with Sodium chloride solution 40 %. Specific identification of coccidia oocysts were done on their size and shape according to literature data.

Results: Amongst the 53 sampled groups, 39 were positive i.e. an overall herd prevalence of 83 %. They were infected respectively by Eimeria bovis 88 %, E. zuernii 75 % and E. alabamensis 75 %. Concurrent infection by 2 or 3 pathogen species were frequent. In dairy farms, the mean of first significative oocyst excretion was between weeks 4 and 5 but in beef farms between weeks 5 and 6. The herd prevalence of Strongyloides papillosus was 25 % from Week 2 probably following clostral infection and the most frequent around Week 4, quite always before coccidian excretion.

Conclusions: Strongyloides papillosus is very prevalent in tropical countries and induces severe disease at sometimes sudden cardiac death. Many European labs never identify this parasite because flotation liquids used for McMaster are not adapted. Before this survey, we demonstrated that saturated sodium chloride solution is the best for the diagnostic of this infection. It was possible to identify this parasite in near by 25 % of the sampled calves. It appeared that coccidiosis was also very prevalent in these animals due to the concurrent infection by both parasites inducing immunomodulation.

OC: 277
Effect of gastrointestinal nematodes on ovulation rate of Merino ewes in Uruguay

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Objectives: The purpose of this study was to measure the effect of a nematode challenge during the autumn on live weight, body condition, follicle development and ovulation rate of Merino ewes.

Materials and Methods: Twenty-five multiparous ewes, were divided into two experimental groups (Control, n=13 and Challenged, n=12). The treatments were applied between March and May. The sheep in the Control group were dosed orally twice-weekly with 10 ml water, and dosed with Levamisole every 14 days. In contrast, sheep in the Challenged group were dosed orally twice-weekly with 6000 nematode larvae in 10 ml water. Live weight and body condition score were recorded at the beginning and at end of the treatment period and the faecal samples were collected every 14 days.

Results: The ovaries were examined by laparoscopy. Challenged sheep shed more nematode eggs per gram of faeces, lost 1.9 Kg live weight and 0.5 units of body condition during the study compared with the Control sheep. At the end of the experiment, both ovulation rate and ovarian activity were significantly lower in the larval Challenged group. No differences were found in efficiency; the lower ovulation rate was a consequence of a lower number of recruited follicles developing to the unruptured stage. While live weight, body condition and the number of developing follicles all decreased in association with a nematode larval challenge, the proportion of developing follicles which formed a corpora lutea were unaffected.

Conclusions: Thus a larval challenge during joining with nematode larvae at doses comparable to those encountered under field conditions can be expected to affect subsequent lambing performance.

OC: 278
Sheep naturally infected with Strongyloides papillosus: The effects of albendazole treatment on the development of oxidative/nitrosative stress

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Objectives: The aims of this study was to evaluate oxidative stress parameters in sheep in the presence of Strongyloides papillosus and after treatment with albendazole. Parasites, during its development stages can seriously damage parenchymatous organs during the migration in host, and thus provoke increased production of reactive oxygen and nitrogen species. On the other hand, it is a well known that certain drugs can be very harmful for delicate oxidant-antioxidant equilibrium and thus provoke oxidative stress during its biotransformation.

Materials and Methods: The research was performed on Württemberg sheep (n=40). The distribution of parasites in sheep was evaluated by native smear coprological technique and by sedimentation and flotation methods, while the degree of infection per sheep was quantitatively established upon method by McMaster. The oxidative stress parameters were evaluated upon catalase activity, the lipid peroxidation by level of malondialdehyde, while carbonyl and thiol plasma protein group concentration was used as indicator of the degree of oxidative modification of proteins, upon spectrophotometric analyses. The activity of Cu,Zn-superoxide-dismutase and relative distribution of lactate-dehydrogenase activity (LDH1-LDH5) was determined electrohoresetically.

Results: By coprology examination the presence of Strongyloides papillosus was revealed. The distribution of LDH isoenzymes in sheep moderately and
highly infected with *S. papillosus* revealed the parasite-induced damage of myocardial (LDH2), lung (LDH3) and liver (LDH5) cells occurred in infected animals, while the treatment with albendazole gave rise to liver cell damage only. The presence of *S. papillosus* has great impact on antioxidative enzymes activity in infected sheep (p < 0.001). The MDA concentration as indicator of cell membrane damage revealed that lipid peroxidation increases both in presence of parasites (p < 0.001) and anthelmintic formulation tested (p < 0.001), while the increase of carbonyl concentration (p < 0.01) as well as the observed decrease of thiol concentration (p < 0.001) indicated remarkable oxidative damage of plasma proteins in tested sheep.

**Conclusions:** Our results indicate that *S. papillosus* induce oxidative stress in sheep. The anthelmintic treatment with albendazole further promotes dysbalance of oxidative-antioxidative equilibrium in sheep. Further research efforts are needed in order to establish adequate treatment protocols for parasite infections (for e.g. using substances with antioxidative properties).

**OC: 279**

**Field study to evaluate the effectiveness of worm control programmes and inform decisions on the need for further anthelmintic treatments**

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**Objectives:** Gastrointestinal strongyles are a major source of economic losses during the first grazing season of cattle. Consequently, anthelmintics may be overused, without consideration of epidemiology, pharmacology and spectrum of action. This has economic implications for the farmer and increases the risk of anthelmintic resistance. The anthelmintic dosing programme should be tailored to meet the requirements of the farmer (cost, efficiency, availability etc) and those of the cattle (build up of immunity etc). After assessment of the parasitic risk, individual control measures are provided to the farmer before the start of the grazing season. The effectiveness of the dosing programme can be assessed by, for example, the measurement of serum pepsinogen levels at the end of the grazing season. This can be used to inform the need for anthelmintic treatment at housing. The avoidance of treatment at housing has potential to allow the development of immunity towards Ostertagia during the winter months and thereby enable reduced frequency of dosing during the second grazing season, possibly until first calving or integration into the adult herd.

**Materials and Methods:** Twenty herds in several France areas were dosed in 2011 with a long acting anthelmintic formulation at turn out or before turnout so that the persistent action of the anthelmintic expired before the end of July. This approach should enable some exposure to natural parasitic infection towards the end of the grazing season. At the end of the grazing season, five calves per herd were blood sampled for serum pepsinogen analysis.

**Results:** The results will be known in November 2011 and will allow estimations of: the level of the parasitic burden at housing; the level of zootechnical performance during the grazing season; the effectiveness of the anthelmintic dosing regime; the need for anthelmintic treatment at housing; the level of the acquired immunity at the end of the grazing season; and inform decisions on the dosing requirements for the cattle in their next grazing season.

**Conclusions:** This field study will provide insights regarding the effectiveness of customized dosing programmes. The responsible use of anthelmintics in this way has potential to enhance the sustainability of anthelmintics and optimise farm profits.

**PHARMACOLOGY**

**OC: 209**

**New mechanisms through which an antibiotic delivers anti-inflammatory benefits: The effects of tulathromycin**

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**Objectives:** Clearance of neutrophils dying by programmed cell death (“apoptosis”) is a central feature of the resolution of inflammation. Findings indicate that immuno-modulation and induction of neutrophil apoptosis by some macrolide antibiotics may generate anti-inflammatory benefits, but the mechanisms remain obscure. Tulathromycin (Draxxin(TM)), a recently developed antimicrobial agent for bovine respiratory disease, offers superior clinical efficacy for reasons that have not yet been explained. **OBJECTIVE:** The aim of this study was to identify mechanisms through which tulathromycin may exert pro-apoptotic and immuno-modulating effects and, in this process, to establish tulathromycin as a new model for characterising novel anti-inflammatory properties of antibiotics.

**Materials and Methods:** Bronchoalveolar lavages were collected from Holstein calves 3 and 24 h post-infection, challenged intra-tracheally with live Mannhemia haemolytica (2x107 CFUs) and treated with vehicle or tulathromycin (2.5 mg/kg). In another set of studies, pulmonary inflammation was induced in calves in the absence of live bacteria, via intra-tracheal inoculation of zymosan particles. Finally, mechanisms were further characterised using purified bovine neutrophils and macrophages in vitro.

**Results:** TUNEL staining and ELISA revealed that tulathromycin-treatment significantly increased neutrophil apoptosis and reduced levels of the potent pro-inflammatory lipid mediator leukotriene B4 in M. haemolytica-challenged calves, as well as in the lungs of calves infected by zymosan, a model of sterile inflammation. In vitro, tulathromycin dose-dependently induced apoptosis in freshly isolated bovine neutrophils from healthy steers in a capase-3 dependent manner, but failed to induce apoptosis in bovine fibroblasts, epithelial cells, endothelial cells, as well as freshly isolated bovine blood monocytes and monocyte-derived macrophages. The pro-apoptotic effects of TUL were also, in part, drug specific; equimolar concentrations of penicillin-G, oxytetracycline and cefotia failed to cause neutrophil apoptosis. In addition, tulathromycin significantly reduced levels of phosphorylated p70S6 kinase (S6K1), nuclear translocation of NF-κB p65, and mRNA levels of the pro-inflammatory cytokine interleukin-6 (IL-6) in LPS-stimulated bovine neutrophils, and in macrophages. Finally, tulathromycin activated the phagocytic uptake of apoptotic neutrophils by macrophages.

**Conclusions:** The findings illustrate novel mechanisms through which tulathromycin confers direct anti-inflammatory benefits. The discovery that an antibiotic with superior clinical efficacy may confer potent direct anti-inflammatory benefits by combining induction neutrophil apoptosis and by controlling the local synthesis of pro-inflammatory cytokines and lipid mediators paves to way towards novel approaches in drug design.

**OC: 210**

**Study of the effect of pangamic acid (vitamin b15) performance of bulls to repair jaripeo in oaxaca central valleys, Mexico**

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**Objectives:** Our objective was to observe the effect of applying acid or vitamin B15 pangamic, a substance that accelerates the recovery from fatigue prolonging the lifespan of cells through the stimulation of enzymes, a group of bulls for rodeo repair in physiological response expressed in number of repairs produced in a given period of time, considering it is a legally acceptable drug that is not addictive or harmful effects in animals that use it.

**Materials and Methods:** Observations were made at 100 bulls in the rodeos repair made in the region of the Central Valleys of Oaxaca during the spring season in 2008, divided into two groups of equal numbers of animals, selected at random, both with following common characteristics: age 4 to 5 years, average weight 350 kg, appropriate preventive health management in the area, with crosses of breeds: criollo-zebu, criollo-brown Swiss an wiss and brown Swiss and Creole. An untreated group and the other treatment used to prepare each bull pangamic Acid 2500 mg intramuscularly. 30 minutes on average before being ridden. The statistical method used was the hypothesis test for the means of two populations with variances not homogeneous, with 95% confidence interval.

**Results:** The results obtained in the untreated group comprising 50 bulls showed a response that ranged from 11 to 26 reservations, with 924 jumps total, giving an average of 18.4 per bull repairs for a period of 20 to 25 seconds, showing that the 38% (19 bulls) exceed the 20 objections and 62% (31 bulls) had a poor range of 11 to 19 repairs. By contrast, in the group
where pantoamic acid was applied, consisting of another 50 bulls, there was an answer that was from 25 to 30 reservations, with 1355 total jumps, giving an average of 27.1 repairs bull in a period of 20 to 25 seconds, exceeding the first group with a difference of 431 objections and jumps on average 8.62 per bull, where 66% (33 bulls) ranged from 25 to 27 repairs and 44% (17 bulls) showed responses excellent between 28 and 30 objections.

**Conclusions:** We conclude that repair bulls receiving pantoamic acid treatment showed a difference between the total number of repairs in 1355 produced jumps of 27.1 and an average repairs per bull and treatment had not occurred 924 hopping and an average of 18.48 repairs per bull, establishing a greater difference between the two groups of 431 objections and jumps 8.62 more on average per bull, applying the same conditions of age, weight, preventive health management and racial characteristics.

**OC: 211**

**Pharmacokinetics and milk elimination of flunixin in dairy cattle following different routes of administration**

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**Objectives:** Flunixin, is a nonsteroidal anti-inflammatory drug approved for use in dairy cattle in many countries to control the inflammation associated with mastitis and respiratory disease. It is approved for intravenous use with a meat withdrawal time of 4 days and a milk withdrawal time of 36 hours. Despite this approval, flunixin residues in both milk and meat have become a significant problem in many countries which has resulted in flunixin becoming a drug of very high regulatory concern. It is possible that residue violations are largely related to cattle not receiving flunixin by the approved route of administration (IV). Therefore the purpose of this study was to examine the pharmacokinetics and milk elimination of flunixin in dairy cattle following different routes of administration.

**Materials and Methods:** Twelve lactating Holstein cows were used in this study with 6 considered high producers (>34 kg of milk/day) and 6 considered low producers (<16 kg of milk/day). Flunixin was administered at a dose of 1.1 mg/kg at a 12-hour interval (2 injections total) by intravenous, intramuscular, and subcutaneous routes using a crossover design. Plasma and milk were collected for 5 days following the last flunixin dose. Following a 1-week rest period, the study was repeated with the same cows receiving flunixin by a different route of administration. Ultimately, all 12 cows received flunixin by the IV, IM, and SC routes. Plasma and milk concentrations of flunixin and its metabolite 5-hydroxyflunixin (5-OH flunixin) were determined by UPLC/MS.

**Results:** The terminal half-life for flunixin in both plasma and milk was longer following IM and SC administration as compared to IV administration. No 5-OH flunixin was detectable in milk samples collected 36 hours after flunixin was last administered. However 3 cows that received IM flunixin and 2 cows that received SC flunixin had residues above the tolerance limit (2 ppb) 36 hours after the last administration.

**Conclusions:** The high number of flunixin residues identified in both milk and cull dairy cows is likely related to administration of the drug by an unapproved route. Cattle that receive flunixin by the approved (IV) route consistently eliminated the drug before the approved withdrawal times, however residues can persist beyond these approved times following IM or SC drug administration. Education of veterinarians and farm personnel in proper drug administration is critical in the prevention of both milk and meat residue violations.

**OC: 212**

**Synovial perfusion of marbofloxacin after regional subcutaneous administration in the distal portion of the front limb of bovine (preliminary study)**

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**Objectives:** To determine the pharmacokinetics of marbofloxacin in serum and synovial fluids following regional subcutaneous perfusion (RSCP) of the distal portion of the front limb in healthy bovine.

**Materials and Methods:** Marbofloxacin (5ml; 10% solution, 1.5-2 mg/kg) was administered subcutaneous to four young bovines and a pneumatic tourniquet was applied to the proximal carpal region (45 min; 400mm/Hg). Sampling jugular times were 0 (control), 0.5; 0.75; 1; 1.5; 2, 3, 4, 6, 8, 10, 24 and 32 h and synovial times were 0.5, 0.75, 1.5, 2, 3, 4, 6, 8 and 10th after drug administration. Plasma and synovial concentrations of the marbofloxacin were determined by a high performance liquid chromatography with u.v. method.

**Results:** No side effects were observed after treatment. Marbofloxacin was not found in jugular blood during regional perfusion (45min), the observed lag time was 1h post administration, the peak concentration (Cmax = 0.41 ? 0.21 µg/mL) was achieved 1.75 ? 0.29 h post administration (one hour after regional tourniquet were removed), the area under curve (AUC) was 3.2870.9 µg•h/mL and the last quantifiable time oscillated between 1.62 and 6.81 µg/mL and a high variability was observed. The peak synovial concentration (0.48 ? 0.11µg/mL) was reached at 9.50 ? 1.00 h post-administration and AUC was 3.31 ? 0.25 µg•h/mL. The marbofloxacin concentration ratios (synovial:serum) was 1.08 ? 0.32.

**Conclusions:** Following RSCP, high marbofloxacin concentrations (>0.35 µg/mL) were achieved in synovial fluid during 6 hours. In cattle, RSCP may be useful and safety in the treatment of infectious diseases involving the distal portion of limbs, using a low dosage regimen.

**PUBLIC HEALTH/FOOD SAFETY**

**OC: 49**

**Antimicrobial and anti-inflammatory drug use in Belgian white veal calves**

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**Objectives:** The white veal industry is an intensive livestock production system where multidrug resistance is abundantly present. The objective of the present study was to describe and quantify drug use in white veal calves. Materials and Methods: Drug consumption data were prospectively collected on 15 white veal production cohorts (n= 5853 calves) in Belgium (2007-2009). Treatment incidences (TI) based on (animal) defined daily dose (DDD), prescribed daily dose (PDD) and used daily dose (UDD) were calculated.

**Results:** The mean treatment incidence (TI/DDD) of antimicrobial treatments was 416.8 DDD per 1000 animals at risk per day, and consisted for 95.8% out of oral group treatments. The main indication for group and individual drug use was respiratory disease. The most frequently used antimicrobials (group treatments) were oxytetracycline (23.7%), amoxicillin (18.5%), tylosin (17.2%) and colistin (15.2%). Deviations from the leaflet dosage recommendations were frequently encountered, with 43.7% of the group treatments underdosed (often oxytetracycline and tylosin to treat dysbacteriosis). In 33.3% of the oral antimicrobial group treatments a combination of two antimicrobial preparations was used. Smaller integrations used more antimicrobials in group treatments than larger ones (P<0.05). Producers used higher dosages than prescribed by the veterinarian in cohorts with a single caretaker (P<0.01). Anti-inflammatory drugs were far less frequently used (TI/DDD = 5.94) and markedly overdosed when individually injected.

**Conclusions:** The present study demonstrates highly intensive antimicrobial use in the white veal industry. Reduction can only be achieved by reducing the number of oral group treatments.

**OC: 50**

**Cephalosporin-resistant digestive commensal flora in ruminants**

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**Objectives:** Resistance to antibiotics has been described in bacteria isolated from cattle. Emergence of Gram negatives exhibiting resistance to 3rd gen-
eration cephalosporins by production of extended-spectrum β-lactamases (ESBLs) in animal isolates is particularly worrisome. In order to better evaluate the rate of resistance to broad-spectrum β-lactams in France, a study has been conducted in dairy farms, aiming to evaluate the rate of colonisation by cephalosporin-resistant Gram negatives. Our objectives were: - to detect emerging resistance to beta-lactams in bacteria isolated from dairy cattle - to characterize genes responsible for resistance to recent cephalosporines in commensal flora of dairy cows

Materials and Methods: The screening was performed by trans-rectal swabbing of 50 cows randomly chosen in 3 different dairy herds situated in the Paris region. Screening was performed on several occasions on each farm, by using agar plates selecting for ESBL-producing isolates (ChromID ESBL, bioMérieux, France), and Drigalski plates containing imipenem.

Results: Our study first allowed us to evidence the presence of genes responsible for resistance to recently licensed cephalosporines in Gram negatives belonging to the commensal flora of dairy cows. Several genes coding for different mechanisms were evidenced and characterized: they included cephalosporinases and ESBL (extended-spectrum beta lactamases). Prevalence of these genes among the sampled cows was determined and appeared to be quite low: for instance, only 2.15% of the cows had a common origin. Importantly, samples collected from one farm gave nine species not responsible for cattle nor human infections, but known to be present in the environment. PCR and sequencing allowed identifying the same gene encoding the carbapenem-hydrolysing class D β-lactamase OXA-23. Interestingly, OXA-23 is known to be the main mechanism leading to resistance to carbapenems in Acinetobacter baumannii in humans worldwide. All the isolates harboured the blaOXA-23 gene on their chromosome.

Conclusions: We demonstrated here that cows could be reservoirs of resistance determinants that are clinically relevant in human medicine, including ESBL determinants as well as genes responsible for resistance to carbapenems. In particular and to the best of our knowledge, that study constitutes the first identification of carbapenemase acquisition in animals. These findings are worrisome, as the presence of ESBL genes in the commensal flora or rumenites may lead to therapeutic failures when using last generation cephalosporines. It would be of interest to carry out comparable studies in other animal sectors (for instance in cow-calf herds) and to monitor the situation in the studied dairy herds over several consecutive years. This would help to adapt the behaviour of practitioners in terms of antibiotic use, and to contribute to limit the emergence and increase of this phenomenon.

OC: 51
Determination of aflatoxin M1 and benzoic acid in fresh milk from thai dairy herds
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Objectives: Lactating dairy cows that consume aflatoxin B1 contaminated diet could excrete hydroxylated metabolite aflatoxin M1 into the milk, which may cause adverse effects to susceptible consumers. Benzoic acid has been used in the food industry as a preservative because of its antimicrobial activity against various bacteria, yeasts and fungi. However, benzoic acid could naturally occur in milk and could range from 2 to 5 mg/kg. Data concerning milk aflatoxin M1 and benzoic acid in Thailand are very limited. The study aimed to determine the concentrations of aflatoxin M1 and benzoic acid in fresh milk collected from small-holder dairy herds in Thailand.

Materials and Methods: In total, 340 herds including 3,240 dairy cows were sampled. 50 ml of composite milk samples were collected from each cow. The milk samples were delivered to the laboratory in an ice box within 2 days after collection. Thereafter, the milk samples from each herd were pooled, and 60 ml of pooled samples were kept at -20°C until analyses. Milk aflatoxin M1 was determined using ELISA and benzoic acid was detected using HPLC.

Results: Average concentrations of aflatoxin M1 were 0.097 (± 0.005) μg/kg, with a range from 0.000 to 0.620 μg/kg. Of 340 herds, 338 herds (99.4%) had average concentrations of aflatoxin M1 lower than the FDA recommendation level of 0.5 μg/kg, and 130 herds (38.2%) had average concentrations lower than the EC recommendation level of 0.05 μg/kg. Average concentrations of benzoic acids were 0.492 (± 0.048) mg/kg, with a range from 0.000 to 6.954 mg/kg. Of 340 herds, 68 herds (20%) had a zero-level of benzoic acid, and 270 herds (79.4%) had average concentrations between 0 and 5 mg/kg, and only 2 herds (0.6%) had average concentrations greater than 5 mg/kg.

Conclusions: According to FDA recommendation of aflatoxin M1, fresh milk of dairy cows from small-holder dairy herds was considered to be safe. In addition, fresh milk from Thai dairy herds had a trace level of benzoic acid, which was also nontoxic to the consumers.

REPRODUCTION
OC: 75
Different intrauterine pressure changes after a single treatment with oxytocin or prostaglandin F2a, in early postpartum cows
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Objectives: In order to enhance uterine involution during the puerperium, pharmacological stimulation of myometrial contractility is frequently applied in the bovine. Yet, the efficacy of such treatments remains debatable. We, therefore, compared possible differences between the uterotonic effects of a single therapeutic dose of oxytocin (OT) and natural prostaglandin F2a (PGF2a) in early postpartum cows during two on-farm experiments (A and B).

Materials and Methods: In both experiments, pluriparous Holstein-Friesian dairy cows after uncomplicated calving and without retained fetal membranes were selected and randomly allocated to two groups. The cows of Group A (n = 9) received 50 IU OT (Oxytocin NCP, Newco Pharma Inc.) i.m. between 14 and 16 h after parturition, while the controls of Group B (n = 8) were treated i.m. with 5 ml saline solution. Ten cows of Group B received 25 mg PGF2a (Enzprost, Ceva) i.m. between 14 and 17 h after calving, while 10 others were treated i.m. with 5 ml saline solution (Group B). For the non-invasive intrauterine pressure measurement (IUP) recording and analyzing technique, a transcervically introduced open tip catheter was used as the acquisition unit. The signals were digitalized (at 4Hz) and analyzed, using a graphical programming software (Labview 5.0, National Instruments). For both studies, IUP characteristics during the first 4 h and of the 12th h after injection were compared with values during the pre-treatment hour in each of the two groups separately, using RM ANOVA and Dunnett test. Differences between the belonging groups were additionally analyzed at each time point by Student t tests.

Results: When a single treatment with OT was administered (Gr A1), both contraction frequency and total area under the curve significantly increased from pre-treatment levels (P<0.001) during the 1st post-treatment hour, returned to initial levels during the 3rd hour, and reached the declining level of the controls by the 12th hour. Such change did not appear in the controls (Gr A2). However, if PGF2a was administered, no significant treatment effect appeared in any of the IUP parameters. Only a significant time-related decline was obvious by the 12th h in all IUP parameters both in Gr B1 and B2 (P<0.001) when comparing them with their belonging initial values.

Conclusions: These results showed a clear difference between treatment with OT and PGF2a, with a significant short term contractility improvement after OT and no effect after PGF2a treatment during the early puerperal stage of dairy cows.

OC: 76
Oestrus detection in saliva of cows with special trained dogs
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Objectives: Efficient oestrus detection is a permanent challenge for successful reproductive performance in dairy cattle. Heat detection is time con-
suming and expensive. Dogs have been trained to identify oestrus specific odour in vaginal fluid, milk, urine and blood samples under laboratory conditions with accuracy of more than 80%. But it is still a challenge to use dogs for heat detection on farm. But for this it would be beneficial in terms of hygiene and safety for dogs and cows, that the dog would detect cows in heat from the feed alley with cows fixed in head lockers. The objective of this study was to test if dogs can be trained to detect oestrus specific scent in saliva of cows.

**Materials and Methods:** Saliva samples were collected from cows in oestrus (n = 46) and dioestrus (n = 68). Thirteen dogs were trained in this experiment. In the test and training situation dogs had to detect one positive out of four samples. A false indication was ignored and documented in the test situation. For determination the accuracy dog handlers were blinded regarding the position of the positive sample.

**Results:** Dogs for trained for two to four days in a training center for search dogs. The overall percentage of correct positive indications was 58.8% (n = 316) with a range from 40 (1 dog) to 75% (3 dogs).

**Conclusions:** To our knowledge this is the first report that dogs are able to detect oestrus specific scent in saliva of cows. Although the accuracy of detection was lower as for vaginal fluid, a dog can identify oestrus in cow saliva and thus could identify cows in oestrus sniffing at the mouth and nose. In a next step dogs will be trained to work directly with cows on farm.

**OC: 77**

An enterprise partial budget analysis comparing costs of using fixed time artificial insemination and short season natural service breeding for breeding beef replacement heifers

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**Objectives:** Artificial insemination is considered to be a best practice for the breeding of primaparous beef heifers. In the US, estrus synchronization with fixed time artificial insemination is gaining popularity. In this paper, the author has assembled an enterprise partial budget spreadsheet to compare the cost of a pregnant replacement heifer bred with estrus synchronization and fixed time artificial insemination (FTAI) versus the cost of a pregnant heifer bred using natural service bulls in a 45 day breeding season (45NS). This tool allows producers to compare these 2 management systems using their own enterprise metrics.

**Materials and Methods:** An excel spreadsheet is written that compares FTAI and 45NS using 20 different metrics that affect the cost a producer incurs growing and breeding a beef heifer. Production metrics, financial metrics and temporal metrics were submitted by 25 beef producers in southwest Missouri USA. The production metrics considered include; the number of replacement females desired, the weight at the beginning of the post weaning period, expected average daily gain, expected useful lifespan of bull, involuntary cull rate of bulls, number of heifers per bull, expected 45NS pregnancy rate, expected FTAI pregnancy rate. Financial metrics included the value per pound of the heifers at the beginning of the post weaning period, price slide of added weight (dollars per hundred weight), cost per day for feed and maintenance, bull purchase cost, salvage value of bulls, synchronization and AI expense per head, value of surplus heifers bred with FTAI (if expected AI pregnancy rate is exceeded). Temporal metrics included beginning date of the prebreeding season, beginning date of 45NS breeding season, date of fixed time AI, date of pregnancy confirmation.

**Results:** 25 replicates of the model, using metrics supplied by 25 producers in southwest Missouri, resulted in a mean advantage of $3.85 per pregnant replacement heifer bred with estrus synchronization and fixed time artificial insemination (FTAI) versus the cost of a pregnant replacement heifer bred with estrus synchronization and fixed time artificial insemination (45NS). The range of results were ($174.22) disadvantage to $311.90 advantage for FTAI. This tool confirms that FTAI for beef heifers is financially advantageous for most producers to adopt.

**Conclusions:** This tool is valuable to compare the relative costs of the 2 management systems (FTAI and 45NS) for the producer and his veterinarian when considering estrus synchronization and fixed time AI as a management practice in for their primaparous heifers.

**OC: 78**

Production factors influencing first service conception in dairy cows

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**Objectives:** Study objectives were to explore interrelationships between various milk production parameters and 1st service conception (FSC) performance from individual cow performance records.

**Materials and Methods:** Raw milk production and reproductive events data from approximately 55,000 complete individual cow lactations were collected from the Verden and Bavaria Calculation Centers of German Breeding Test Organizations from 2003 to 2006. These data represented 168 herds from three geographic regions (north, n=40; east, n=10; south, n=118) of Germany. Herd size ranged from 51 to 2158 cows. Individual pregnant and culled cow data were summarized by lactation. Multivariate logistic regression methods were used to model first service conception (FSC) success relative to milk production. Productive variables were quantified as averages across the lactation or by the first two test dates (TD). Production variables were then characterized by quartiles across or within farms and used as the main model effect. All models adjusted for lactation number (LN), year, farm region and size, and all appropriate interactions. Nonsignificant interactions (P>0.2) were removed.

**Results:** Model effects of LN, year, region, and farm size all influenced FSC (P<.0001) regardless of production parameter in the model. Compared to Northern herds (referent), Southern herds (HR=1.35, 1.30-1.40 95%CI) had higher FSC while Eastern herds (HR=.76, .72-.0.79 95%CI) had lower (P<.0001). Moderate sized farms (155-750 cows) had lower (P<.0001) FSC (HR=0.87, 0.83-0.92 95%CI) compared to large (>750 cows) farms. Smaller farms were not different. Relative to the highest quartile cows for average daily milk within farms, 3rd (0.89, .0006), 2nd (0.76, <.0001) and 1st (0.78, <.0001) quartile cows all had lower risk for FSC. Both 1st (P=.0003) and 2nd (P<.0001) TD milk influenced FSC where 2nd, 3rd, and 4th quartile cows had greater risk for FSC compared to 1st quartile cows. For 2nd TD milk, 4th quartile cows had lower (P=.0005) FSC risk (HR=0.86) relative to 3rd quartile cows. There was no interaction between 1st and 2nd TD milk on FSC. FSC was further influenced by total protein and fat yield for 1st and 2nd TD as well as 2nd TD fat:protein ratio. Increasing fat and protein yield in both 1st and 2nd TD increased FSC compared to 1st quartile cows. High and low quartiles for fat:protein ratio had lower FSC.

**Conclusions:** These data suggest FSC is not adversely affected by milk yield, though herd management factors greatly influence this interrelationship.

**OC: 79**

A comparative study of the performance of New Zealand Friesian cross Holstein-Friesian cows in Australian commercial dairy herds

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**Objectives:** A comparative study involving 9 dairy herds in Victoria, Australia was conducted with the aim of comparing the reproductive performance and milk production of straight-bred Holstein-Friesian cows with that of daughters of New Zealand Friesian sires crossed with Australian Holstein—Friesian cows, run under identical conditions on commercial, seasonally calving dairy farms.

**Materials and Methods:** The comparative field study collected data from the herds over one single lactation in 2009/2010. In total, 816 cows, including 529 Holstein-Friesians (HF) and 287 NZ Friesian×Holstein-Friesian cows (NZFxHF) in 9 herds were used to analyse reproductive performance and production based on a 305-day lactation. This enabled a comparison of breed differences to be assessed under pasture-based, seasonal calving conditions. Seasonality in Australia implies that cows should have an average calving interval close to 365 days with peak calving preceding peak grass growth and availability of pasture in Spring or Autumn. Farm profitability is therefore closely linked to the reproductive performance of the herd as reflected in the compactness of the calving pattern.
Results: The milk yield and reproductive performance parameters were adjusted for herd, age group, and interval from calving to mating start date. The HF produced a higher volume of milk (203 litres, p=0.015) than the NZF×HF cows, but only after the exclusion of cows with lactations less than 250 days. The NZF×HF cows had higher concentrations of milk fat (0.17%, p=0.0001) and protein (0.10%, p<0.001) than the HF cows, regardless of lactation length. Reproductive performance of the NZF×HF cows was superior to that of the HF cows in pregnancy rate after 14 weeks of breeding (77.6% versus 69.0%, p=0.027) and not pregnant at 21 weeks (20.5% versus 29.8%, p<0.019).

Conclusions: Overall, the study was able to show that daughters of NZF sires, crossed with Victorian HF’s, had superior reproductive leading to a more compact calving pattern and were less likely to be non-pregnant at the end of breeding compared to Victorian HF cows. The results suggest that this form of crossbreeding can improve the reproductive performance of the herd where a 12-month calving interval is desired, particularly in temperate climates with cows on pasture-based diets.

OC: 80 Reproductive and productive performance and behaviour of purebred Holstein-Friesian compared with their crossbreds with Montbeliarde and Swedish Red

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Objectives: Reproductive technology development associated with tight selection programs has led to loss of genetic diversity in the dairy population, mainly in the Holstein-Friesian (HF) breed. As a result, HF has been subjected to a high selection pressure, leading to an increase in inbreeding coefficient. The main consequences were the decline in fertility and the increase of certain pathologies. Because it is known that heterosis can reduce the effects of inbreeding depression, crossbreeding has been suggested as a way to increase dairy cows’ health, fertility and longevity. A rotational breeding system using three breeds [HF, Swedish Red (SR) and Montbeliarde (MB)] has been used for this purpose. The aim of this study was to determine differences in reproductive and productive performance, disease incidence and behaviour between pure HF, F x HF and Swedish Red x HF.

Materials and Methods: This study was performed in a Portuguese dairy farm, involving 30 pure HF, 32 MB x HF and 28 SR x HF primiparous cows. We compared age at first insemination, age at first calving, conception rate, incidence of diocysy, incidence of postpartum diseases and milk yield and somatic cell count at 100 days of lactation. We also measured blood ketone bodies (beta-hydroxybutrate) in the second week of lactation and behavior during milking (stepping and kicking behavior).

Results: Blood ketone-bodies were higher in HF compared with MB x HF animals. There was a higher incidence of clinical mastitis in SR x HF. MB x HF showed more steps and kicks at milking compared with the other groups and VS x HF were less temperamental than the other two groups. There were no differences in fertility indices, incidence of dystocia and stillbirth, incidence of postpartum diseases, milk yield or somatic cell count.

Conclusions: Our study shows that MB animals are more restless at milking and suggest that HF need to mobilize more fat in the first weeks post-calving. It should be recalled that this data only reflects the early stage of lactation of primiparous cows and is not enough for a comparison of the overall performance resulting from heterosis.

OC: 81 The effect of farmer enrolment in a reproductive extension programme (InCalftm) on the reproductive performance of seasonally-calving pasture-based dairy herds

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Objectives: There is a widely reported 1% annual decline in mean reproductive performance of the national dairy herd in New Zealand. However, the range of reproductive performance has been growing wider suggesting that the causes are various. In response to this decline the InCalftm reproductive management extension programme has been adapted from the Australian model and has been made available to herd owners throughout the country. A core objective of the New Zealand National Herd Fertility Study (NHFS) was to quantify the effects of the InCalf programme on the reproductive performance of enrolled herds as well as benchmarking the reproductive performance of the national herd. It was done using a large scale, multi-year randomized controlled study in four dairy-intense regions of New Zealand (between May 2009 and June 2011).

Materials and Methods: In total, 168 herds were ranked based on estimates of their pre-enrolment 6 week in- calf rate and agreed to random allocation to either a control group or treatment group that received a yearlong InCalf farmer action group programme which ran throughout the first year of the study. The programme provided a structured and supported environment for farmers to plan and review management decisions at strategic points in the dairy season. In 133 herds the 6 week in-calf rate was measured using over 180,000 dated pregnancy tests from 146,000 cow lactations over two years. Additional measures included 42,000 pre-calving and pre-mating body condition scores and 18,000 pre-calving heifer weights. Social science interviews were conducted at key points in the study to capture the attitudes, priorities and constraints perceived by farmers.

Results: Preliminary results indicate that the mean 6 week in-calf rate for the control group remained similar across years at 66% but that the 95 percentile range widened. The median 3 week submission rate remained at 78% across years but the median pregnancy to first service declined to 48% with widening variation over time between herds. A multivariable model including biophysical and demographic explanatory variables (including region and season) found allocation to treatment was associated with a small but not statistically significant increase in 6 week in-calf rate.

Conclusions: More variation was explained by reproductive performance at allocation and variation between herds was greater than between years. Determinants of changes in herd reproductive performance will be explored to refine expectations and strategies for delivery of extension programmes.

OC: 82 Evidence of the association of Chlamydia-like organisms with cases of bovine abortion

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Objectives: Despite the worldwide economic importance and welfare issues associated with infectious bovine abortifacient, as well as potential zoonotic threats posed to human health, diagnosis of the causes of abortion remains poor. This could in part be explained by the presence of unidentified infectious abortifacient agents. Recently several novel species of Chlamydia-like organisms (CLOs) including Parachlamydia acanthamoebae have emerged as putative ruminant abortifacients, as well as involved in cases of respiratory infections and miscarriage in humans. The aim of this study was to investigate whether such organisms are present in cases of bovine abortion in the UK.

Materials and Methods: An initial study investigated the presence of CLOs in pooled samples of brain, heart and placenta obtained from bovine abortuses of unknown aetiology. Samples were processed to extract genomic DNA and analysed using a pan-Chlamydiales 16S rRNA PCR. PCR-positive samples were subsequently sequenced and subjected to phylogenetic analysis to determine their similarity to other known CLOs. Samples were also routinely tested for the presence of other known abortifacient agents.

Results: Twenty two of 83 (26.5%) samples initially tested were identified as Chlamydiales-positive by PCR. Sequence information was obtained for 15 of these 22 samples with the majority of the sequences (10/15) identified as Parachlamydiaeae. Four of the remaining 5 samples were found to cluster with a different species, the Rhabdchochlamydiaeae, which have been associated with pneumonia in humans. No other abortifacient could be detected in any of the samples. Ongoing studies of bovine abortions from across Scotland has confirmed these initial observations. Recently as part of ongoing surveillance activities, parachlamydial antigen has been detected in 10 of the 31 placental samples (32.2%) with pathology consistent with chlamydial infection.
Conclusions: The identification of these organisms in such a large percentage of the bovine fetal tissue samples tested may be indicative of a role for these organisms in undiagnosed cases of bovine abortion in the UK and Europe, and may be a zoonotic source of infection for humans. Given their zoonotic potential and the economic and welfare impacts of bovine abortion upon the agricultural sector, further studies are required to understand the incidence and the pathogenetic roles of these organisms in both human and veterinary medicine.

OC: 83
2 years of diagnosing bovine abortion in Flanders: lessons learned
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Objectives: To monitor Brucellosis in Belgium, farmers are required to report each ruminant abortion to the Federal Agency for the Safety of the Food Chain (FASFC). Subsequent autopsy and analysis of fetus, placenta and maternal serum aim to sustain the Brucellosis-free status. Besides, the abortion protocol intends to detect potential infectious causes of submitted cases.

Materials and Methods: In 2010-2011 about 9000 abortions were analysed: 70% of all cases consisted of fetus, placenta as well as a maternal serum sample, while 30% only included a placenta and maternal serum sample. 50% of the cases originated from beef cows, 40% from dairy cattle and the residual 10% from cross-bred animals. The sample was analysed for antibodies against Bovine Viral Diarrhea virus (BVDV), Bovine Herpesvirus 1 (BHV-1; gE antibodies), Neospora caninum, Brucella spp, Leptospira hardjo and Coxiella burnetii. The fetus was assessed by aerobic bacteriological culture, Listeria spp culture and yeast/fungal culture (on abomasal and lung tissue); Brucella spp culture (on abomasal tissue); histology (on lung tissue) in case of a pure bacterial culture; histology (on brain and heart tissue) in case of a N. caninum seropositive dams; Coxiella burnetii PCR, BVDV Ag Elisa and Blue Tongue virus (BTv) PCR (on spleen tissue). On the placenta sample, Ziehl-Neelsen and Stamp staining were performed as well as a Brucella spp culture.

Results: In 40% of the cases a diagnosis could be established. In dairy cattle N. caninum appeared to be the most common cause of abortion (14%), followed by several bacterial organisms (such as A. pyogenes, E. coli, Listeria spp, Bacillus spp) causing rather singular cases of abortion. In beef cows, these bacterial organisms were even more frequently isolated (17% of the examined abortions could be linked to a bacterial organism). In these breeds, N. caninum came in second place (8% of the cases). Additionally, BVDV (4-5%) and yeasts/fungi (6%) were commonly diagnosed causes of abortion in dairy as well as beef cattle.

Conclusions: An elaborate investigation of abortion results in at least 40% of the cases in a potential diagnosis. This success rate will further increase when the samples are delivered to the laboratory rapidly after occurrence of the abortion event. Besides infectious organisms (included in the present abortion protocol), one should also consider several non-infectious causes for abortion, which are not within the scope of this FASFC abortion protocol. Project financially supported by the FASFC.

OC: 84
Peripartum haptoglobinemia for predicting retained placenta and metritis in dairy cows
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Objectives: Haptoglobin is an acute phase protein produced primarily in the liver in response to pro-inflammatory cytokines. Increased haptoglobinemia has been associated with several diseases in dairy cattle. The objective of this retrospective case-control field study was to determine if peripartum haptoglobinemia can be used to predict retained placenta and metritis in dairy cows.

Materials and Methods: Data from 244 Holstein dairy cows in Canada (173 cows from 3 herds in study A and 71 cows from 1 herd in study B) were combined when the timing of sampling was similar. Samples were selected from cows having retained placenta only (RP; n=44), metritis only (MET; n=70), both RP and metritis (BOTH; n=48), or unaffected by both diseases (CONTROL; n=82). Retained placenta was defined as retention of fetal membranes 24 hours after parturition and metritis as systemic illness including fever >39.5 °C with fetal vaginal discharge occurring within the first 14 days in milk. Serum haptoglobin concentration was measured weekly from 2 weeks prepartum (weeks -2 and -1) until 3 weeks postpartum (weeks +1, +2, +3). Statistical analyses were performed in SAS using herd as a random effect. Haptoglobin data were considered in statistical analyses only if sampling occurred before disease diagnosis.

Results: Cows with RP had greater haptoglobinemia than controls at week -1 (n=244; RP: 0.28 g/L; CONTROL: 0.11 g/L; SE: 0.06; P<0.01) but not at week -2 (n=71; RP: 0.19 g/L; CONTROL: 0.25 g/L; SE: 0.10; P=0.98). The odds of RP were 3.1 times higher (P=0.02) in cows with haptoglobin =0.2 g/L at week -1 than in cows with lower haptoglobinemia (sensitivity (Se): 29.7 %, specificity (Sp): 86.5 %). Cows with MET had greater haptoglobinemia in weeks -1 and +1 than controls after adjusting (week -1, n=244; MET: 0.26 g/L; CONTROL: 0.11 g/L; SE: 0.06; P<0.01; week +1, n=244: MET: 0.79 g/L; CONTROL: 0.42 g/L; SE: 0.05, P<0.01) or not (week -1, n=244: MET: 0.25 g/L; CONTROL: 0.11 g/L; SE: 0.06. P<0.01; week +1, n=244: MET: 0.84 g/L; CONTROL: 0.46 g/L; SE: 0.06, P<0.01) for RP, season, and parity. Cows with haptoglobinemia =0.2 g/L at week -1 (Odds Ratio (OR) = 2.6, P=0.04; Se: 23.0 %, Sp: 81.4 %) or =0.9 g/L at week +1 (OR=3.5, P<0.01; Se: 49.4 %, Sp: 69.8 %) were more likely to have MET in the final multivariable model.

Conclusions: Haptoglobinemia increases days before the onset of disease in cows affected RP and MET, and as soon as 1 week prepartum. Haptoglobinemia could potentially be used as an early predictor for RP and MET.

OC: 85
Accuracy of rectal temperature and vaginal discharge score in dairy cows postpartum
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Objectives: Monitoring rectal temperature and vaginal discharge score (VDS) after parturition is a common method to identify cows with acute puerperal metritis. For body temperature both type I (i.e. diagnosed as diseased when the animal is actually healthy) and type II errors (i.e. diagnosed as healthy when the animal is actually diseased) have been reported to occur. For vaginal discharge as an indicator of uterine inflammation no data on accuracy are available. The objective of our study was to validate these two monitoring tools and to provide test characteristics.

Materials and Methods: Four experiments were conducted to determine intra- and interinvestigator variability of rectal temperature measurements and to evaluate the effects of variables such as different thermometers, performance of the investigator, the effect of transrectal palpation and experience of the investigator evaluated. Sensitivity and specificity of a visual assessment were determined in vitro utilizing 33 images showing yellow and pink areas in certain percentages as a reference standard to simulate assessment of discharge in the vagina.

results: Repeated measures by a single investigator were highly repeatable (CV = 0.2%). Between investigators coefficients of correlation (r = 0.98) were high and differences between values small (39.3 ± 1.0°C; 39.4 ± 1.0°C). Measures could be influenced, however, by the procedure itself (up to 0.5°C), type of thermometer (up to 0.3°C), penetration depth (11.5 cm or 6.0 cm) into the rectum (up to 0.4°C), and ambient temperature (up to 0.9°C). VDS had moderate intra- (r = 0.56 – 0.60) and interobserver (r = 0.44) repeatability. Transrectal palpation (RP = 0.96 - 1.03) or experience of the investigator (RP = 0.9 - 1.1) did not affect results. Both sensitivity (99.6% - 99.3%) and specificity (98.7% to 99.1%) were high.

Conclusions: Overall, rectal temperature measurements are repeatable. Some care is required in generalizing measures of body temperature and using only one single threshold. Visual assessment of vaginal discharge is not perfect but can be considered a reasonable measurement and as a practical
Results of bull breeding soundness examinations from a UK farm practice
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Objectives: The objective of a bull breeding soundness examination (BBSE) is to detect bulls whose fertility is sub-optimal so their use can be avoided. This study aims to investigate the reasons for bulls to fail breeding soundness examinations and whether they differ for bulls kept on beef and dairy farms.

Materials and Methods: Between July 2006 and February 2011 112 bulls from 60 farms were examined by a UK veterinary practice. Fifty one bulls were from beef farms and 61 were from dairy farms. In 53 cases there was no suspected poor fertility whereas in 49 cases the farmer already suspected the bull had a fertility problem.

Results: Overall 73 (65%) bulls were passed as fertile and 39 (35%) bulls were failed. Of the bulls with suspected poor fertility 44% failed the BBSE compared to 25% of bulls undergoing a routine pre-breeding examination (P=0.041). 72% of the bulls which failed could have been identified on clinical examination alone without the need for semen evaluation. The reasons for a bull failing a BBSE differed between bulls kept on beef farms compared to those kept on dairy farms. The most frequent reason for a bull kept on a beef farm failing was testicular abnormalities combined with abnormal sperm morphology, whereas laneness was the most frequent reason for a bull kept on a dairy farm to fail.

Conclusions: The majority of bulls classified as sub-fertile on bull breeding soundness examination could have been identified by clinical and reproductive tract examination alone without the need for semen evaluation. The causes of sub-fertility appear to be different on beef and dairy farms. More research is needed to help clinicians give evidence-based decisions regarding the likelihood that a bull will breed satisfactorily.

Influence of age on outcomes of 443 bull pre-breeding examinations performed in the United Kingdom
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Objectives: Fertility remains a key focus in improving profitability within both the beef and dairy industries in the UK. Sub-fertile breeding bulls, particularly in beef enterprises, can be the source of substantial economic loss. The objective of this study was to review the relationship between age and outcome of 443 bull pre-breeding examinations performed in the United Kingdom, between January 2007 and September 2011.

Materials and Methods: The bulls were classified according to age at examination, into one of the following groups; <=18 months (n=105), 19-24m (n=66), 25-36m (n=80), 37-48m (n=66), 49-60m (n=35) and >60m (n=59). The examinations were structured upon guidelines outlined by the Society for Theriogenology (Chenoweth et al 1993,) including a general physical examination, reproductive system examination and assessment of a semen sample attained through electro-ejaculation (EEJ). Examinations were conducted by eight veterinary surgeons trained in these procedures.

Results: Overall, the pass rate of PBEs was 69.1% (n=306) whereby the animal was deemed suitable for breeding. Pass rates were highest in bulls less than 37 months, being 74.3% (n=78), 77.3% (n=51) and 71.3% (n=57) in the <=18m, 19-24m and 25-36m categories respectively. The pass rate then declined with increasing bull age, being 63.6% (n=42) in 37-48m category, 57.1% (n=20) within the 49-60m group and 44.1% (n=26) in bulls older than 60 months.

Conclusions: This study identified a relationship between the age of the bull at the time of examination and the success of being deemed as a satisfactory potential breeder. Pass rates were highest in animals aged between 19 and 24 months followed by a gradual decline in successful outcome with increasing age. These findins reinforce the importance of performing thorough pre-breeding examinations, not only in naive or virgin bulls but also experienced stock bulls, if commercial production losses are to be avoided.

Use of monosyn®/safili® and monodox®/surgicyt® in caesarean sections performed in belgian blue cattle
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Objectives: Caesarean section (CS) is a common surgical procedure in cattle and the first choice at parturition for double-muscled Belgian Blue (BB) cows in Belgium. In this paper, the use of Monosyn® (poly glyconate, USP 1, Braun, Germany), or Monodox® (poly dioxanone, USP 2, Michel Frere, Belgium) for the uterus, and the use of Safili® (poly glycolic acid, USP 2, Braun, Germany) or Surgicyt® (poly glycolic acid, USP 2, SMI, Belgium) for the peritoneum, muscles and skin were compared.

Materials and Methods: All CSs were performed on the standing BB cow on the left side at one farm by 16 different veterinarians. At the time of surgery a questionnaire about the comfort of the material was completed. Between 10 and 17 days after CS a total check up was performed by a veterinarian, including a general examination, an examination of the abdominal tension, and an examination of the incision site by palpation (looking for emphysema, swelling, temperature, discharge, scar tissue). Size, symmetry, content, contractility and adhesions of the uterus were examined by rectal palpation. Afterwards a monthly rectal examination was done to follow up the uterus and the ovari al activity, and to check for pregnancy until proven pregnant twice.

Results: In total 119 CSs have been performed (Monosyn®: S7; Monodox®: 62). Concerning the results on suturing comfort, Monodox® has more memory (90.0% vs. 33.3% with Monosyn®, P < 0.001) and seems to become entangled more often during suturing (Monodox®: 41.7%; Monosyn®: 90.0% vs. 0.001). There was no significant difference between Safili® and Surgicyt® in comfort during suturing of the muscles and the skin. At the first check-up moment, wound infection was detected in 27.5% of the cases, but was not significant different between the two groups. Also general well-being and abdominal tension were comparable. In cows sutured with Monodox®, the material was detected longer (82 days) in comparison with animals in which Monosyn® was used (52 days; P < 0.001), whereas other parameters of uterine rectal palpation were not different.

Conclusions: Finally 87.5% of the animals came in calf again with an inter calving interval of 405 days with no difference between the two groups in pregnancy rate and inter calving interval respectively.

Pathophysiology of prolonged luteal phase in Holstein cows postpartum
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Objectives: Aim of this study was to identify the characteristics and associated risk factors for prolonged luteal phase (PLP) and its effects on subsequent reproductive performance in high producing Holstein cows.

Materials and Methods: Milk samples were collected twice weekly from 497 cows from three commercial dairy herds in Hokkaido and Yamaguchi Prefecture in Japan with average milk yield of 8700 kg to 10100 kg per cow per lactation and progesterone concentrations in whole milk were determined by ELISA. Prolonged luteal phase was defined when progesterone concentrations were 5 ng/mL or higher for 20 d or more of duration in any cycle during a pre-service period postpartum. Delay of first ovulation to 35 to 60 d postpartum, or more than 60 d, a short luteal phase, and the cessation of cyclicity were considered to be the other categories of abnormal resumption of ovarian cyclicity postpartum.

Results: The Overall incidence of PLP in the three herds was 11.9% and significantly higher proportion of PLP was observed in the first cycle postpartum.
(64.4%) compared with the 2nd (30.5%) and 3rd (5.1%) cycles. There was a tendency that cows with longer duration of PLP show a higher maximum progesterone concentration than those with shorter duration of PLP. Approximately 83% of the PLP were of 20 to 28 d of duration; 10% were of 29 to 35 d and 6.9% were of more than 35 d. Higher parity, commencement of luteal activity within 28 d postpartum and postpartum complications significantly increased the occurrence of PLP within 90 days postpartum. Cows with PLP, in comparison with those with normal ovarian cycles, showed reduced conception rate to first AI (27.1% and 45.9%), reduced pregnancy proportion within 100 d (23.2% and 60.6%), 150 d (49.2% and 78.8%) and 210 d (67.8% and 87.0%) postpartum (P<0.01). Based on survival analysis, PLP was associated with a 56% reduction in relative pregnancy rate and a 36% reduction in AI submission rate.

Conclusions: In conclusion, twelve percent of lactations had PLP, of which approximately two thirds was seen in the 1st cycle postpartum. Most of the PLP were of 20 to 28 d of duration. Higher parity, postpartum complications and early commencement of luteal activity postpartum increased the risk for PLP. Occurrence of PLP adversely affected reproductive performance.

OC: 237
Field study of reproductive performance with an automated activity monitoring system vs. a synchronized breeding program in dairy herds
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Objectives: The objective was to compare reproductive performance with an automated activity monitoring system relative to a synchronized breeding program under field conditions.

Materials and Methods: A pen-level randomized trial was performed over 1 year using 3 commercial herds in Ontario, Canada. Pens were assigned to an automated heat detection (AHD) system based on monitoring activity (Heatime, SCR) or a timed artificial insemination program (TAI; Ovsynch); cross-over occurred after 6 months to avoid confounding treatment with parity. AI based on additional detection of estrus by observation was practiced in all pens. Herds A, B, and C milked 495, 305 and 260 cows on average, providing 1303, 726, and 986 AI analyzed throughout the study period, respectively. Herd-level analyses were conducted using pen as the experimental unit. At the individual cow level, time to pregnancy throughout the study period (n = 1985 cow 6-month-periods) was analyzed with a Cox proportional hazards model accounting for herd effect; parity, period and calving season were not significant covariates.

Results: The proportion of TAI in the TAI pen was 49%, 72% and 55% and the proportion of AI in after a heat signaled by the AHD system was 69%, 63% and 61% for herds A, B, and C, other AI in both groups were by observation of estrus. The mean annual 21-d pregnancy rates (RR) across the 3 herds (6165 cow-21-d-periods) were compared controlling for herd. There was no difference (P = 0.25) in the overall RR between TAI (15.9%) and AHD system (14.6%) or in the probability of pregnancy per AI (CR = 30 to 33%). Overall, time to pregnancy was not different (Hazard ratio (HR) = 1.13, P = 0.2) between cows assigned to management by AHD or TAI. However, an interaction between herd and breeding program indicated that time to pregnancy was not different in herd A (median = 151 and 136 days; HR = 0.93, P = 0.52) and herd C (median = 99 and 124, HR = 1.24, P = 0.08) whereas herd B had a median time to pregnancy of 119 d and 146 d (HR = 1.3, P = 0.02) in the AHD and TAI groups, respectively.

Conclusions: Under conditions in which a substantial minority of AI in both groups was based on visually detected estrus, herd pregnancy rate and cow-level interval to pregnancy were not different between TAI and AHD-based programs. However, factors that influence the variability in relative performance of these management systems between herds require further investigation.

OC: 238
The effect of adding a progesterone device and re-synchrony to an Ovsynch program with eCG when used for whole herd synchrony on an Australian seasonal calving dairy herd
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Objectives: To investigate the effect of adding progesterone (P4) combined with re-synchrony to a “prosynch” program - a modification to the standard ovsynch program, where equine chorionic gonadotrophin (eCG) is given on day 7 at the time of the progesterin (PG) injection.

Materials and Methods: 524 cows calved more than 30 days from a single herd were randomly divided into control and treatment groups. All cows were treated with Gonadorelin 100ug (Ovurelin®) at day -10, cloprostenol 500ug (Ovopro®) and eCG 400iu (Pregnotrigger®) at day -3, and Gonderel 100ug at day -1 in the evening. Cows in the treatment group (n=273) received a P4 releasing device (QueMater®) between days 10 and 3, and were re-synchronized using a cleaned re-used device between days 14 and 21. Fixed time insemination (FTAI) occurred on the morning of day 0. Cows were deemed to have been cycling if heat detection aids applied 30 days prior to FTAI had been activated.

Results: A large statistically significant difference in first service conception
rate in favour of the treatment group was seen in the 219 cows not cycling prior to mating start date (17.5%-31.4%, p = 0.017). These cows were nearly twice as likely to conceive to the first service. No difference was observed in the 305 cows that had previously cycled. In contrast, the second service conception results for the 365 cows that did not conceive to the first insemination showed a statistically significant difference in favour of the control group that was not resynchronized (30.4%-18.5%, p = 0.008). Resynchrony made no significant difference in the number of cows that did not have a second service, even though they were not pregnant to the first service (so called “Phantom cows”).

Conclusions: In this trial, adding P4 made a significant positive difference to the first service conception rate in non-cycling cows. Re-synchrony had a negative effect on second service conception rates for all cows, with no effect on submission rates. Since the ban on the use of oestraodione benzoate (OdB) in lactating dairy cows by the EU in 2006, fixed time synchrony in Australia has largely moved from programs involving P4/OdB towards GnRH based programs with or without eCG and P4. There have been few reports of resynchrony following GnRH based synchrony programs. Previous reports attribute an increase in second round submission rates as a major benefit of re-synchrony. Further work is required to investigate the effectiveness of re-synchrony following P4/GnRH based synchrony programs.

**OC: 239**

**Pharmaceutical intervention to improve fertility in dairy herds: an evaluation of veterinarians’ beliefs, concerns and prescribing rationales.**

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**Background:** Pharmaceutical interventions (PI) for the purpose of improving submission rates (by increasing or replacing oestrus detection) are common and the protocols used range from a single prostaglandin injection to blind multi-injection synchronisation programmes. However the use of PI may mean that underlying management problems causing poor fertility are less apparent and hence the need to tackle them may be diminished; genetic evaluation may also become difficult. The use of PI as a means to overcome suboptimal management is a controversial issue and it is crucial that practitioners can robustly justify the prescription of PI. Our hypothesis is that the decision to use PI is difficult for practitioners for several reasons, including the existence of multiple stakeholders. In this research we explore the concerns and ethical positions of practitioners when prescribing PI for management of dairy cow fertility.

**Objectives:** To evaluate the beliefs, concerns and prescribing rationales of practitioners with respect to PI and assess the variability in ethical stance and prescribing practice.

**Materials and Methods:** A random cluster sample selected 95 vets in 20 practices in England to answer a 3 page questionnaire. Response rate = 95% (90 vets).

**Results:** Unprompted, 52% of practitioners said the use of PI gave them cause for concern. On farms making no efforts to address underlying management problems, blanket long-term use of fixed time AI immediately after the voluntary period was unacceptable to 59%. PI was considered morally acceptable overall to 80%, unacceptable to 9% whilst 11% were unsure. 41% would not use PI if the only stakeholders they had to consider in their decision were themselves and the dairy cow. 66% believed PI is a necessity for the profitability of the UK dairy industry. A preference for total future use to decrease was stated by 73% and by 23% for it not to alter. The top 3 areas cited as contributing to poor oestrus expression were: nutrition, poor environment and lameness. If underlying management issues were addressed (relative to using PI alone) then an increase in overall herd fertility performance was expected by 91% of the vets surveyed, in overall cow welfare by 78%, in farm businesses’ profitability by 89%, in veterinary practices’ profitability by 32% and in genetic selection for fertility by 60%.

**Conclusions:** Results suggest that many vets have concerns over the current use of PI and the complex issues involved are highlighted. The Wellcome Trust funded this study.

**OC: 240**

**Evaluation of three synchrony programs for pasture-based dairy heifers**

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**Objectives:** Synchronisation of heifers is generally required if artificial insemination (AI) is to be used to shorten the generation intervals. It was hypothesised that synchronisation of dairy heifers with programs including an intravaginal progesterone (P) releasing device would result in higher pregnancy rates and better economic return than a PG-based program.

**Materials and Methods:** Blood samples were drawn from 1,137 maiden dairy heifers (from 10 herds) on two occasions, 7 days before, and at the time of commencement of synchrony, for progesterone analysis to determine pubertal status. Heifers were randomly assigned to 1 of 3 treatments: two injections of prostaglandin F2a (PG) 11 days apart with AI following detection of oestrus within 5 days after the final PG (Double PG); injection of GnRH, PG and GnRH at 7 and 2 day intervals, respectively, with placement of a P device between the first GnRH and PG with set time AI (STA) approximately 24 h after the final GnRH (GPG+P4); and the same as for GPG+P4 group but with the STA coincident with the final GnRH (Cosynch+P4). A stochastic partial budget was constructed which included the costs of the treatments and veterinary delivery and the benefits associated with increased value of AI bred calves and earlier calving date.

**Results:** Cosynch+P4 was associated with a higher (P<0.05) first service conception rate (57% vs. 47% vs. 48% for Cosynch+P4, GPG+P4 and Double PG, respectively), higher 21 day pregnancy rate (76% vs. 72% vs. 63% for Cosynch+P4, GPG+P4 and Double PG, respectively) and a shorter median interval from the start of the breeding program to conception (0 vs. 14 vs. 19 days for Cosynch+P4, GPG+P4 and Double PG, respectively). There were no differences among treatment groups in the proportion of heifers pregnant by the end of the breeding program (95.7% vs. 92.4% vs. 92.3% for Cosynch+P4, GPG+P4 and Double PG, respectively). Conception rate varied among herds, was lower in heifers that had not reached puberty and was higher for heifers in oestrus <24 h before AI compared to those in oestrus >35 h before AI (63%, 58% and 32% for heifers in oestrus <24 h, 24-35 h and >35 h, respectively). The net return was $NZ 26.90/heifer (95%CI = -$8.54 to $47.15) and $NZ 1.28/heifer (95%CI = $15.59 to +$18.58) for the Cosynch+P4 and the GPG+P4 program, respectively relative to the double PG program.

**Conclusions:** It was concluded that the Cosynch+P4 program resulted in the highest reproductive and economic performance of the three programs evaluated.

**OC: 241**

**Comparison between different synchronization protocols and their reproductive efficiency on dairy cattle - a field study**

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**Objectives:** The objective of this work was to compare the efficiency on pregnancy rate of three different protocols for synchronizing ovaulation on dairy cattle and simultaneously evaluate the reproductive efficiency of progesterone- based protocols.

**Materials and Methods:** Cycling lactating dairy cows without reproductive tract diseases(n=288) from six commercial dairy herds in the northwest Portugal, were randomly assigned to four groups: (group A) cows inseminated at observed estrus as a control group, (group B) cows submitted to Ovsynch(OVS) protocol (Injecting GnRH 7 days before and 48 hours after PG2a followed by time-fixed artificial insemination(TAI) 16 hours after the second GnRH injection), (group C) cows submitted to OVS plus a controlled intravaginal device release containing 1.38 g of progesterone (CIDR) inserted for 7 days, beginning at the first GnRH injection (OVS+CIDR), and (group D) cows submitted to a CO-Synch + CIDR (CIDR inserted for 7 days with administration of GnRH at insertion and PGF2a at removal. TAI and GnRH administration was performed 66 hours after CIDR removal. Pregnancy rate
at first insemination was determined in 266 cows (n= 266), since 22 cows did not conclude the protocol. Cows that returned to estrus 21 ± 3 days after first insemination (n=80) were inseminated, and pregnancy rate was determined.

**Results:** Pregnancy rates at first insemination were 39.7, 33.3, 34.3 and 40.3% for groups A, B, C and D, respectively. Pregnancy rate on returned estrus were 20, 17.6, 23.8 and 45.5 %, for group A through D, respectively.

**Conclusions:** Those results suggest that CO-Sync + CIDR may be the best protocol for routine use in dairy farms. More studies are necessary to validate those results, because reproductive issues are very complex and may be influenced by several factors. Moreover, similar studies on beef production in order to understand if similar results are obtained should be performed.

**OC: 242**

Effects of early pregnancy diagnosis by palpation of amniotic sac per rectum on pregnancy loss in dairy cattle

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**Objectives:** In cattle, palpation per rectum (PPR) is the most frequent procedure for pregnancy diagnosis around the world. Controversy exists in the literature with respect to the effects of PPR for pregnancy diagnosis on pregnancy loss. All previous investigations that associated amniotic sac palpation per rectum (ASP) with increase of pregnancy loss have important limitations in the study design, including lack of a non-PPR control group, uncertainty of pregnancy status, unknown viability of the conceptus, lack of information on twins, combined analysis between cows and heifers, multiple evaluations of the female at the same time for more than one person, variable interval between PPR and reevaluation. The objective of the present study was to estimate the effect of ASP for pregnancy diagnosis during early gestation on pregnancy loss in lactating cows.

**Materials and Methods:** A controlled, randomized block design with 347 healthy lactating pregnant cow was performed. All cattle were detected pregnant by use of transrectal ultrasonography (TRUS) at approximately day 29 after estrus and randomly allocated into 2 groups (control group [CON; n = 167 cows] and ASP group [n= 180]). The CON was not subjected to pregnancy diagnosis via PPR. ASP involved the compression of the pregnant uterine horn by PPR and detection of the amniotic sac vesicle between the hand and the fingers. The entire ASP was performed by 1 trained veterinarian between days 34 and 43 after estrus. All cattle were reevaluated by TRUS on days 45, 60 and 90 to determine viability of conceptus.

**Results:** Overall pregnancy loss between days 29 and 90 was 12.7%. Pregnancy loss for late embryonic period (days 29 to 45; 9.5%) was significantly higher (P=0.001) than for early (days 46 to 60; 2.5%) or late (days 61 to 90; 1%) fetal periods. The pregnancy loss between days 29 and 90 between CON and ASP groups was 13.2% and 12.2%, respectively (P=0.79). Late embryonic pregnancy loss for the CON and ASP was 10.8% and 8.3%, respectively (P=0.44). Early fetal pregnancy loss for CON and ASP groups was 1.2% and 3.3%, respectively (P=0.93) and late fetal pregnancy loss for the same groups was 1.2% and 0.6%, respectively (P=79). The percentage of cows with twins at initial pregnancy diagnosis by TRUS was 7.5%. The pregnancy loss (days 29 to 90) in single pregnancies was 12.2% and in twin pregnancies was 19.2%, respectively (P=0.29).

**Conclusions:** It can be concluded that pregnancy diagnosis via ASP during early gestation did not increase pregnancy loss in dairy cattle.

**OC: 243**

Prediction of twin pregnancies by measuring certain endocrine and metabolic parameters in dairy cows in the peripartal period

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**Objectives:** Reproductive consequences of twin calvings are one of the most important causings of economic losses in a dairy farm. The objective of the study was to monitor some endocrine and metabolic parameters in twin pregnancies compared to single pregnancies during the last 2 months of gestation.

**Materials and Methods:** Holstein-Friesian dairy cows (n=178) were monitored in two consecutive years. None of these cows were first parity heifers. In the first year 98 cows, in the second 80 cows were monitored. The following hormones and pregnancy associated glycoprotein (PAG) were measured by RIA tests: P4, E2, cortisol, T4, T3, insulin, IGF-1 and PAG. Additionally the following metabolic parameters were also measured from the blood and urine samples: AST, BHB, NEFA, Glucose, Albumin, BUN, total protein, Ca, P, Mg, Beta-carotene, NABE. Blood samplings were made 2 months and 3 weeks before calving and within 1 h after calving and a generalised linear model was used with binomial error distribution and logit link function (multivariate logistic regression). The significance level was set at P< 0.05 and a trend between P>0.05 and < 0.01.

**Results:** The overall prevalence of twin pregnancy was 9.6%. Twin calves weighed significantly less compared to singletons. Posterior presentation showed a trend among twins, but body condition score, parity, gestation period, number of assistants at calving and the ratio of male/female did not significantly differ between the two groups. P4 was significantly higher in cows giving birth to twins compared to controls at 2 months and 3 weeks before expected calving, and there was a trend within 1 hour after calving as well. E2 significantly differed only within 1 hour after calving. IGF-1 was significantly lower in cows giving birth to twins compared to controls 3 weeks before expected calving. PAG was significantly higher in cows with twins compared to controls at 3 weeks before expected calving and within 1 hour after calving. Considering metabolic parameters ASTand BHB showed significant differences, but in both groups the results changed within the physiologic range.

**Conclusions:** Measurements of P4, PAG, IGF-1 and E2 concentrations in the periparturient period may contribute to the prediction of twin pregnancy in Holstein-Friesian dairy cows, however, further studies are needed to provide more evidence. Other hormones measured in our study (cortisol, T4, T3 or insulin) did not mirror any dependency on twin pregnancy in dairy cows and metabolic parameters are also not seeming to influence the course of late gestation and calving. This study was supported by OMFB-0173/2006 research fund.

**SMALL RUMINANTS**

**OC: 193**

Evaluation of a competitive ELISA for the estimation of within-flock prevalence of antibody-positive ewes to Border Disease virus

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**Objectives:** Border Disease is a pestivirus linked disease that highly affects the productivity of sheep flocks. A large control scheme was set in Aveyron, France, based on serological testing of replacement ewes. However, the use of a bulk tank milk test would be a less expensive and easier to perform alternative to define the infectious status at the flock level. However this diagnostic approach has never been evaluated in sheep. The aims of our study were therefore to evaluate the performances characteristics of a commercial ELISA applied on bulk tank milk, to establish decision thresholds and to investigate whether it could be used, as in cattle, to estimate the within-flock prevalence of antibody positive animals.

**Materials and Methods:** The study was based on data collected in 162 commercial milking flocks in 2009 and 2010. Ninety eight flocks with no history of Border Disease and that had been negative for at least 3 years on serological survey were used as negative control. In the remaining 64 flocks, in which the circulation of BDV virus had been evidenced, the prevalence of anti-NS2/3 antibodies was estimated using an age representative sample of 45 milking ewes. In parallel, a bulk tank milk sample was analysed using a competitive ELISA (Pourquier Bvdt/Mt/Bd P80 Antibody Screening Kit). ROC Curves analysis was used to define the best decision threshold. To take account of the imprecision of within-flock seroprevalence estimates, Monte Carlo simulations were used to calculate the performances characteristics and 95% confidence intervals (CI) of the bulk tank milk test.
Results: A strong but non linear relationship between the prevalence of antibody positive ewes and the bulk tank results was evident. The best decision threshold (inhibition percentage 65 %) was shown to strongly differ from that established in cattle (80 %). The bulk tank milk test was not sensitive enough to discriminate negative control flocks from those with very low seroprevalence (<10 %). However the sensitivity (93.3 % CI = 87.8 - 97.7), specificity (97.6 % CI = 95.8 - 99.1) and efficiency (96.4 % CI = 94.4 - 98.1) were excellent for discriminating between flocks with prevalence less than or higher than 10 %. Finally different threshold are proposed, that may help to estimate the within-flock seroprevalence.

Conclusions: As in cattle, the use of bulk tank milk test was shown to be reliable enough for use in large scale surveillance and control scheme on Border Disease, but the decision threshold appears to be sheep specific.

OC: 194

Development of a model to study transplacental transmission of Bluetongue virus serotype 8 in ewes
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Objectives: The bluetongue virus serotype 8 (BTV-8) strain that caused the 2006 European outbreak has an unusually high ability to cross the placenta. A model was developed for research into (i) the mechanisms of transplacental transmission and (ii) the effect of vaccination on the transplacental transmission.

Materials and Methods: Experiment 1: 16 pregnant ewes were infected with BTV-8 at 70-75 days gestation. The foeti were collected at 18-19 days after infection (dpi). Experiment 2: 20 pregnant ewes were infected with BTV-8 at 40-45 days of gestation; the foeti were collected at 10 or 30 dpi (10 ewes each). Experiment 3: 10 ewes were vaccinated with an inactivated BTV-8 vaccine. Together with 10 non-vaccinated ewes, they were infected with BTV-8 at 70-75 days of gestation. In all experiments, foeti were examined for macroscopic and microscopic lesions. RT-qPCR and virus isolation tests were performed on samples of blood, liver, spleen, thymus, cerebrum and cerebellum.

Results: Experiment 1: the presence of BTV-8 could be demonstrated in at least two organs of 11/40 lambs from 11/16 infected ewes. The main pathological findings in the foeti were meningo-encephalitis and vacuolation of the cerebrum. Experiment 2: in 2 foeti from 2/10 ewes at 10 dpi and in 4 foeti from 4/10 ewes at 30 dpi, BTV could be detected. In the foeti, haemorrhages in various tissues and necrosis in the placentomes were found. Experiment 3: BTV could be isolated from the tissues of 11/23 lambs of 6/10 non-vaccinated ewes. Immunohistostchemistry demonstrated the presence of BTV in association with central nervous lesions. No virus could be isolated from the tissues of the 18 lambs of the vaccinated ewes.

Conclusions: These experiments demonstrate for the first time the presence of infectious BTV in lamb foet at different stages of gestation, combined with a difference in transmission rate depending on the gestation stage. In addition, the suitability of the model for vaccine studies was demonstrated.

OC: 195

Evidence of trans-placental transmission of blue-tongue virus serotype 8 in goats
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Objectives: One of the main features of Bluetongue virus serotype 8 (BTV-8), which is present in Europe since 2006, is the ability to cross the placental barrier. This feature of the virus is well described in sheep and cattle but not yet in goats. The ability of the BTV-8, from the 2006 European outbreak, to cross the caprine placenta during mid- or late-gestation was investigated in two separate experiments.

Materials and Methods: In the 1st experiment, ten female goats were experimentally infected with BTV-8 on the 135th day of pregnancy, while six animals were uninfected controls. During the study, clinical examination of experimental animals was carried out and blood samples were collected for virological examinations. Fifteen days after infection, a caesarian -section was performed in all ewes and the foetuses (n=11 from infected goats) were delivered. Blood samples (from liveborn kids), spleen samples (from stillborn kids) and placentome samples were collected for virological examination by means of real time-RT-PCR. In the 2nd experiment, nine female goats were experimentally infected with BTV-8 on the 60th day of pregnancy, while four animals were uninfected controls. During the study, clinical examination was carried out and blood samples were collected for virological examinations. Twenty-one to 22 days after infection, all goats were euthanized. Blood samples (from umbilical vessels) and spleen samples (from foetuses (n=13) from infected goats) were collected for virological examination by means of real time-RT-PCR and virus isolation (VI).

Results: In the 1st experiment, no abortion was observed in the two groups. The virus was detected in the blood samples of the infected goats, as well as in all placentome samples; however, no BTV-8 could be detected in blood or spleen samples from kids. In the 2nd experiment, no abortion was observed in the two groups. The virus was detected by RT-PCR and VI in the blood samples of the infected goats, as well as in umbilical blood and spleen samples of 3 foetuses out of 13 (23%). No specific macroscopic or microscopic lesions were observed in the foetuses of the infected goats, and especially no placenta abnormality could be observed.

Conclusions: The experiments showed the ability of BTV-8 to cross the placenta of goats when the infection takes place around the 60th day of pregnancy and the inability when infection takes places around 135th day of pregnancy. The importance of this transmission in overwintering of the virus, the mechanisms associated with it and the ability of vaccines to prevent this kind of transmission require further investigations.

OC: 196

The innate immune response controls the differences of clinical sensitivity to bluetongue disease between two ovine breeds
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Objectives: To date mechanisms that regulate host sensitivity to Bluetongue virus (BTV) infection are not well known. Clinical signs are mainly observed in sheep whereas bluetongue was considered mainly asymptomatic in cattle and goats. Previous observations suggested a variation of susceptibility amongst ovine breeds. The objectives were to examine the differences between two ovine breeds upon BTV challenge, and to use this model to define the host mechanisms involved in disease susceptibility.

Materials and Methods: Fifty-six 4-5 month-old and BTV-negative male lambs of Lacarne or Martinik Black Belly (MBB) breeds were used. Eighteen Lacarne and 18 MBB sheep were infected by intravenous and subcutaneous routes with a highly virulent BTV-8 strain. Ten sheep of each breed were used as negative controls. At days 2, 6 and 10 post-inoculation (pi), 2 sheep of each group were euthanized for collection of post-mortem (pm) specimens. Clinical signs and rectal temperature were assessed every day and records were expressed as a clinical score. BTV mRNA was measured by RT-qPCR in blood every 2 days and on pm tissue samples. Furthermore, virus was detected on pm tissues by immunohistostchemistry. BTV antibody response was quantified by seroneutralisation and blocking VP7 ELISA assays. Moreover, the innate immune response was examined at day 2, 6 and 10 pi by transcriptomic profiling of blood mononuclear cells using an Agilent ovine microarray.

Results: We observed highly significant differences of rectal temperature and of intensity of the clinical signs between the two ovine breeds. Indeed, MBB sheep appeared to be highly resistant to BT disease. Surprisingly, these differences were not explained by differences of BTV-8 loads and distribution in the blood and tissues, especially in the endothelia. The BTV-8 neutralising antibody response developed two days earlier (day 6 pi) in the MBB than in the Lacarne sheep, but was similar 21 days pi. Gene expression differences were observed between the blood cells of the two breeds and functional analysis of differentially-expressed genes is presented.
**Conclusions:** For the first time, we showed strong differences of clinical sensitivity between two ovine breeds upon BTV inoculation. Our results suggest that intrinsic host factors control the sensitivity to the BT disease, probably related to the quality of their innate responses.

**OC: 197**

**Chronic proliferative rhinitis in sheep associated with salmonella enterica subspecies diarizonae**

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**Objectives:** This report describes the clinical, histopathological and immunohistochemistry findings of 21 clinical cases of chronic proliferative rhinitis associated with *Salmonella enterica* subspp. *diarizonae* serovar 61:k:1,5,(7). We have diagnosed in the Veterinary Faculty Ruminant Medical Service at the University of Zaragoza, Spain. Some of the affected animals were hospitalized for more detailed examination at the Ruminant Medical Service at the Veterinary Faculty of Zaragoza. Data of clinical parameters were retrieved and haematological and biochemistry analyses were performed. Post-mortem examination was carried out and immunohistochemistry analyses were also performed. Microbiological study and serotyping was carried out at the alimentary laboratory of Zaragoza and Central Veterinary Laboratory (Algete, Madrid, Spain).

**Results:** Chronic rhinitis in sheep is commonly associated with parasites and also fungus (Silva et al. 2007a). However, few references are found in the literature of this chronic inflammations associated with bacteria of the *Salmonella* genus, Thus, Meehan et al. (1992) reported two cases of chronic proliferative rhinitis associated with *Salmonella azerona* serovar 61:k:1,5,(7) infection in the United Kingdom. In all the animals of the study the clinical signs and the histopathological findings were similar. The clinical presentation began with a rhinitis causing a characteristic snore. This clinical signs worsened until bilateral proliferator obstructed the upper respiratory forcing the animal to mouth breathing. At the same time, the animals lost weight until cachexia. In the 21 cases *Salmonella enterica* subspec. *diarizonae* serovar 61:k:1,5,(7) was isolated. Moreover, no significant abnormalities were observed in routine blood biochemistry, but the haematology showed a relevant anaemia in some of the cases. Histopathological findings revealed a mucosa served in routine blood biochemistry, but the haematology showed a relevant anaemia in some of the cases. Histopathological findings revealed a mucosa

**Conclusions:** It is possible to conclude that *Salmonella enterica* subspp. *diarizonae* serovar 61:k:1,5,(7) is an infective agent in sheep, being able to develop chronic proliferative rhinitis that cause the animal death.

**OC: 198**

**The Dry Period Length of Lacaune dairy sheep under intensive management: factors and effects on the productivity**

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**Objectives:** The present study investigated the effect of the length of the dry period (DP) on the performance of Lacaune sheep under intensive management conditions as well as the factors that could influence DP.

**Materials and Methods:** Records from 8136 lactations from 4220 sheep from one farm, for the period 2005-2010, were studied. The DP were classified into five intervals: DP-XS (very short, 1-30d), DP-S (short, 31-60 days), DP-M (middle; 60-90d), DP-L (long; 91-120d) and DP-XL (very long; >120d). Analyses were performed with SPSS® 19.0. Statistical differences and relationships were estimated by ANOVA and Pearson correlation; significance was considered with P<0.05.

**Results:** Milk yield/lactation (MY) was 429.6±188.5L: Days in Milk/lactation (DIM) 231.7±68.8d; Milk Yeld per Day in Milk (YDIM) 1.799±0.561L; Mean Length of DP (DL) 65.5±55.9d and Mean Lambing Interval (LI) 300.4±66.3d. The DP correlated with MY (r=0.386; P<0.0001), YDIM (r=−0.280; P<0.0001) and LI (r=0.396; P<0.0001) of the same lactation. The analyses from the lactations separated by lactation order demonstrated that the significant and negative correlation between MY, YDIM and DP remained until lactation sixth. The influence of DP on reproductive and productive parameters of next lactation was studied. DP correlated positively, slight but strongly significant to the interval Lamning-Next-Conception (LNC; r=−0.089; P<0.0001). Results analyzed by lactation order demonstrated this positively correlation between DP and LNC from the second lactation onwards until the forth one (P<0.1). DP-XS, S and L resulted in shorter LNC (142.3±67.2; 147.7±57.0 and 148.7±52.4d) than DP-XL and M (158.3±62.7; 165.9±74.2d; P<0.0001). At lactation 2, previous DP with shortest LNC was DP-XS (147.3±68.3d). Previous DP with larger LNC were DP-XL (175.8±73.5d) and DP-M (188.5±79.4d; P<0.0001). At the second lactation the DP-XS, L and XL resulted in the lowest milk yields (390.5±225.3, 402.1±182.3 and 437.6±194.5L), and deferred from DP-S (458.1±195.0L) and DP-M (486.3±197.6L; P<0.0001)). Similar results were observed in lactations 3 and 4 with DP-S and M reaching best MY (P<0.0001).

**Conclusions:** The higher the MY and YDIM the shorter is DP in the same lactation. Ewes with DP of 30-90d showed larger yields in the lactation after, whilst the best LI was observed by the ewes with the shortest DP (DP-XS and DP-S). Based on these results, the optimal DP would be 30-60d for Lacaune sheep under intensive conditions.

**OC: 199**

**Effects of drying-off procedure of ewes’ udder in subsequent mammary infection and development of mastitis**

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**Objectives:** Objective of the study was to evaluate effects of the procedure followed for drying-off of ewes’ udder (i.e., abrupt or progressive drying-off) in subsequent mammary infection and development of mastitis.

**Materials and Methods:** We used 31 ewes, at the end of a lactation period, which were allocated in one of two groups. In ewes of group A (n=19), udder drying-off took place progressively during a period of 20 days; in ewes of group B (n=12), drying-off took place abruptly. We took samples of teat duct material and of milk for bacteriological and cytological examination before the start of the drying-off procedure, as well as immediately after the subsequent lambing (i.e., after a full dry-period).

**Results:** At the end of lactation, before the start of the drying-off procedure, bacteria were isolated from 4 samples of teat duct material and from 4 milk samples from group A ewes; respective results from group B ewes were 5 and 2 samples. Subclinical mastitis (confirmed by simultaneous presence of bacteriological isolation and increased cell numbers in milk) was detected in 4 group A and 2 group B ewes. Immediately after the subsequent lambing, bacteria were isolated from 3 samples of teat duct material and from 4 milk samples from group A ewes; respective results from group B ewes were 1 and 3 samples. Subclinical mastitis was detected in 3 group A and 2 group B ewes. There was no statistical difference (P>0.55) between results of bacterial isolation before the start of the drying-off procedure and those immediately after the subsequent lambing. Incidence of new infections during the dry-period was 0.19 for group A and 0.20 for group B (P<0.94).

**Conclusions:** The results do not support a hypothesis that the procedure for udder drying-off could affect the risk of infection of the mammary glands during the dry period.
dietary n-6 and n-3 polyunsaturated fatty acids of soybean oil and fish oil on testis development and blood metabolites of male goat kids.

**Materials and Methods:** Twenty-four Mahabadi goats (BW = 19.43±1.2 kg; age 5 months) were assigned to three equal groups and received one of three dietary treatments as follows: control (C0), soybean oil (SO) or fish oil (FO). All three diets were isonitrogenous and isenergetic, but contained different fat sources. Rumifat® (grilled palm-oil, high in C16: 0, Malaysia), soybean oil (high in C18:2 n-6) and fish oil (high in EPA 20:5 n-3 and DHA 22:6 n-3) were supplemented at 2% DM to control, soybean oil and fish oil diets, respectively. Testicular measurements of circumference, width, length and volume were obtained on kids at 5 and 8 months. During the experimental period, goats were kept in individual pens and testicular growth measures were defined as differences between 5- and 8-months measurements. After 84 d experimental period, blood samples were collected and kids were slaughtered. Immediately after killing testes were dissected, weighted, and fixed in 10% formalin for histological studies.

**Results:** FO diet significantly elevated (p<0.05) the testicular growth measurements (circumference, volume, width and length). Also, absolute fresh testis masses at slaughter significantly were higher (p<0.05) in FO diet. However, plasma glucose, triglycerides, total cholesterol, HDL and LDL cholesterol, and testosterone concentrations did not differ among treatments (p>0.05). Histological results showed that FO diet significantly increased seminiferous tubule and lumen diameter, leydig cell, sertoli cell, spermatogenesis, cell, spermatoocyte and sperm cell counts (p<0.01).

**Conclusions:** Results showed that fish oil supplementation positively affected gonad developments of the growing kids.

**OC: 201**

**Glycemia in dairy goats with pregnancy toxemia (PT) as a sign of the viability of the fetuses in the last days of gestation**

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**Objectives:** The main objective of our study was to show that the levels of glycemia in pregnant goats with PT could be an indicator of the viability of the fetuses.

**Materials and Methods:** This study involved 10 does with clinical signs of PT. A physical exam was performed and a blood sample was taken and analyzed with a portable analyser (i-Stat) for glucose, pH, pCO2, HC03-, Na, K, Cl and BUN. Five of these does showed a marked hyperglycemia (HG). Of the five HG does, a cesarean section was performed in four, two does had three dead fetuses, one does had three dead fetuses and one doe had four fetuses, of which one was alive, the other doe delivered two dead fetuses after kidding was induced. A cesarean section was performed in all five does with hypoglycemia (LS), four does had three fetuses and one had two fetuses, all alive. A two-tailed T test for independent samples was used to compare the means values of the two groups, LG and HG.

**Results:** The rectal temperature of the HG group does (34.3 ± 1.2 °C) was significantly lower (p<0.005) than the LG does (37.8 ± 1.5). There was no significant difference between the two groups concerning heart rate, respiratory rate and rumen activity. Besides the difference in blood glucose levels in the two groups (HG = 12.4 ± 5.4 mmol/L, LG = 17.6 ± 0.5 mmol/L), in the LG group the blood levels of Na were higher (140 ± 4 mmol/L) and lower in BUN (3.4 ± 2.13 mmol/L) when compared with the HG group of does (131 ± 3.4 mmol/L) and (8.7 ± 3.35 mmol/L) (p<0.005, p<0.05). The blood levels of pH, HC03, pCO2, K, Cl were not different between the two groups.

**Conclusions:** The blood levels of glucose in pregnant goats with PT could be a good indicator of the viability of the fetuses. Because the condition of these does deteriorates very fast we advise that goats with PT in the last days of pregnancy with hypoglycemia should be submitted to a cesarean section because the fetuses are still alive.

**OC: 202**

**Associations between feeding and management practices and neonatal lamb mortality in Norwegian sheep flocks**

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**Objectives:** The aims of the study were to 1) obtain information about sheep farms in Norway and 2) identify flock characteristics that were associated with neonatal mortality of lambs 0–5 days of age.

**Materials and Methods:** A questionnaire was submitted to 4829 of the 16,909 sheep farmers registered in the Norwegian Livestock Register in November 2007. Responses were received from 2260 farmers who provided demographic data and detailed information on sheep housing conditions and feeding and management practices. Data on lamb mortality during the preceding lambing season were available for those flocks that were enrolled in the Norwegian Sheep Recording System. Flocks where the number of lambing ewes was less than 20 (n=74) or greater than 400 (n=2) were excluded. The total number of flocks suitable for analysis was 1125. The outcome variable was the proportion of neonatal deaths within each flock, i.e the number of live-born lambs that died 0–5 days of age divided by the total number of live-born lambs. The proportion was assumed to follow the binomial distribution. Generalized linear models with a binomial distribution and a logit link were used to model the association between the potential risk factors and the outcome. Extra-binomial variation was accommodated through the inclusion of an overdispersion scale parameter when estimating the confidence intervals.

**Results:** Factors significantly associated with decreasing neonatal mortality were increasing degree of monitoring the ewes during the lambing season, increasing degree of involvement to ensure sufficient colostrum intake of the lambs, increasing experience (years) of the farm er in sheep farming, feeding a combination of silage and hay compared with silage alone, and supplying roughage at least twice per day versus only once. An increase in the mean number of live born lambs per flock was associated with increasing neonatal mortality.

**Conclusions:** Following identification of risk factors related to housing conditions and management practices, targeted preventive measures could be introduced. Assuming that losses in flocks with high mortality rates can be reduced to the level of flocks with low mortality rates, improvement of such factors might have the potential of greatly reducing lamb losses.

**OC: 203**

**Ewe characteristics associated with stillbirth**

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**Objectives:** Perinatal mortality is a major cause of economic loss in the sheep industry worldwide. The aim of this study was to identify ewe characteristics associated with the risk of stillbirth.

**Materials and Methods:** In flocks enrolled in the Norwegian Sheep Recording System a number of variables are routinely recorded and reported to a central database. Data characterizing ewes and the number of stillborn lambs for each of those ewes that lost lambs were available. All ewes registered in the NSRS that lambed in 2004 were included. The ewes were from 4393 flocks. We conducted an m:n matched case-control study in which ewes with at least one stillborn lamb were cases (n=18,284) and ewes without stillborn lambs were controls (n=267,943). Flock was the matching factor, which eliminated the influence of flock level factors in the analyses. Multivariable conditional logistic regression was used for analysis. Ewe age (in years) was modelled as a two-term fractional polynomial function. The remaining covariates were categorical variables. Possible interactions between covariates were taken into account.

**Results:** Litter size had a marked and age-dependent effect. For example, 1-year old ewes those with triplets had 8.2 times greater odds of having a stillborn lamb than those with singletons, while for 3-year old ewes the corresponding odds ratio (OR) was 4.5. Adjusted for litter size 1-year old ewes had a higher risk of stillbirth than older ewes. Comparing 3-year old and 1-year old ewes with singletons the latter had 1.9 times greater odds. There
were highly significant associations (P<0.001) between increased risk of stillbirth and several diseases experienced prepartum. Multivariate adjusted point estimates were: OR = 2.8 for clinical mastitis, OR = 2.5 for hypocalcaemia, OR = 2.5 for vaginal prolapse, OR = 4.2 for ketosis, OR = 2.3 for limb disorders, and OR = 1.9 for abdominal hernia. Ewes of the old Norwegian breed Spael had a significant and somewhat greater risk than ewes of other breeds (OR = 1.2). Lambing early in the lambing season was associated with greater risk than lambing in the final part of the season (OR=1.6).

Conclusions: Litter size larger than 2, and in particular larger than 3, is a major risk factor for stillbirth. Several diseases of pregnant ewes that are not uncommon are also important risk factors and measures aiming at disease prevention will reduce the number of stillbirths as well.

OC: 204
The use of milk as a test media for OPP AGID testing in sheep
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Objectives: The objective was to compare the use of milk to serum as a test media with agar gel immunodiffusion (AGID) for Ovine Progressive Pneumonia (OPP) in sheep.

Materials and Methods: Five hundred eighty two paired milk and serum samples from 4 sheep operations were tested. One hundred ninety four were collected between 1 to 3 days postpartum from one flock (flock A) over a 3 year period (flock size about 2300 ewes) and 388 were collected between day 1 and 150 days postpartum from 3 flocks (flocks B, C, and D) in one year (flock size varied from 30 to 300). The paired samples were tested using a commercially available AGID test (CAE/OPP Virus Antibody Test Kit, Veterinary Diagnostics Technology). Plates were cultured and results reported per kit instructions. Data were analyzed using Pearson Correlation Coefficients (PROC CORR, SAS Institute Inc.) and sensitivity/specificity calculations.

Results: Overall prevalence of OPP in these flocks was 31.6%. However, there was 68.6% prevalence in flock A and 13.1% prevalence in flocks B, C, and D combined. When all 582 paired samples were analyzed together the following results were obtained: r=0.60, P<0.0001 Sensitivity (Se) 48.9%, Specificity (Sp) 97.8%, Positive Predictive Value (PPV) 94.7%, Negative Predictive Value (NPV) 80.7%. Due to the extreme differences in prevalence and timing in lactation of sampling, the samples were separated into two groups and analyzed separately. Results from analysis of flock A (1-3 days postpartum milk and 68.8% prevalence) are as follows: r=0.57, P<0.0001, Se 64.7%, Sp 96.7%, PPV 97.7%, and NPV 44.3%. Analysis of flocks B, C, and D combined (representing samples on random days postpartum over the first 15 days and 13.1% prevalence) resulted in the following: r=0.18, p=0.0005, Se 7.8%, Sp 99.1%, PPV 57.1%, and NPV 86.9%.

Conclusions: These data would suggest that milk could be used as a test media for OPP AGID in sheep. Milk samples tested within the first 3 days of lactation had a much stronger correlation with serum than those collected randomly throughout lactation. This may be due in part to the higher concentration of antibodies in the early lactation samples. The best sample may be colostrum which should have high levels of antibody compared to milk. While sensitivities were less than ideal specificity remained high in all 3 analyses. This would suggest that one should use milk early in lactation to remove positives (Se 64.7% PPV 97.7%) and later in lactation to select and save negatives (Sp 99.1% and NPV 86.9%).

OC: 205
In vivo phenotyping of carcass traits in Merino lambs using magnetic resonance imaging
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Objectives: Nuclear magnetic resonance imaging (MRI) can be used to reliably predict carcass composition in live lambs. Therefore, the study evaluates the combination of different body regions of lambs regarding their informative value in reference to the carcass composition.

Materials and Methods: In this context 30 live, male Merino lambs (average age 115 days, average weight 41.4kg) were examined by MRI and slaughtered 3 or 4 days later. Complete carcass dissection was performed after slaughtering. Prior to MRI examination lambs were sedated by i.m. injection of xylazine (0.2mg/kg BW) and i.v. injection of ketamine (2mg/kg BW), followed by constant infusion of D5W containing 4mg/ml ketamine (ca. 2ml/min) for the time of examination. A Siemens Magnetom Open with field strength of 0.2 Tesla was used to examine the whole body and especially the gigot region. As whole body scan, accordingly to the body length, 5 or 6 T1 weighted sequences including 10 slices (thickness 15mm, distance factor 0.25) were performed. Additionally, also a T1 weighted sequence including 15 slices (thickness 7mm; distance factor 0.25) was performed to especially examine the gigot region regarding its fat tissue. Volume calculations of whole body fat (WBF) and whole body muscle (WBM) including fat and muscle of the shoulder, the back, and the gigot, shoulder volume (SV), and gigot volume (GV) based on the whole body scan MR images were performed (Software Able 3D Doctor 3.0, FDA-approved). In addition, based on the 7mm-sequence, gigot fat tissue volume (GVF) was calculated. Stepwise regression analyses were performed to predict carcass weight (CW) and meat (CM) and fat mass (CF) of the whole carcass by the MRI variables. Subsequently, the CW calculated by MRI Variables (MRI-CW) was also included into the stepwise regressions predicting CM and CF.

Results: CW was predicted best by WBM, WBF, GV, and SV (=MRI-CW; R=0.98; VMSE, [g]=560.37) and showed a high correlation with the actual CW (R=0.95; vMSE, [g]=746.61). CM was predicted best by WBM and SV (R=0.92; vMSE, [g]=580.34), and CF was predicted best by SV and GVF (R=0.91; vMSE, [g]=365.36). Including MRI-CW into regression analyses, CM was predicted best by MRI-CW alone (R=0.94; vMSE, [g]=485.24), while CF stayed unchanged.

Conclusions: Therefore, it was concluded that a whole body MRI scan is a useful tool to predict the carcass value of lambs in vivo and could be used instead of progeny testing and carcass dissection. Prediction of CF requires additional information of a thin-sliced sequence.

OC: 206
Targeted selective treatment scheme combining Famacha©, body condition score and fecal egg counts: results from three commercial sheep farms in tropical Mexico
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Objectives: Targeted selective treatment (TST) based on the FAMACHA© system may cause the repeated use of anthelmintic (AH) drugs in anemic animals with low gastrointestinal nematode (GIN) burdens. A TST scheme that combines FAMACHA©, body condition score (BCS) and faecal eggs counts was designed for sheep in tropical Mexico (Yucatan). The present paper describes the validation of this system in commercial sheep flocks.

Materials and Methods: The study was performed in 3 farms with confirmed presence ofivermectin resistant worms. The numbers of grazing ewes in each farm were approximately 450, 150, and 350 (farms 1, 2, and 3 respectively). Each farmer responded a questionnaire about the parasite control practices and the general aspects of their farm. The TST scheme was performed one day every month from March to August (3 months of the dry season and 3 months of the wet season). All the adult ewes were reviewed once monthly to determine their FAMACHA© score and the BCS. Animals showing FAMACHA© 4 and 5 and BCS 2 or less (anemic and / or thin) were sampled directly from the rectum to obtain faeces to determine the faecal egg count (modified McMaster technique). Sampled animals with more than 750 egg per gram of faeces (EPG) were de-wormed with levamisole (7.5 mg/kg SC route) in farms #1 and #2 or albendazole (5 mg/kg oral route) in farm #3. Animals with an EPG below 750 were marked in the monthly report for the farmers to highlight the need to improve their management to prevent further physical deterioration and negative effects on production. The frequency of animals de-wormed once, twice and thrice was also determined.

Results: Faecal cultures performed in the 3 farms (Farms 1, 2 and 3 respectively) showed a mixed GIN infection with Haemonchus spp. (86.11%, 75.76%, 56.32%), Trichostrongylus spp. (6.48%, 6.06%, 36.78%), Oe-
sophagostomum spp. (7.41%, 15.15%, 6.9%), and Cooperia spp. (0%, 3.03%, 0%). Moniezia spp. and Trichuris spp. were also found during the McMaster processing. Farm #1 had an average of 48.6% of animals sampled and 10.4% of the total herd was treated. Farm #2 had a sampled average of 47.5% and 14.09% of the total herd was treated. Farm #3 had a sampled average of 24.68% and only 2.2% of the herd was treated. The importance of the combined approach was evident as most animals on Farm A (#4-5) were not treated and many animals with low BCS were not treated. On average, in all the three farms 76.4% of the animals were not treated, 19.5% were treated once, 3.5% were treated twice and 0.5% was treated thrice. The time needed to perform the TST per animal was quicker as the project progressed in time reaching approximately 30 seconds per animal. Time per animal varied depending on the facilities in each farm.

Conclusions: The TST showed to work on farms with high prevalence of Haemonchus. It was easier to perform when the ewes had a good nutritional status. Otherwise, many thin animals with very low FEG are sampled increasing the costs of materials and labour in the field and laboratory.

OC: 207
Parasitic diversity in goats (Serpenina breed) with respect to Eimeria spp.in Alentejo, Portugal
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Objectives: Portugal comes with a total population of half a million goats. With less than 5000 mature individuals, the Serpenina goat breed is in risk of extinction, according to IUCN Red List. However, there is an encouragement for the protection of this well adapted animal. In the present study all 15 surveyed Serpenina breed goat herds originated from the province Alentejo, Portugal, and represented a semi-intensive production system. The aim of the study was to define the presence, the diversity and the parasite load of Eimeria spp. in adult and pre-adult Serpenina breed goats. The influence of age range on oocysts per gram faeces (OPG) was also studied.

Materials and Methods: Faecal samples obtained from 144 animals (52.08% adults and 47.92% pre-adults older than five months) were examined using McMaster modified technique for OPG analyses. Adults were distributed in three age ranges: 2 to 4 years, 5 to 7 years and 8 to 11 years old.

Results: In total, Eimeria spp. oocysts were present in 98.61% of the faecal samples. Nine species of Eimeria spp. were identified: the most prevalent species were E. ninakohiyokimovae (88.19%), E. arloingi (85.42%), E. alijevi (62.50%) and E. capriona (62.50%). Other species found less frequently were E. hirci, E. caprina, E. joheljivi, E. christenseni and E. aphelenchoides, present in 52%, 52%, 49%, 39% and 26% of the samples, respectively. E. arloingi and E. ninakohiyokimovae were consistently the most frequent species in all age groups and E. aphelenchoides represented the least frequent species in all age groups. Considering the two most pathogenic species, nine of the fifteen herds presented a higher OPG average for E. arloingi when compared to E. ninakohiyokimovae, but differences were not significant (P=0.4308).

The average number of shedded oocysts was significantly lower in adult goats (996.4 ± 1,066.1 OPG) when compared with pre-adult goats (11,358.3 ± 49,753.9 OPG). No significant differences were detected in between all age group ranges.

Conclusions: Despite the differences in numbers of oocyst and Eimeria species recognized in the survey, no clinical signs of coccidiosis were observed in any of the examined animals, which might indicate a natural resistance of the caprine Serpenina breed against coccidiosis infections.

OC: 208
Comparative evaluation of apoptotic and anti-apoptotic mechanisms in the brains of sheep and goat naturally infected with Border Disease
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Objectives: Border disease (BD) is a viral and congenital disease of sheep and goats and first reported in sheep in 1959 from the border region of England and Wales. It causes reproductive failure and abortion in ruminants. The aim of this study was to examine and compare the relation between apoptotic and anti-apoptotic mechanisms in aborted foetuses, lambs and goats which were previously confirmed as BDV positive using RT-PCR and immunohistochemical examination.

Materials and Methods: Study materials were aborted foetuses, lambs and goats which were previously confirmed as BDV positive using RT-PCR. Besides, in immunohistochemical examinations on their formalin fixed and paraffin embedded central nervous system tissues Pestivirus antigens were demonstrated. It is known that Pestiviruses are related to triggering or inhibition of apoptosis. However, it is not clear which pathway and molecule they use. In this study, immunoperoxidase investigations toward INOS, eNOS, Bcl-2, Caspase 3,8,9, TNF-R1,TNF-a and IFN-7 were performed. The activity of caspases are involved in the extrinsic and intrinsic apoptotic pathways.

Results: Result of this study, main fetal lesions in the brain included ce-rebellar hypoplasia and hydranencephaly. The most prominent microscopic changes in the brainstem and cerebral hemispheres were nonsuppurative meningoencephalitis accompanied by hypomyelination. Immunohistochemical analyses showed strong immunopositivities depending on significant increases in the number of INOS and eNOS in vascular endothelial cells, microglia and neurons. However; microglia cells showed immunostaining with TNF-R1,TNF-a and IFN-7 in a lesser degree. In addition, moderate immuno-positivities were observed in microglia and neurons with Bcl-2, Caspase 3,8 and 9. Widespread Tunnel, a principle determinant of apoptotic cells based on showing DNA fragmentation, positivity was detected in BDV-infected brain tissue, especially predominantly in the nucleus of glial and neurons cells.

Conclusions: The results suggest that intrinsic apoptotic pathway rate of cell death was more dominant than extrinsic apoptotic pathways.

SURGERY AND LAMENESS
OC: 144
Assessment of the curative and preventive effectiveness of different practical modalities of a collective treatment of digital dermatitis in dairy herds
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Objectives: The objective of this study was to evaluate the preventive and curative effectiveness of different practical modalities of collective treatments, without using formalin or copper sulphate, and their factors of variation.

Materials and Methods: Three different modalities of a collective treatment using copper and zinc chelates were assessed. The modalities were [B] walking the cows twice daily through a footbath (5% Hoof-fit bath®) on two consecutive days a week every 4 weeks (11 farms) or [C] every 2 weeks (11 farms) and [D] spraying the hind feet in the milking parlour twice 4 days apart every 2 weeks (50% Hoof-fit Liquido®, 13 farms), for 24 weeks. For ethical reasons, severe DD lesions were treated additionally individually with topical oxytetracycline in all groups. All feet were cleaned with a medium-pressure hose before treatment. The effects of these modalities on incidence and cure of severe DD lesions were compared with the effects of a control measure [A], consisting of only topical oxytetracycline treatment (17 farms), using survival analysis (Cox model). DD and leg hygiene were scored on all lactating cows during 7 follow-up visits carried every 4 weeks. During these visits, data related to management practices were also collected.

Results: Initially, the proportion of active DD lesions (M1 or M2) on hind feet within farm ranged from 0 to 28%. Monthly cure rate of M1 or M2 lesions were 58%, 55%, 76% and 76% in A, B, C and D regimens respectively. Hazard of cure of DD was increased by 1.27 and 1.40 when footbath and collective spraying were applied fortnightly respectively compared to the control regimen. The risk of developing M1 or M2 lesions was decreased by 1.8 and 1.4 when collective treatments were applied fortnightly through collective spraying (D) or footbath, respectively, compared to individual treatment alone. High initial DD prevalence strongly increased the risk of developing DD (HR = 2.09), as well as absence of hoof-trimming (1.79) and poor leg cleanliness (HR: 1.75). Poor leg cleanliness also slowed the cure of DD lesions (HR: 1.46).
Conclusions: These results highlight the need of combining several measures to control DD. Collective treatments using copper and zinc chelates may be useful, in addition to individual treatments, when applied on cleaned feet at least every fortnight, either through a collective spraying in the milking parlor or by a walk-through split footbath.

**OC: 145**

**Digital documentation of digital lesions in cows with the Claw Manager – a digital protocol and analysis program for claw health of dairy herds**

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Objectives: In most dairy herds, there is a lack of documentation of lameness and claw disorders, and digital software programs are rarely used by claw trimmers or farmers (1). The aim of this report is to present a newly established digital protocol and soft ware program – the Claw Manager - for documentation of claw disorders during routine claw trimming and for immediate analysis of these data.

Materials and Methods: Documentation in practice can be carried out using either a shockproof and washable touch-screen connected to a laptop, a tablet PC or using a laptop only. Animal data on the farm can be registered manually or by import of data from public farm registers. The animal data file comprises 12 claw disorders graded into three severity scores and five lameness scores. As a default, lameness scores for severe claw disorders and reminders for presentation of affected cows are also included for the farmer and the vet. For each of the 8 main claws, 10 zones are presented graphically by the software and the pre-selected diagnoses can be inserted by touching the corresponding zone on the touch-screen. Until now this program was used by the author R.P. for claw data documentation and analysis in more than 350 herds over a period of two years.

Results: The software was programmed to analyse the documented claw-horn and claw skin findings and lameness scores. The severity of lesions was arithmetically and geometrically scored using already published claw scoring systems (2, 3, 4). The geometric severity scores for all zones of all eight claws were added resulting in the Cow Claw Score (CCS) for each animal. The median of all CCS of a herd describes the FCS (Farm Claw Score) (5). An analysis of the various claw zones is expressed by the FZS (Farm Zone Score) that lists the most frequently and most severely affected claw zones in a descending order (6).

Conclusions: The Claw Manager proved to be a practical digital documentation program for the professional claw trimmer. A modern tool for claw health control may be offered, based on the integration of methods which until now only has been used for scientific evaluation of claw health, such as CCS (2, 3, 4) and FCS (5). The digitally recorded claw data can be analyzed in an individual cow but also within a herd. Additionally, a long-term course of claw health of individual herds may be monitored easily, furthermore comparing claw data of different farms is now very easy and quick using the parameter FCS (6).


**OC: 146**

**Clinical trial on the curative effect of intra hoof-fit gel® on digital dermatitis**

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Objectives: Digital dermatitis (DD) is an increasing problem in modern dairy industry. Intra Hoof-Fit gel® (IHF, Intracare) is a water-based gel with active components copper and zinc for topical treatment and was tested as an alternative for the use of antibiotics. Reduction of the use of antibiotics.

Materials and Methods: A trial was conducted from in 2009-2010 on 5 commercial dairy herds, to estimate the efficiency of IHF as a treatment for ulcerative DD lesions (M2) in comparison with a registered antibiotic spray (CTC-spray®, Eurovet). All the farms included had slatted floors with cubicles and cows included in the trial were in different stages of lactation. Cows with M2 lesions were divided into two groups and treated either with IHF or treated with CTC, both according protocol and claws were inspected on d7, d21 and d28. The experimental unit was the hind leg with an ulcerative DD lesion (M2) and cure was defined as the transition of an M2 into a non-ulcerative stage at D28.

Results: Results The cure rate of M2 over 28 days was 0.92 for IHF compared with 0.58 for CTC. Thus, the risk difference equalled 0.92 − 0.58 = 0.34 (95% CI: 0.22 - 0.45). So the cure rate of Intra Hoof-Fit Gel® was significantly better than CTC-spray®.

Conclusions: IHF is a good alternative for the use of antibiotics in case of treatment of digital dermatitis.

**OC: 147**

The effects of feeding systems on the hoof health of dairy cows in south eastern australia

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Objectives: In response to drought and reduced pasture availability in south-eastern Australia, studies at DPI Eilеннbank are examining alternative ways of providing high amounts of supplements to grazing dairy cows. Part of this research is to monitor cow health and welfare, including hoof health. This study examined the effects of method and level of supplementation on cow hoof health.

Materials and Methods: Measurements were made to determine the type, prevalence and severity of hoof lesions across the lactation and to test for relationships with cow locomotion score, lying time and hoof hardness. A hoof lesion scoring chart was developed to allow a more quantitative and repeatable measurement. The initial measurements were taken between 20 and 81 days post-calving. A herd of 160 cows were scored for locomotion (scale 1-5) and hind feet lesions by experienced veterinarians. The measurements were repeated twice more during the lactation. The second measurements were taken 6 weeks after a short - term feeding trial which involved allocation of cows to feed groups with 8, 10, 12 or 13.5 kg of supplement, fed twice daily either as a mixed ration on a feedpad, or as a “slug” in the dairy at milking. The final measurements were taken in late lactation, when any impact of the short-term trial on the hooves were expected to have resolved. At this time, samples of hoof were analysed for puncture resistance, with the aim of comparing the integrity of the hoof with the severity of lesions.

Results: Throughout the experiment, it was found that there was no correlation between lesion score and locomotion score (e.g. rs = 0.11; p = 0.16 at assessment 2). The most prevalent lesions at the initial assessment were white line disease, paintbrush haemorrhages, and traumatic bruising. At the second assessment, the odds of a cow having these lesions did not increase significantly if they were present at the first assessment. There were no effects of supplement method or level on the prevalence of the major lesion types.

Conclusions: It was concluded that in this pasture-based system, the feeding system did not have an impact on the prevalence of the major hoof lesions. Locomotion scoring was found to be of limited use in the evaluation of hoof health. The findings illustrated the importance of the maintenance of hoof health in early lactation, in order to minimise the progression of lesions later in the lactation and the risk of subsequent lameness.
OC: 148

Attitudes of farmers, veterinarians and claw trimmers towards painful interventions in the area of the feet of dairy cattle in Switzerland

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Objectives: The majority of lameness-causing problems are located in the area of the feet. As cow-level prevalence of lameness is 15% in Switzerland (Becker et al., 2011, unpublished data), painful surgical interventions on the feet of cows have to be performed regularly. The administration of local anesthesia is required in cases involving the pododermia, according to Swiss legislation on animal welfare, but anesthesia is usually not performed due to various reasons. Furthermore, most of these interventions are performed by farmers and claw trimmers instead of veterinarians. The objective of this study was to approach this problem in Switzerland, assessing attitudes of farmers, veterinarians and claw trimmers towards painful interventions in the area of the feet of dairy cows.

Materials and Methods: Attitudes of 77 farmers and 32 claw trimmers towards painful interventions in the area of the feet were assessed during structured personal interviews, 137 bovine veterinarians completed an equivalent online survey.

Results: The knowledge of the statutory provision of Switzerland that anesthesia has to be administered in any case of painful intervention, was low among farmers and veterinarians. About three out of four veterinarians, but less than 50% of farmers and claw trimmers considered local anesthesia during the excision of a sole ulcer involving the pododermia as useful. 65% of the veterinarians performed local anesthesia for the painful excision of a sole ulcer in at least 50% of cases, one out of four in less than 25% of the cases. Pain during this intervention without anesthesia was often considered to be low by farmers and claw trimmers.

Conclusions: Information about the need and usefulness of anesthesia for treatment of painful interventions in the area of the foot in dairy cattle has to be spread and propagated among involved professionals to improve animal welfare and productivity in dairy farms. We found signs of underestimation of pain and deficient pain management. Furthermore, it was the general opinion that local anesthesia during painful interventions in the area of feet of dairy cattle was neither necessary nor useful.

OC: 149

Does hoof trimming affect locomotion of the cows?

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Objectives: Hoof trimming, bedding, foot bathing, feeding and overall management may considered as main factors in health of the cattle hooves. Hoof trimming result in proper weight bearing surfaces, however, it has been proven that hoof trimming can increase locomotion score that may be a result of over trimming or making new weight bearing surfaces. Locomotion scoring known as a method for assessing walks of the cows that could be a reflection of sound hooves and locomotors system.

Materials and Methods: This current study was done to evaluate impact of hoof trimming on locomotion score (LS) in a dairy farm consist of 1000 milking cows with average production of 37 lit/day during a 9 month period. All cows scored with a five point scale scoring system on monthly basis as scores one and two considered as sound and three, four and five considered as lame cows. In according to the results data from 2192 cows were recorded and the scores analyzed base on hoof trimming.

Results: The average LS before (1.48) and after (1.45) trimming didn’t show any significant changes. In 1762 sound cows, 87.45% and 89.9% didn’t show any changes in next score in trimmed and untrimmed cows respectively. The average of 10.1%, 9.1% of sound cows change to score three, 1.8% and 3% change to score 4 and 0.65% and 0.7% change to score five in trimmed and untrimmed cows respectively. In lame cows following hoof trimming 48.6% and 48.8% show decrease, 43% and 41.2% didn’t show any change and 8.4% and 5.3% show increase in their scores in trimmed and untrimmed cows respectively.

Conclusions: Results indicate that increase of LS following hoof trimming occurs more frequently in sound cows. Result of current study is in agree with the previous reports concerning risk of increasing LS and possibly lameness following hoof trimming.

OC: 150

Subclinical laminitis in dairy cattle – Thermographic examination of the claw and relations to energy metabolism

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Objectives: The subclinical laminitis represents an important factor regarding animal welfare and economy of high producing dairy cows. In the present study the influence of negative energy balance after calving and the resulting fat mobilisation syndrome on the development of laminitis-like changes of the claws should be investigated. Furthermore should be researched to what extent the thermographic examination of the claws after calving, is able to give information about the status of inflammation of the cornium and according to this it can be used as diagnostic instrument for early detection of subclinical laminitis.

Materials and Methods: The claws of 123 cows and heifers were investigated in the first week after calving as well as after the second month of lactation for the presence of lameness and, after the performance of claw trimming, for signs of subclinical laminitis. Additionally were analysed by thermography of the ground contact area. To define the influence of the metabolism on the development of laminitis measurements of backfat thickness, as well as blood samples for determination of FFA, BHb and.

Results: During the evaluation of lameness and laminitis signs, a significant increase of the latter after the second month of lactation was pointed out. In contras the lameness incidence decreased slightly. Rubber floors had overall a positive effect on the laminitis development. Cows in first lactation showed clearly severe laminitis-like changes (haemorrhaged, yellowish horn, soft horn) than older animals. The laminitis-like changes appeared particularly on the lateral claws of the hindlimbs in all probands. The thermography showed serious differences between the claws of the front– and hindlimbs as well as between lateral and medial claws. The hindclaws were clearly warmer than the frontclaws (p<0.0001). The distribution of laminitis-like changes was consistent with the pattern of the temperature distribution over the main claws, there could no clear correlation be found between the claw temperature after calving and the visible laminitis signs eight weeks later. Between the dimension of backfat thickness, the concentrations of FFA-, BHb- and glucose and the development of subclinical laminitis no convincing correlations resulted. Rather underconditioned animals tended to be affected by claw disorders.

Conclusions: The temperature distribution upon the ground contact area of the claw was consistent with the distribution pattern of laminitis-like changes. Thermography was not suited for early detection of subclinical laminitis. The temperatures between front- and hindclaws as well as between lateral and medial claws differed clearly. A direct influence of the fat mobilisation syndrome on the claws could not be found in the present studies.

OC: 151

Evaluation of the therapeutic use of a serpens species bacterin in a dairy herd with a high prevalence of digital dermatitis

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Objectives: Digital dermatitis is a major cause of lameness in many dairy herds, and can have negative effects on milk production, reproductive efficiency and cow welfare. Most treatment and control strategies have focused on local topical application of antimicrobials for affected individuals or high-risk groups. Recurrence rates are high, signaling the need to explore alternative methods for treatment and prevention. The purpose of this study was to evaluate the therapeutic use of a Serpens species bacterin in a dairy herd known to have a significant prevalence of lameness due to digital dermatitis.

Materials and Methods: Seventy-seven mature lactating Holstein cows
were enrolled in this study. Group 1 (n=38) received three injections of a Serpens species bacterin at four-week intervals (week 0, 4, and 8) while group 2 (n=39) received three injections of the adjuvant. Blood samples were obtained at week 0, and again at week 12 to evaluate anti-Serpens spp. antibody titers. Locomotion scoring and digital dermatitis lesion measurement was performed at weeks 0, 12, and 18. Thirty-two cows in group 1 and thirty-three cows in group 2 remained in the herd at week 12, and data for only these cows was used for comparison between week 0 and 12. Twenty-two cows in group 1 and twenty-five cows in group 2 remained in the herd at week 18, and data for only those cows was used for comparison between week 0 and 18.

Results: Serpens-associated antibody titers increased significantly from week 0 to week 12 in group 1 cows. However the percentage of cows affected by digital dermatitis and the average width of digital dermatitis lesions did not differ between groups at week 0, week 12 or week 18. The percentage of cows identified as clinically lame and the average locomotion scores increased significantly from week 0 to week 12 and from week 0 to week 18 for both groups 1 and 2, but the groups did not significantly differ from each other at any time point.

Conclusions: The results of this study indicate that the Serpens bacterin was able to induce an antibody response in dairy cattle, however this was not protective against disease. The prevalence and size of digital dermatitis lesions increased in both groups throughout the experimental period regardless of vaccination status. Despite its ability to produce a measurable immune response, vaccination for digital dermatitis was not effective in reducing disease prevalence or preventing new infections.

OC: 152
Scoring of digital dermatitis during milking: assessment of a new method
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Objectives: Diagnosis of digital dermatitis (DD) is crucial both for farmers to treat earlier affected cows and for researchers to assess the effectiveness of control measures. The most accurate diagnosis is currently the visual inspection of the feet during trimming. Being not adapted for frequent evaluation in routine, several inspection methods in a standing animal have been tested but they were not fully satisfying. The objective of this study was to assess the repeatability, reproducibility and accuracy of a simple method based on the inspection of cleaned hind feet during milking with a swivelling mirror and a powerful headlamp.

Materials and Methods: The hind feet of 242 Prim’ Holstein cows from 4 farms were concomitantly inspected by five trained observers (to assess reproducibility) during two consecutive milking (to assess repetitability). This inspection was followed by an inspection of the feet in a trimming-chute (to assess accuracy). Performances of this method were evaluated using (i) the 5 M-stages scoring system (M0 to M4) : based on the one first described by Dopfer in 1997, and (ii) a simplified system merging M3 and M4. As most of the disagreements concerned M3 and M4, the performances were better with the simplified system.

Results: With this method, we found a good inter-(percent of overall agreement [PA] =77%), weighted kappa [W] = 0.68) and intra-(PA = 80%, W = 0.71) agreements. The agreement with the reference method was also good (PA = 69%, W = 0.58). Considering absence versus presence of a DD lesion, the method had good sensitivity (Se = 0.90) and specificity (Sp = 0.80). The time spent for inspection varied from 30 to 60 seconds per cow.

Conclusions: This method may be useful and practical both for farmers, veterinarians and researchers, especially when the DD status of many cows has to be evaluated. Its accuracy might be improved using more precise criteria for each M-stage.
to evaluate DD lesions the classification method described by Döpfer et al. (1994) of five points (M1 to M4.1) was used in combination with linear measurements and clinical assessment of the DD lesions.

**Results:** Preliminary results show the importance of the chronic DD stages in the perpetuation of the disease through changes in the skin characteristics of the heel and hoof conformation. Statistical analysis and graphical 3D representations of the changes over time will be presented.

**Conclusions:** Conclusions derived from the study can yield some insights in the understanding of DD pathogenesis and generate ideas for possible new and more effective interventions in the field aiming at controlling and preventing the disease.

**OC: 155**

**The impact of lameness on conception and survival in four commercial dairy farms**

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**Objectives:** Lameness in cattle severely affects animal welfare and causes economical losses through reduced milk production, impaired reproductive performance and increased involuntary culling. Nevertheless, quantifying losses has been challenging and controversial due to the presence of confounding variables and the fact that lameness is time dependent. The objective of this study was to quantify the effects of events of lameness on conception and survival in four commercial dairy herds.

**Materials and Methods:** The retrospective cohort study included data from four typical Israeli commercial dairy herds chosen to participate based on completeness of data recording. Lameness was defined as an abnormality in gait caused by a claw lesion identified by a senior herdsman, regardless of diagnosis. The database included calving, health and reproduction data from cows calving between January 2006 and December 2008. Time from calving to conception or culling was divided into 7 days intervals and maximum follow-up time to conception was set at 26 weeks. The association between lameness and conception was quantified using a multivariable proportional odds model in which lameness was a time dependent variable. For estimating the association between lameness and 365 days survival in herd, a Cox proportional hazard model was used.

**Results:** Data from 4,331 cows were included in the analysis. At least one event of lameness during lactation occurred in 242 (5.6%) cows. Cows lame during a week preceding an insemination were less likely to conceive (OR = 0.4, P = 0.018) compared with cows that were not lame during the week preceding an insemination. Events of lameness occurring earlier than 1 week before insemination were not associated with odds to conceive. The hazard to leave the herd by 365 days was 2.15 times greater (P < 0.001) in cows that experienced at least one event of lameness compared with cows that did not.

**Conclusions:** Lameness was associated with a reduced likelihood to conceive during the 26 weeks after calving. It was not possible to demonstrate a negative effect of lameness on the odds to conceive when the lameness occurred earlier than 1 week before insemination. Cows experiencing at least one event of lameness were more than 2 times more likely to leave the herd compared with cows that were never lame. The fact that high producing cows are more likely to become lame together with the finding that lame cows are more likely to leave the herd demonstrates the great importance of preventing lameness in dairy herds.

**OC: 156**

**Collagen implants isolated or associated with stromal autogenous mesenchymal cells in tendon repair in sheep**

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**Objectives:** The objective of this study was to evaluate the biological behavior of autogenous mesenchymal stromal cells implants, associated or not with collagen matrix in tendon repair of 21 sheep adults.

**Materials and Methods:** The animals were divided into three groups of seven animals each and submitted to tenotomia partial flexor digitorum superficialis left chest, measuring 1.5 cm long by 0.3 cm wide, on the palm side of metacarpal III. In group 1 (G1 or control), the injured tendon has not undergone any treatment or tenorrhaphy, group 2 (G2) failure tendon implant was filled with collagen matrix and in group 3 (G3), collagen membrane was implemented associated with autogenous mesenchymal stem cells. The histological evaluations and scanning electron microscopy were made to 30 (two animals per group), 60 (two animals per group) and 90 (three animals per group) postoperative days.

**Results:** The G1 and G2 at 30, 60 and 90 days after surgery, showed collagen fibers are thin, branching and loss of longitudinal arrangement compared to the superficial flexor tendon of the fingers of normal sheep. The G3, in the same periods arrangement of collagen fibers was observed similar to that of normal tendon, however, thinner than normal.

**Conclusions:** This organization more uniform collagen fibers observed in the G3 infer that the addition of autogenous mesenchymal stromal cells to biological implants, has promising prospect in the surgical repair of tendons of sheep, which entails further research on the subject.

**OC: 157**

**Evaluation of an electroencephalogram-based automatic system for monitoring anesthesia in calves**

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**Objectives:** The aim of this study was to test the Narcotrind™ monitor, which was developed for humans, in calves. It converts the original electroencephalogram (EEG) into a numeric index from 0 (deep anesthesia) to 100 (awake).

**Materials and Methods:** In 43 Simmental calves, aged 2 days to 4.5 months, anesthesia was monitored and data were collected during surgery and the subsequent waking or deepening phase. The animals were divided into two groups according to the general condition and sensorium – either unremarkable (group 1) or disturbed (group 2). For anesthesia, the standard protocol of the Clinic for Ruminants was used, i.e. xylazine (0.2 mg/kg/min), ketamine (2 mg/kg) and isoflurane (1.5-3.0% in oxygen (10 - 20 ml/kg/min). The patients breathed spontaneously throughout the entire anesthesia, and end-tidal isoflurane concentration (ETiO) was monitored. Depth of anesthesia was assessed using clinical parameters. It was divided into four planes: “awake”, “too light”, “adequate” and “too deep”. At the moment of skin incision and manipulation of the peritoneum, the occurrence of movements following surgical stimuli was monitored. The EEG was visually analyzed, looking for burst suppressions. This, as well as the evaluation of the deepening phase, was done for both groups. All other analyses were carried out only for animals with undisturbed general condition and sensorium.

**Results:** There was no discernable relationship between the Narcotrind™ index and the clinically determined plane of anesthesia. Furthermore, the Narcotrind™ index did not reflect the presence of responses to pain-associated surgical stimuli. Between the Narcotrind™ index and ETiO there was a weak significant positive correlation (Spearman) (group 1: r = 0.309, plane of deepening (both groups): r = 0.317), which was contrary to what was expected. In both groups, the EEG epochs were correctly classified in 97.7 % regarding burst suppression patterns. However, there was a large difference regarding the incidence of these patterns (group 1: 1.6 %; group 2: 31.3 %).

**Conclusions:** Under the given circumstances, the Narcotrind™ was no useful aid in the monitoring of anesthesia in calves.

**OC: 158**

**Evaluation of three different methods for anaesthesia of calves in umbilical surgery**

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**Objectives:** The objective of this study was to compare the effects of three
different anaesthetic protocols with respect to possible pain-associated re-
actions.

**Materials and Methods:** A total of 105 calves were allocated to three pro-
tocols, each one with umbilical surgery (trial) or without surgical interven-
tion (control): group injection (INJ) with xylazine (0.2 mg/kg), ketamine (5 mg/kg) and local anaesthesia (2% procain); a combination of injection and inhalation (group COM) with xylazine, ketamine, and isoflurane (1.5 vol% in oxygen (12 ml/kg/min)); and inhalation (group INH) with isoflurane alone. During the trial, the anaesthetic level was controlled, and signs of response to surgical stimulation or spontaneous movements, changes in heart rate, mean arterial pressure, plasma L-lactate and cortisol levels were recorded.

**Results:** The dosage of 5 mg ketamine/kg body mass was rarely sufficient to obtain surgical tolerance (CT) in group INJ. In order to attain CT, it was necessary to administer an average of 8.4 mg ketamine/kg body mass. All animals of the INJ groups (trial and control groups) started to show signs of spontaneous movements or response to surgical stimulation between 5 and 12 minutes after the last administration of ketamine. Signs of response to surgical stimulation at the time of skin incision were significantly most frequent (37 %) in the INH test group, while agitation or response to surgical stimulation at least once during the entire time of anaesthesia was signifi-
cantly most frequent in the INJ trial group (100 %). Heart rate and mean blood pressure were not found to be related to surgical stress situations. Ten minutes after the incision, the highest increases in blood cortisol levels above basal levels of the previous day were determined in the INJ trial and control groups. However, significant differences between the experimental and con-
trol groups between the previous day and ten minutes after incision were found only in the INH trial and control groups. Within the experimental groups with surgical intervention, the increase between the previous day and ten minutes after incision between the INJ and COM trial groups was significant.

**Conclusions:** Under the conditions of the present study, the anaesthetic protocol of group COM was best.

**OC: 159**

**Omphalolec with intestinal and mesenterial abnormality**

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**Objectives:** An omphalole is a congenital protrusion of part of the abdo-
minal viscera through a defect in the abdominal wall at the umbilicus. The hernial ring either consists of an abnormally wide umbilical ring (small om-
phalole), or sometimes comprises both, an abnormally wide umbilical ring associated with an abdominal hernia of variable size (large omphalole). Unlike true umbilical herniae, the evaginated organs (small intestines, portion of the liver or abomasum) in an omphalole are not covered with skin but by a paper-thin membrane (amnion). In some cases traumatic insults may rupture the amnion and cause an open hernia with intestines exposed to the environment. Omphalole is a malformation. During early stages of fetal de-
velopment, the intestines rest partly within the extra-embryonic celom of the umbilical cord. Failure of the intestines to return or failure of one of the four body folds to migrate normally results in an omphalole. In humans, ompha-
locle is frequently associated with other congenital anomalies. However, at present no other congenital anomalies have been reported in calves.

**Materials and Methods:** This report is based on the case records of 13 cal-
ves with omphalole with (10/13) and without (3/13) rupture of the hernial sac that were admitted to the Clinic for Ruminants, LMU Munich, in the years 1996 through 2009.

**Results:** In addition to omphalole, an extensive abnormality of both me-
senterly and small intestine was detected in each of the 13 calves. Addition-
ally, a small string, consisting of fibrous tissue, at one particular point of intestine, was documented in five cases. One case of both groups of patients is described in detail.

**Conclusions:** Early diagnosis and intervention are crucial for successful treatment of affected calves. In cases of omphalole with intact hernial sac, reduction of the hernia and placement of an abdominal bandage before immediate transport to a clinic or arrival of the practitioner to the farm is the first aid treatment of choice. Patients with omphalole with and without rupture of the hernial sac should only be operated if following conditions are met: no severe disturbance of general condition, no additional severe conge-
nital anomalies, only little contamination and no severe damage of intestines. At present, only speculations about aetopathology of this complex umbilical abnormality are possible.

**OC: 160**

**Outbreak of spontaneous fractures in dairy calves associated with osteoporosis**

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**Objectives:** In practice, outbreaks of spontaneous fractures in calves are scarcely investigated. Nutritional deficiencies in the calf diet after weaning are frequently incriminated, but very few report describe the origin of mineral bone fragility. The aim of this presentation is to describe the clinical and paraclinical investigations of an outbreak of spontaneous fractures in dairy calves and propose a diagnosis of osteoporosis.

**Materials and Methods:** In January 2011, 3 Prim’holstein calves (out of a barn of 6) were referred to our hospital for inability to stand and lateral decu-
bitus occurring suddenly one month ago. Any precise information regarding the diet was available. The calves were ranged from 4 to 4.5 months of age and were weaned 2 months ago. Clinical examination revealed: - Calf 1 and 2: inability to stand, lateral decubitus, swelling of both hind limbs and strong suspicion of bilateral fracture of femurs. - Calf 3: inability to stand, lateral decubitus, swelling of right hind limb and strong suspicion of fracture of right ti-
bia Several bedsores and decubitus ulcers were observed for all the 3calves.

**Results:** All the calves had normal calcium while calves 1 and 2 had severe hypophosphatemia (28 and 29 mg/L [55-75]). Radiography and necropsy findings confirmed the fractures for the 3 calves, but no abnormality of the bone was noticed (no cortical thickness, no oepiphysis).The concentration of Ca and P in the bone ashes (in comparison to a control healthy calf) revealed mineralization deficiency in the diaphysis. At this stage, osteoporosis (due to hypophosphatemia) was suspected. Osteodensitometry and histopathology were concomitantly performed on the femur and the tibia of the 3 affected calves and of one control calf. The very low bone mineral densities for calves 1 (0.224 g/cm²) and 2 (0.543 g/cm²) in comparison to control (0.909 g/cm²) in addition to histopathology confirmed the severe demineralization of the bones associated with the absence of abnormality of the bone confirming the diagnosis of osteoporosis.

**Conclusions:** The interest of the different available approaches and ancillary tests in the diagnosis of spontaneous fractures in calves will be discussed.

**OC: 161**

**Clinical signs, treatment, and outcome in 15 cattle with sinonasal cysts**

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**Objectives:** To describe clinical symptoms, diagnostic measures and surgi-
cal treatment in cattle with sinonasal cysts.

**Materials and Methods:** The medical records of 15 cattle that were refer-
red because of a fluid-filled mass in a nasal passage, the conchae, and/or paranasal sinuses were reviewed. Diagnostic measures included endoscopy, radiography and computed tomography.

**Results:** Of 15 cattle, 10 were treated. Osteoplastic techniques were used in five cattle. In three cattle, the cysts were removed through the nasal ca-
al with endoscopic guidance, using the nostrils as natural orifice. In two patients, both approaches were required to remove the cysts. Four animals were euthanased and 1 slaughtered. Of 10 cattle, 8 animals were healthy at long term follow up (means, 19.3 months post op), and 2 had signs of recurrence of the disease which was treated successfully in one.

**Conclusions:** Sinonasal cysts should be considered as a primary differential diagnosis in cattle with abnormal respiratory noise, particularly in younger animals. One third of the cattle in this study had multiple cysts, which un-
derlines the importance of advanced imaging modalities when treatment is considered. CT was the examination technique of choice; it allowed a definitive diagnosis and aided in the planning and execution of surgical treatment.

**OC: 162**

**Epidural analgesia of the flank in cattle with romifidine and its effects on cytokine gene expression**

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**Objectives:** Standing flank laparotomy is a common procedure in cattle, and different methods of local anaesthesia of the flank are described in literature. Sacrococcygeal epidural analgesia, most commonly with local anaesthetics, is frequently used for surgical and obstetrical procedures because of a complete analgesia of the skin, muscles and the peritoneum. It has been shown that α-adrenergic agonists administered epidurally are able to cause analgesia through activation of specific spinal receptors. The advantage of epidural anaesthesia with α-adrenergic agonists - as opposed to local anaesthetics - is the creation of a selective sensory blockade without unwanted depression of motor or autonomic neurons, and thus without affecting the ability to stand. The aim of our study was to evaluate the clinical efficiency and usefulness of the selective α-adrenergic agonist Romifidine (Sedivet®/Boehringer Ingelheim) for epidural analgesia of the flank in cattle.

**Materials and Methods:** Epidural analgesia was performed on 6 healthy adult cows using 25 ml NaCl as a control. The same procedure was repeated after three weeks using Romifidine (50 µg Romifidine / kg body weight in a total volume of 25 ml NaCl). Every animal served as its own control. Onset, duration, intensity and spread of analgesia as well as sedative effects were evaluated by the same veterinarian every hour over a period of 2 days. Total RNA was isolated from venous blood samples and transcribed into cDNA. Different expression of Hsp70 and IL-18, IL-2, IL-6, IL-10, INF-γ and TNF-α were calculated against house-keeping genes using Real Time-PCR.

**Results:** Epidural administration of Romifidine provided full analgesia of the flank and even up to the coronary band of the hind limbs and chest in all animals. The analgesia of the flank lasted at least 6 hours. As a side effect, we observed a distinct sedation of the animals, with the ability to stand, however, remaining intact. Preliminary data show that the mRNA expression of pro-inflammatory cytokines Interleukin-6 (IL-6) and Interleukin-18 (IL-18) is diminished after Romifidine analgesia in comparison to the NaCl control, whereas Heat Shock protein (Hsp70) expression is slightly up-regulated.

**Conclusions:** Epidural administration of Romifidine provides a reliable, long lasting and cost-effective analgesia of the flank in cattle and is easy to perform. However, further studies are needed to optimize the dose and investigate possible side effects.

**OC: 163**

**Balling gun induced oropharyngeal trauma in cattle. Complications during administration of intraruminal boluses: an illustration of clinical cases**

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**Objectives:** The administration of intraruminal boluses for the treatment or prevention of disease in cattle has become very popular in recent years. Examples include the application of calcium boluses, the supplementation with copper, cobalt or selenium by giving trace mineral-enriched boluses or the administration of anthelmintics such as fenbendazol. Balling gun induced traumata and perforation of the oropharynx and esophagus are possible complications with severe consequences.

**Materials and Methods:** Medical history, clinical findings, diagnostic procedures and treatment of cattle suffering from these complications are illustrated based on four cases that were admitted to the Clinic for Ruminants, University of Munich.

**Results:** All animals had been administered boluses by laymen, some of which had reported pronounced resistance of the animals during the procedure; all animals also showed reduced appetite promptly after the procedure. Dyspnea was present in three cases and swelling of the throat was obvious in three out of four patients. Increased salivation was observed in two cases. Diagnosis was aided in all cases by endoscopic examination (videos of the endoscopic examination will be shown). Two boluses were successfully extracted surgically from the esophagus in an adult bull, but tissue damage and necrosis of the oropharyngeal perforation site ultimately ended further treatment. In one other case a partial bolus could be removed from the esophagus with the help of a Thysgen probe. Two remaining animals had to be euthanized after confirmation of the diagnosis, due to the severity of lesions and/or the length of time between insult and initiation of treatment.

**Conclusions:** Owners usually perform the administration of boluses with the help of commercially available balling guns but are seldomly aware of the possible complications that may arise from the oral administration of such boluses. Therefore it seems to be of importance that veterinarians can give adequate advice on the correct use of these devices prior to their use. Additionally, they should inform owners about the treatment options and the poor prognosis in cases of perforating lesions. Veterinarians should be able to recognize these complications and their corresponding clinical symptoms early.

**OC: 164**

**Humeral osteosynthesis in calves using a polymeric interlocking nail**

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**Objectives:** To test in vivo a polymeric interlocking nail for humeral osteosynthesis in calves.

**Materials and Methods:** Under general anesthesia, five Holstein calves aging 30 to 60 days had a polypropylene rod intramedullary implanted in one of their humeruses immediately after oblique diaphyseal osteotomy. The osteosynthesis was completed by inserting 4 transverse stainless screws. Prophylactic analgesic and antibiotics were provided. Calves were allowed to walk after anaesthesia recovery and were kept in stall for 60 days. Calves were daily evaluated for the presence of pain and lameness. Radiographic exams were performed with one, 15, 30, 45 and 60 days after surgery.

**Results:** Although calves avoid bearing weight in the affected limb, all of them were able to stand up and walk starting just after recovery from anesthesia. One of the calves had a second polypropylene nail implanted because the original one was broken in the first post-operative day. This same calf died 10 days later affected by blood parasites. Local swelling and pain were noted in the first days, but progressively decreased in the following weeks. Radiographic evaluation showed good cooptation of bone fragments in the first day, but cranial dislocation of the proximal fragment in all, and screw fracture in one calf were detected in post-operative day 15. In spite of that, bony consolidation in all was completed within 60 days after surgery. Also no adverse effect was observed with the use of polypropylene.

**Conclusions:** Polypropylene interlocking nailing can be considered as an alternative technique for humeral osteosynthesis in young calves.

**OC: 165**

**Bursitis with severe tendon and muscle necrosis on the lateral stifle area in 21 cattle**

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**Objectives:** To describe severe lesions of the stifle region in cattle which caused difficulty to rise, weight loss and recumbency.

**Materials and Methods:** 21 cattle with chronic bilateral swelling of the stifle region were evaluated. Ultrasonography showed increased fluid in the distal subtennis bursa of the biarticular tendon muscle and severe changes in the tendons, muscles, subcutis and fasciae. Soft tissue swelling and an irregular contour of the lateral tibial condyle were typical signs on radiographs. Treatment included box rest, antibiotic, NSAIDs, intravenous fluids and other supportive measures.
Results: The majority of animals did not respond to treatment and had to be culled due to a poor prognosis. Macroscopich pathologic changes were found at the insertion of the biceps femoris muscle, the distal subtenonous bursa of the biceps femoris muscle, the lateral collateral ligament of the stiffe, the origin of muscles on the lateral femoral condyle and the lateral tibial condyle. They mainly consisted of tendon and muscle tissue necrosis with granulation tissue. Histology revealed areas of coagulation necrosis in tendons and ligaments, in which occasionally Onchocerca spp. were seen.

Conclusions: The severity of lesions correlated well with the clinical signs, which were associated with a poor prognosis in advanced cases. Possibly, the condition was associated with poor housing conditions during late pregnancy. The role of Onchocerca spp. still has to be determined.

TROPICAL ANIMAL DISEASES

OC: 52
Improving small-holder cattle productivity in Cambodia through a combined health and production approach
Bush David, R.; Sothoeun S.; Young J.; Rast L.; Nampanya S.; Windsor Andrew P. Faculty of Veterinary Science, The University of Sydney, Australia

Objectives: Underfeeding and poor health of cattle in smallholder village-level enterprises in Cambodia is a major constraint to improving productivity. Most cattle are raised in the traditional manner and fed available natural grasses or rice straw/stubble with little regard to biosecurity. Most cattle are raised in the traditional manner and fed available natural grasses or rice straw/stubble with little regard to biosecurity. The role of Onchocerca spp. still has to be determined.

OC: 53
Investigating the field efficacy of foot and mouth disease vaccination of large ruminants in northern Lao PDR
Windsor Andrew, P.; Windsor A.P.; Khounsy S.; Richards J.; Nampanya S.; Rast L. University of Sydney, Australia

Objectives: Assess the efficacy of vaccination of large ruminants to FMD, by analysis of the antibody responses in vaccines under field conditions in the endemicly infected province of Xiang Khuan in northern Lao PDR.

Materials and Methods: In late 2008, buffalo and cattle in 2 villages in the north-eastern province of Xiang Khuan were vaccinated with a trivalent FMD vaccine. When compared to morbidity in surrounding villages, both 100% and 50% vaccination rates were found to have significant protection against an FMD outbreak that occurred in early 2009 (Rast et al, 2010, TBED 57:147-53). Vaccination was not performed in late 2009, and another FMD outbreak occurred in early 2010. Prior to vaccination in late 2010, pre-vaccination blood samples were collected, with post vaccination samples (n=112) collected 2 months later. Sera were analysed by a serotype-specific liquid phase blocking enzyme linked immunosorbent assay to detect antibodies to serotypes O, A and Asia1 FMD virus structural proteins (anti-SP), and also tested for antibodies to FMD virus 3ABC non-structural proteins (anti-NSP).

Results: Pre-vaccination titres were consistent with reports of previous disease outbreaks, with a majority of the population displaying anti-SP titres <1:80. There was a significant increase in post-vaccination anti-SP titres with a majority of the population displaying titres >1:80. There was no significant change in the anti-NSP titres between pre and post vaccination samples. A high prevalence (93%) of antibodies to FMD virus 3ABC NSP non-structural proteins is consistent with previous exposure to wild-type FMD virus infection.

Conclusions: FMD is endemic in Lao PDR where the majority of large ruminants are owned by smallholders and provide a vital source of food, draught power and cash income. High morbidity rates associated with FMD outbreaks cause significant losses at the village level (Rast et al, 2010) and are a concern for the rapidly expanding trade in livestock and their products in the region which may hinder long-term economic development of ASEAN countries. Vaccination for FMD is not currently widely practiced in Lao PDR. However this study indicates that effective herd immunity is achievable and titres due to vaccination can be distinguished from those due to endemic infection. The finding suggests that FMD control is hypothetically possible in Laos PDR should sufficient resources be made available, information of importance to the OIE SAFMID roadmap that promotes FMD eradication in south east Asia by 2020.

OC: 54
Toxocara vitulorum and fasciola gigantica in cattle and buffalo in northern Lao
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Objectives: In many parts of Asia T. vitulorum and F. gigantica infections in ruminants are endemic and contribute to low productivity. In northern Lao both parasites are considered endemic and a major production constraint based on anecdotal reports. This research aims to assess the financial and clinical impacts of these parasites in cattle and buffalo as well as farmers' knowledge, attitudes and practices towards parasite control in order to provide recommendations on cost-effective and context appropriate approaches to control.

Materials and Methods: Between September 2009 and February 2011 prevalence studies using faecal egg counts (FEC), followed by farmer interviews to collect data on calf morbidity and mortality, large ruminant productivity, household finances, farmer knowledge, attitudes and practices were completed. Two-stage sampling of villages and then households was undertaken in 5 northern Lao provinces. Total animals sampled were 886 cattle and buffalo calves < 3 months old from 65 villages for T. vitulorum and 1270
cattle and buffalo >12 months old from 75 villages for F. gigantica. Around 250 owners each of the animals sampled for T. tenuis and F. gigantica were interviewed 3-7 months after sample collection. An abattoir survey at 5 provincial slaughterhouses to assess carcass damage due to internal parasites and other diseases was completed from March to June 2011 and 72 buffalo and 60 cattle were assessed. Treatment trials for both parasites and genetic analysis of fluke specimens are in progress.

Results: T. tenuis prevalence: 76% of the villages had FEC positive calves. 21% of cattle and 26% of buffalo calves were positive. F. gigantica prevalence: 73% of villages had FEC positive animals. 15% of cattle and 22% of buffalo were positive. At slaughter 96% of buffalo and 38% of cattle had gross liver lesions consistent with fluke infection. Of the animals with liver lesions 36% of buffalo and 30% of cattle were FEC positive. 92% of cattle and 63% of buffalo slaughtered were < 3 (out of 5) body condition score. 9.6% had FMD lesions and 34% had gross lung lesions of unknown aetiology. Abnormal livers, lungs or other organs/products were not condemned and were sold at local meat markets for the same unit price as normal organs/products. Farmer interview analysis and treatment trials are ongoing.

Conclusions: Results confirmed that the prevalence of both parasites is high in northern Laos. Initial analysis of farmer interviews indicates that knowledge on internal parasites is low and effective control is absent. The abattoir survey showed that mostly low condition ruminants get slaughtered, probably reflecting their health status and farmers selling animals when they need cash. The large discrepancy between fluke damage of livers and FEC positive results indicates that the true prevalence of F. gigantica is higher. The lack of meat inspections, condemnation and current non-discriminatory local market demand for large ruminant meat products provide a potential disincentive for farmers to control parasites. Full analysis of the interviews and results of treatment trials are hoped to provide evidence for practical and acceptable control options for T. tenuis and F. gigantica for Lao smallholder farmers.

OC: 55
Sero logical survey of Rift Valley Fever among sacriﬁce animals in Holly Mecca during pilgrimage season
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Objectives: The current work aimed to evaluate the prevalence of RVF exposure among sacriﬁce animals during pilgrimage season in Saudi Arabia and to determine the vulnerability of the sacriﬁce herds based on its immune status.

Materials and Methods: A total of 580 sacriﬁce animals, including 120 local and 460 imported animals, were randomly selected from the sacriﬁce herds at Al-Kaahiah slaughter houses, Mecca during the 2009 pilgrimage season. Blood samples were collected from all investigated animals for serum separation and conduction of capture and sandwich ELISA techniques for detection of anti-RVF virus IgM and IgG immunoglobulins, respectively.

Results: The study revealed an overall rate of recent RVF exposure, manifested by positive IgM sera, of 2.59% among investigated sacriﬁce animals (0.83% among local animals and 3.04% among imported ones). On the other hand, the overall herd rate of immunized animals based on the positive IgG cases, were 47.06% (55% among local animals and 45% among imported ones).

Conclusions: In spite of the low prevalence of recent RVF exposure among sacriﬁce animals, the low level of immunity among both local and imported animals increase the potential risk of eruption of another outbreak among sacriﬁce animals during pilgrimage with the subsequent socio-economic and public health consequences. The study clearly denotes the importance of applying an effective and controlled vaccination program for local animals and veriﬁcation of the immune status of imported herds.

**Tropical Animal Diseases / Udder Health**

**OC: 1**

**Udder pressure development before and after dry-off in cows with different milk yield**

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Objectives: At the end of lactation dairy cows are dried-off following procedures established decades ago. Sudden interruption or intermittent milking and a reduction of feed and water are most common. While milk production has increased considerably in the past these procedures are still used unchanged. It is suspected, that drying-off cows with high milk yields (> 20 kg) leads to higher – and possibly painful - pressure in the udder. The objective of this study was to investigate the mammary pressure in dairy cows before and after drying-off considering different milk yields (MY).

Materials and Methods: Fifty healthy Holstein-Friesian dairy cows were classified based on milk yield (MY) averaged over 7 days before dry-off to 3 groups (i.e. low (IMY) < 15 kg/d, n = 19; medium (mMY) 15-20 kg/d, n = 15; high (hMY) > 20 kg/d, n = 16). Drying-off regime consisted of a sudden interruption of milking combined with a group and feed change. Mammary pressure measurements were carried out with a dynometer (Penelit DFT 14, Agro Technologies, Forges les Eaux, France). Pressure was measured 7 days before dry-off (i.e. before and after milking), again before and after the last milking and 9 days after dry-off. All measurements were carried out by the same investigator at 15:00 ± 1 h in the middle of the left hind quarter. The measuring point was marked to ensure an identical location every day.

Results: Overall, udder pressures ranged from 0.31 to 2.35 kg (mean ± SD = 0.78 ± 0.35 kg). Before milking pressure was lower in IMY (0.71 ± 0.29 kg) than in mMY (0.98 ± 0.33 kg, P < 0.05) and hMY (0.97 ± 0.23 kg; P > 0.001) groups, respectively. After milking the pressure was similar in all three groups (i.e. IMY 0.48 ± 0.15 kg, mMY 0.53 ± 0.15 kg, hMY 0.50 ± 0.10 kg, P > 0.05). Udder pressure increased significantly within 2 days after dry-off in all groups (P < 0.05). But only in hMY cows pressure was significantly (P < 0.05) higher after dry-off compared to unmilked udders. Pressures similar to after milking values were reached 4 IMY and 7 days (mMY) after dry-off, respectively. There was still a difference for hMY on day 9 after dry-off (P < 0.05). Udder pressures differed between IMY and mMY cows from day 1 to 4 after dry-off and between IMY and hMY from day 1 to 7 (P < 0.05).

Conclusions: Considerable differences of udder pressure existed between cows with different milk yields before milking and after dry-off. Consequently, especially for high yielding cows considering health and animal welfare aspects warrant further investigations.

**OC: 2**

**Influence of infection pressure on efficacy of extended treatment of clinical mastitis.**

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Objectives: Studies have shown that the probability of bacteriological cure of chronic clinical mastitis can be increased through an extended duration of treatment. However, re-infection easily occurs on farms with a high infection pressure, caused by sub-optimally managed health management. The objective of this trial is therefore to investigate the effect of prolonged treatment on farms with different levels of infection pressure.

Materials and Methods: The study is performed on 20 different farms all over Germany and tries to include 400 cows, 20 cows on each farm. Included farms have a large variation in both the BMSCC and infectious pressure, expressed as % of new intramammary infection in the herd. Lactating cows with clinical mastitis in one quarter and two consecutive elevated CSCC (> 200,000 cells/ml) before the occurrence of the clinical case are eligible for enrolment. Cows that get a clinical mastitis in the first month after calving, are eligible for enrolment only when they have an elevated CSCC (> 200,000 cells/ml) in an extra sample in the first week after calving and one elevated
CSCC in their first herd milk recording. Two different treatment regimes were investigated and randomly assigned to the cows, short 1.5 day intramammary treatment of a cefquinome containing intramammary tube (SIMM) and extended 5-day intramammary treatment of the same tube (EIMM). Milk samples were collected at 0, 14 and 21 days after the occurrence of the clinical case. Efficacy of treatment is defined as a bacteriological cure, CSCC cure (< 200,000 cells/ml) at both 14 and 21 days after treatment and clinical cure is defined by the absence of clinical signs at the end of treatment.

Results: Preliminary data of 208 clinical cases included show that the most important isolated pathogens are Strep. uberis (28.6%) and coiforms (20.5%). As expected, overall bacteriological cure rate (BC) is higher (71%) after EIMM treatment than after SIMM treatment (61%). There is a trend that EIMM has a better effect than SIMM (14% difference in BC) on farms with a low new infection rate than on farms with a high new infection rate (11% difference in BC).

Conclusions: Preliminary conclusions are that EIMM treatment results in a higher overall cure than SIMM treatment and the difference in bacteriological cure between the two treatment regimes becomes larger on farms with low infection pressure, suggesting that extended treatment should preferably be performed on farms with good udder health management.

OC: 3

DEMO Project Udder Health: a first step towards a better udder health and milk quality in Flanders (Belgium)

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Objectives: Since 1999, the average bulk milk somatic cell count has increased 1 to 2% per year in Flanders. Inspired by this trend, Milk Control Centre Flanders and M-teamGent, together with the farmers’ organizations and the Flemish Cattle Breeding Association, decided to design a two-year program (2009-2011) in order to create some dynamism around udder health and milk quality. The objective of this paper is to describe the structure and coordination of the project as well as the experiences gained in the project.

Materials and Methods: Communication to dairy farmers was established by general means such as an informative website (www.uiergezondheid.be), a digital newsletter and four “road shows” full of inspiring lectures. Additionally, 20 groups of 10 to 12 dairy farmers were brought together at the farm of one of the participants to discuss udder health and milk quality. A couple of months before these on-farm meetings, all participating farmers were asked to complete an on-line questionnaire to get more insight in their attitude and behavior in relation to udder health. Each of the meetings started with a tour of the barn and cows, while the management practices of the host-farmer were discussed. The results of the questionnaire were discussed as well. The farmers that participated in one of the study groups were recently asked to complete a short follow-up questionnaire which allowed us to evaluate the value of the study groups in the transfer of knowledge on mastitis and milk quality to dairy farmers.

Results: The website attracted on average 500 visitors per month. The concept of the on-farm meetings was overall highly appreciated as could be derived from the short follow-up questionnaire. Sharing experiences and discussion among participants was considered of high value. Preliminary analysis of the data of the online questionnaire indicate that even the more basic principles in milking technique and treatment of clinical mastitis are not part of the daily routine of a large proportion of Flemish dairy farmers.

Conclusions: There is currently enough technical knowledge available to be successful in improving and maintaining the udder health situation on a dairy farm. Still, too many farmers, even though it would considerably improve their results, do not implement those effective mastitis management practices. Interestingly is that communication and education on mastitis and milk quality seems to change the farmers’ attitude and behavior.
treatment decisions in low BTSCC herds. With rising public concern over antibiotic resistance and residues, the use of selective dry cow therapy promotes the judicious use of antibiotics and can have a positive impact on the public perceptions of the dairy industry.

OC: 6
Methodological framework for the use of bacteriology by the vet practitioner in mastitis control
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Objectives: Considering new diagnosis needs for more targeted mastitis control plans and the absence of guide to use bacteriology in this purpose, the study has aimed to draw up a field-tested methodology of using bacteriology by the vet practitioner for epidemiological diagnosis at herd level.

Materials and Methods: 1) an experimental methodology has been elaborated by a group of experts and skilled practitioners: systematic sampling by the farmer of milk samples from mastitic quarters; selection by the vet of the frozen milk samples to be analysed in each farm following a pre-diagnosis based on somatic cell counts, clinical mastitis and observed risk factors; levels of pathogen identification and antibiotic sensitivity testing; rules for epidemiological interpretation at herd level; software to manage the bacteriological data. 2) this methodology has been tested through a pilot-study involving 9 vet practitioners and 18 farmers from their practices. The study design allowed to compare three epidemiological diagnoses (and the corresponding control plans) successively established by the vets in each farm: a) without any bacteriological result (control); b) with the analyses planned in the experimental methodology (experimental); c) with the bacteriological analyses from all the quarters with clinical and subclinical mastitis (gold standard). 3) considering the results of the pilot study and opinions of experts, the experimental methodology was partially amended to set the final proposition.

Results: 1) Less than 5% of the quarter milk samples taken by the farmers were contaminated. 2) Bacteriological analyses of 40-50% of the frozen milk samples were sufficient to get a correct estimation of the frequency in the herd of the main causative pathogens. 3) Epidemiological interpretation of the bacteriological analyses could be made considering the relative frequency of aggregates of pathogen species showing common features: contagious versus environmental pathogens; dry period versus lactation acquired infections; inside versus outside the activity spectrum of different antibiotic families, streptococcal versus coliform new infections during the dry period. 4) The software appeared indispensable to manage milk samples and to calculate the ratios of pathogen aggregates for epidemiological interpretation.

Conclusions: Through an explicative booklet and training sessions, this methodology is in the process of being widely spread to the French vet practitioners.

OC: 7
Efficacy of an on-farm culture system for the selective treatment of clinical mastitis
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Objectives: The objective of this clinical trial was to evaluate the efficacy of using on-farm culture to guide strategic treatment decisions in cows with clinical mastitis.

Materials and Methods: A total of 422 cows affected with mild or moderate clinical mastitis in 449 quarters were randomly assigned to either a) a positive-control or b) an on-farm culture-based treatment program. Quarter cases assigned to the positive-control group received immediate on-label intrammary treatment with cephalin sodium. Quarters assigned to the culture-based treatment program were treated with cephalin sodium after 18-24 hr of incubation only if had Gram-positive growth or a mixed infection.

Results: The proportion of quarters that received intrammary antibiotic therapy because of study assignment or secondary (or extended) therapy was 100% for positive-control and 51% for culture-based. There was a tendency for a reduction in days in which milk was discarded from cows assigned to culture-based vs. cows assigned to positive-control (5.9 vs. 5.2 days). There were no statistically significant differences between cases assigned to positive-control and cases assigned to culture-based in days to clinical cure (2.7 vs. 3.2 days), bacteriological cure risk (71 vs. 60%) and new intrammary infection risk within 21 days of enrollment (50 vs. 50%). There were also no differences in the risk and days to recurrence of clinical mastitis in the same quarter (35% and 78 days vs. 43% and 62 days), linear somatic cell count (4.2 vs. 4.4), daily milk production (30.0 vs. 30.7 kg), and risk and days for culling or death events (28% and 160 days vs. 32% and 137 days) for the rest of the lactation.

Conclusions: In summary, the use of on-farm culture to guide the strategic treatment of clinical mastitis reduced intrammary antibiotic use by half and tended to reduce withholding time by one day, without significant differences in short or long-term outcomes.

OC: 8
Is there a place for welfare scoring systems of dairy cows in udder health?
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Objectives: The body condition score (BC), hygiene condition score (HC) and lameness condition score (LC) are used to evaluate the dairy cow welfare and recommended by welfare organizations. Our purpose was to find associations between cows with sub-clinical mastitis and poor performance in these three scores accounting, simultaneously, for several variables at farm and cow level in a representative sample of Portuguese dairy farms.

Materials and Methods: Dairy farms representative of Portugal (n=82) were randomly selected from the Dairy Herd Improvement Book (DHI) framework and visited to assess the BC, HC and the LC of 3,426 from 6,724 cows present. The type of barn, cleanliness of beds and bedding material, type of foot-care and type of parks were also recorded in a structured questionnaire. For each cow the number of lactation, number of days in milk, production and the somatic cell count (SCC) were collected from the DHI database. The outcome variable was the linear score of the average of the two nearest SCC results (LSScc) to the date of the visit. Each variable was first tested in a univariate model and variables with p=0,15 were retained for the multivariable generalized linear mixed model (GLMM). The variables retained were analyzed with (GLMM) using the R software (CRAN project, www.r-project.org). The model accommodates the bi-level structure of the data taking into consideration that each cow is in a particular farm (included as random effect). The explanatory variables were considered fixed effects. Only variables with p<0.01 were retained in the final model. Confounding and interaction were investigated.

Results: Final model was: LSSce=-2,1+HCh*0,23+BC*0,21+LC*0,22+D*0,002+N*0,29. Legend of the variables and their reference level “good status”: HSh, hygiene of the hips<3; BC, BC >2,5, <3,5; LC, LC <3; D – days in lactation; N, number of lactations. Poor hygiene (=3), LC =3 and BC deviating from 2,5 to 3,5 have statistically significant impact on SCC rising, although of small magnitude. However the impact of poor scores occurring simultaneously is relevant. No interaction was found between the variables analyzed, confusion was excluded. Further analysis will be carried to explore these relationships and their magnitude in udder health and the possibility of a “conjunct score” creation.

Conclusions: Cows which score poorly in BC, HC and LC have increased risk of elevated SCC. A possible use of these associations in udder health management will be further explored.

OC: 9
Hyperkeratosis characterization and welfare in dairy cows
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Objectives: The purpose of this study was to characterize the hyperkera-
tosis and its association with the morphology of the teats, parity and stage of lactation, over milking, milking time and SCC in Portuguese dairy farms.

Materials and Methods: A total of 43 farms were recruited for the study. The Dutch method for the evaluation of hyperkeratosis on a scale from 1 to 8 (Neijenhuis et al., 2000) was used in 2954 cows. The teats were also scored as round, flat, sharp and inverted (Klaas et al., 2005). The rest of the data was obtained in a structured questionnaire by one of the authors. Statistical analysis was made with SPSS for Windows version 15 (SPSS Inc.) Analysis of variance and the test of Tukey were used.

Results: The average lactation was 2.4 and 64.1% of cows were in the first two lactations. There was an average of 206 days in lactation and 68.4% of the animals were above 121 days, with a production of 13.6 kg per milking. The teat shape was scored as 71.4% round, 16.8% flat, 9.1% sharp, 1.0% inverted and 1.4% was injured or belonged to dry quarters. The degree of hyperkeratosis in the studied population ranged from 1.4 to 4.6 (n=11,816). The average of hyperkeratosis was 2.9 and 54.6% of the front teats as well as 62.9% of the rear ones scored levels 1 or 2, hence showing good condition. We found significant differences (p<0.05) in the average level of hyperkeratosis in the front vs. rear teats: 3.2 vs. 2.7 respectively; the frequency of rough teats was also higher in front vs. rear teats: 28.3% vs 22.7% respectively. Inverted and flat teat ends also revealed differences in the degree of hyperkeratosis (1.3) and (2.2) respectively compared to round (3.3) and sharp (4.2) ends. Differences in the average score were found between the first lactation (2.7) and subsequent ones: 3.4 to 3.5. There was also an effect due to the stage of lactation. Cows with less than 60 days had lower scores than the rest: 2.4 vs 3.5. Both overmilking and milking time revealed differences on averages in hyperkeratosis: the normal milking was 2.9 and overmilking 3.5. Regarding the milking time, less than 10 minutes had 2.6 and more than 10 minutes had 3.3 of score. Elevated levels of hyperkeratosis were associated with higher SCC: 446,000 vs 245,000 cells.

Conclusions: The hyperkeratosis of the teat canal is a problem of welfare in dairy cows present in many dairy farms and management of the risk factors associated may contribute to improve the cow welfare, the udder health and the farm income.

OC: 10

Association between dry period length, bacterial culture, and SCC at dry-off and incidence of early lactation mastitis in cows receiving Cefitiofur or Penicillin Dihydrostreptomycin as dry therapy

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Objectives: Mastitis remains the most frequent and expensive disease in dairy cattle. Dry therapy is a practice widely implemented to reduce both the prevalence of existing intramammary infections and the incidence of new infections. The objective of this randomized controlled trial was to analyze the association between dry period length, bacterial culture, and SCC at dry-off and incidence of early lactation mastitis in cows receiving Cefitiofur (Spectrumast®DC) or Penicillin Dihydrostreptomycin (Quartemaster®) as dry therapy.

Materials and Methods: Cows originated from two dairy farms in central Florida. The dry-off procedures were performed in one farm and cows remained in this unit until calving. Cows eligible for enrollment were in good health with 4 functional quarters free of significant teat lesions. Cows (n=401) were randomly assigned to one treatment at the time of dry-off processing (Spectrumast®DC or Quartemaster®). Milk samples were collected for bacteriological culture and somatic cell count and submitted to the Quality Milk Production Services (Cornell University). A teat sealant (Oraseal®) was applied to all the quarters. Data regarding occurrence of clinical mastitis, post-partum health events (metritis, ketosis, left displaced abomasum, and hypocalcemia), and individual SCC during the first 3 DH monthly test-day were recorded. Data were analyzed by multivariate logistic regression. Variables were considered in the final models when P<0.10.

Results: The occurrence of subclinical mastitis during the first 100d after calving was significantly associated with parity and occurrence of subclinical mastitis at dry-off (OR= 3.5, 95% CI=1.9-6.4). The presence of gram-negative bacteria in milk at dry-off had a significant effect on the odds of clinical mastitis at 30d (OR= 13.8; 95% CI=1.2-163). The odds of clinical mastitis within the first 30d and 100d after calving for cows receiving Quartemaster® were 2.5 and 2.2 times the odds for cows receiving Spectrumast®DC, respectively. The univariate analysis indicated a significant effect for early post-partum disease and dry period length on clinical mastitis. However, these effects were not significant in the final model.

Conclusions: Gram-negative bacteria at dry-off increased the risk of early clinical mastitis. The occurrence of subclinical mastitis at dry-off significantly affected the mammary health in the subsequent lactation. The use of Spectrumast®DC as dry therapy reduced the occurrence of clinical mastitis after calving compared to Quartemaster®.

OC: 11

Association between herd size and somatic cell count

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Objectives: European Union milk quotas are to be phased out by 2015, and the importance of producing low somatic cell count (SCC) milk for dairy farmers trading on the world market is expected to increase to counter volatile prices. Milking more cows per herd is a well established strategy to increase production efficiency, and this trend is set to continue. The objective of this research was to investigate the impact of herd size on cow level test day SCC with emphasis on comparison between cows in Irish and UK herds.

Materials and Methods: The study populations were 7,608 Irish dairy herds, with 10,316,907 records from 869,593 cows taken between 2005 and 2009, and 2,128 UK dairy herds, with 6,793,298 records from 474,678 cows taken between 2004 and 2006. Two samples of 500 Irish, and 200 UK herds were taken at random. Four-level linear models for test day log SCC were developed using data for herds in the first samples; random effects structure accounted for clustering of cows within herds, parities within cow, and recordings within parity. Data from the second sample datasets were used for cross validation of the models.

Results: At a herd size of 25 cows, baseline test day SCC was 63,000 cells/ml in Irish and UK herds. An increase to 180 cows was associated with increased SCC up to 75,000 cells/mL in Irish herds, and a decrease to 61,000 cells/mL in UK herds. Rate of increase in the 2 countries was approximately equal from 225 cows. By 316 cows SCC was 88,000 and 69,000 cells/mL in Irish and UK herds respectively. At higher herd sizes SCC decreased in the Irish herds but continued to increase in the UK herds. The models accounted for calendar month and year of test, parity, stage of lactation, and test day milk yield adjusted for fat and protein content. Fit of the models to the data was acceptable.

Conclusions: Many Irish and UK dairy herds have failed to benefit from economies of scale for mastitis control. Further investigation is required to determine underlying reasons for the differences between Irish and UK herds, and to develop strategies to optimize udder health during future dairy herd expansions.

OC: 12

Microbial diversity of dairy cows’ mastitic milk samples

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Objectives: Pyrosequencing of 16S rRNA genes can provide detailed information on the microbial diversity and abundance of a sample but has not up to now been used for the investigation of cow mastitis aetiology and thus, this was the objective of the present study.

Materials and Methods: 147 clinical mastitis milk samples that were submitted to the Quality Milk Production Services (Cornell University) for microbiological culturing were used. The culture-based diagnosis was used for grouping the samples. Isolation of microbial genomic DNA from the milk samples was performed by using a QIAamp DNA minikit (Qiagen). The 16S
rRNA genes were individually amplified from each sample using a composite pair of primers containing unique 10-base barcode. Pyrosequencing of the samples was carried at the Cornell University Life Sciences Core Laboratories Center using Roche 454 GS-FLX System Titanium Chemistry. The Ribosomal Database Project (RDP) classifier, Genious, NCBI BLAST and the RDP pyrosequencing pipeline were used for the analysis of the obtained sequence library. The analysis of variance option of JMP was used for the analysis of mean prevalence of different orders of bacteria in each group of samples.

**Results:** In general, pyrosequencing of the 16S rRNA gene came to confirm the culture-based diagnosis. The predominant order of bacteria was in most cases the one including the microorganism that was diagnosed by culture. On the other hand, high numbers of anaerobic bacteria were prevalent in all the samples. For example, 29.05% ± 2.95% of the bacteria found in samples diagnosed by culture as Streptococcus uberis mastitis, belonged to the order Lactobacillales. However, in the same samples, prevalence of bacteria belonging to the orders Fusobacteriales, Clostridiales, and Bacteroidales was 9.5% ± 1.75, 16.47 ± 2.87 and 20.79 ± 2.19 respectively. In samples that were characterized as non growth by culture, we were able to detect bacteria that cause mastitis (e.g. Streptococcus uberis), bacteria that are known pathogens but have not up to now been correlated with mastitis (e.g. Fusobacterium necrophorum, Porphyromonas levii, Ureaplasma diversum) as well as high numbers of bacteria that are not known pathogens (e.g. Caulobacter leidya).

**Conclusions:** Results from this study provide new information regarding dairy cow mastitis, revealing a possible role of anaerobic bacteria that are difficult to culture and hence not studied when the traditional culturing techniques are used.

**OC: 13**

Mycoplasma bovis in Switzerland: A case-control study

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**Objectives:** Field reports indicated an increase in mastitis, pneumonia and polyarthritis caused by Mycoplasma bovis in Swiss dairy herds in the last 3 years. The aim of this study was to identify risk factors associated with a M. bovis outbreak.

**Materials and Methods:** Herds with cases of mastitis or pneumonia diagnosed positive for M. bovis were reported by private practitioners and laboratories all over Switzerland between September 1st 2010 and October 31 2011. One control herd with a similar herd size was selected within a 5–10 km radius for each case herd. Information about the housing, milking system, milking routine, milking hygiene, feeding management, rearing management and factors related to immune-suppression (heat stress, overcrowding, transportation, mouldy feed, etc.) were collected for both case and control herds similarly. Composite foremilk samples were collected aseptically from all lactating cows and submitted for bacteriological analysis. Nasal swabs were collected from 10% of the animals in the herd. Foremilk samples and nasal swabs were then analyzed by realtimePCR on presence of M. bovis to confirm that the pathogen was present in the herd. Univariable and multivariable logistic regression analyses were performed to identify risk factors associated with M. bovis presence. Statistical significance was set at p < 0.10 level.

**Results:** A total of 21 case and control herds each met the inclusion criteria and were visited. “Brand of the milking parlour“ (OR = 12.4, p = 0.03), “resting area with straw bedding“ (OR 4.4, p = 0.06), “high milk production“ (OR =1.001 p = 0.04), and “presence of immunosuppression factors“ (OR=4.3 p = 0.07) were significantly associated with being a case herd in the univariable logistic regression. “Brand of milking parlour“ (p = 0.02), “resting area with straw bedding“ (p = 0.05), and milk production (p = 0.08) remained in the final multivariable model.

**Conclusions:** The results indicated that a high milk production was strongly associated with a M. bovis case herd. This may be explained by a more labile energy balance of high yielding cows and a higher susceptibility to disease. Interestingly, a specific brand of milking parlour was associated with being a case herd. In our opinion this is a classical confounder and it may be associated with high merit breeding herds. Up to now there is no evidence of M. bovis surviving in straw bedding, but it was shown before that M. bovis survived in bedding-sand. Further studies are needed to investigate the survival of M. bovis in the environment.

**OC: 14**

Use of intramammary antimicrobials in Finland – towards lower consumption and targeted treatment of mastitis

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**Objectives:** The aim of this study was to review the changes in consumption and use patterns of intramammary antimicrobials in Finland.

**Materials and Methods:** Data from Finnish Medicine Agency were used. Consumption of antimicrobials for animals has been monitored in Finland since 1994, and use of intramammaries per cow calculated since 1999.

**Results:** Number of intramammaries used for lactating cows (LC) has decreased from 2.9 tubes per cow per year in 1999 to 2 tubes per cow per year in 2010. This corresponds to approximately 35 % of the cows being treated during lactation. Use of dry cow therapy (DCT) has remained rather stable and each year approximately 22 % of the dairy cows receive DCT. Active substances in intramammaries have changed from broad-spectrum antimicrobials and combinations to benzylpenicillin alone in mastitis treatment. In 1994, a total of 470 kg of penicillin, always in combination with aminoglycosides, was used in intramammaries for LC and for DCT. This was of the same magnitude as use of other betalactams altogether. In 2002, an intramammary product for LC containing benzylpenicillin alone was launched in Finland. Consumption of aminoglycosides in LC products has since dramatically decreased and was only 29 kg in 2010 compared to 660 kg in 1994. Use of benzylpenicillin in LC products has exceeded that of other betalactams since 2005: in 2010 total use of penicillin was 171 kg and that of other betalactams 111 kg (58% cloxicillin, 26% cephalxin, 16% aminopenicillins). Use of macrolides and oxytetracycline in intramammary treatment of mastitis ended in Finland in 1997. Use of lincosamides has been marginal (1 kg/ year). During late 80‘ies, a total of 29 intramammary products with 14 active substances were on the market, but in 2011 only 11 products, 5 for LC and 6 for DCT, with 8 active substances. In DCT, other betalactams have dominated over penicillin, but the difference has decreased. For DCT in 2010, 46 kg of penicillin and 59 kg of other betalactams (83% cloxicillin) was used. Consumption figures must be considered in relation to the number of dairy cows, which has decreased in Finland from 417 000 in 1994 to 289 000 in 2010.

**Conclusions:** The decreasing consumption of LC intramammaries reflects the decreased incidence of mastitis in Finland. The first guidelines for prudent use of antimicrobials for animal treatment were published in Finland in 1996 and they have been updated in 2003 and 2009. A great majority of mastitis causing bacteria are in vitro susceptible to benzylpenicillin, which is the first choice for treatment. We conclude that the guidelines have affected the use patterns of antimicrobials for treatment of mastitis.

**OC: 15**

Therapy of subclinical mastitis during lactation

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**Objectives:** Treatment of subclinical mastitis may cure intramammary infections, reduce the somatic cell count, reduce the risk of culling and reduce the cow to cow transmission of pathogens. However, there are relatively few studies which have evaluated the efficacy of treatment of subclinical mastitis during lactation. The current study aimed to evaluate the bacteriological cure following therapy with one of three treatment regimens compared with no treatment. It was hypothesised that increasing the frequency or duration of therapy would increase bacteriological cure rate.

**Materials and Methods:** Glands from cows with an individual SCC >500,000 cells/ml, without teat end or grossly observable glandular pathology and with a positive rapid mastitis test (RMT) score (i.e. >“trace”) were
milk sampled following aseptic teat end preparation. Cows that had been treated with antibiotics or non-steroidal anti-inflammatory agents in the preceding 30 days were not enrolled. Cows were then randomly assigned to one of four groups: No treatment (Con; 10% of cows); or intramammary infusion of 200 mg cloxacillin sodium on 3 occasions at 48 h intervals (3x48; 40% of cows); on 5 occasions at 24 h intervals (5x24; 40% of cows); or on 5 occasions at 48 h intervals (5x48; 10% of cows). Milk samples were drawn from those glands culture positive at the pre-treatment sampling at 21 (± 3) and 28 (± 3) days after the first treatment to determine bacteriological cure.

Results: The treatment groups were balanced for age, breed, days in milk and SCC. Pre-treatment bacteriological results were no growth (28% of glands), Staphylococcus aureus (28%), Streptococcus uberis (12%), Co- rynebacterium spp. (12%), CNS (10%), and others (10%). The gland-level cure rate for any pathogen was 0/24 (0%), 42/92 (46%), 76/117 (65%) and 22/25 (88%) for Con, 3x48, 5x24 and 5x48, respectively. The cure rate for major pathogens (defined as S. aureus or Streptococcus spp.) was 0/25 (0%), 25/64 (39%), 35/70 (50%) and 13/16 (81%) for Con, 3x48, 5x24 and 5x48, respectively. Half (60/120) of the S. aureus isolates were resistant to penicillin and ampicillin, but none were resistant to oxacillin.

Conclusions: These preliminary data suggest that increasing the duration or frequency of therapy of subclinical mastitis increases cure rate over no treatment or the ‘standard’ regime of 3 x 48 hourly treatments with cloxacillin.

OC: 16
The effect of injectable trace mineral (selenium, copper, zinc, and manganese) on health and production of lactating Holstein cows
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Objectives: The objective of this study was to evaluate the effect of subcutaneous supplementation of 300 mg of zinc, 50 mg of manganese, 25 mg of selenium, and 75 mg of copper (Multimin, Fort Collins, CO) at 230 days carried calf, 260 days carried calf, and 35 days postpartum, on health, milk production and reproduction of lactating Holstein cows.

Materials and Methods: A randomized field trial was conducted on 3 large commercial dairy farms located near Ithaca, New York and 1416 cows were enrolled. Dry cows and pregnant heifers were blocked by parity and randomly allocated into one of two treatments; Trace Minerals Supplemented (TMS) or control. Information regarding health, reproduction and milk production traits was obtained for all the studied animals. Mixed model methodology and Kaplan-Meier survival analysis were used for the statistical analysis of the data.

Results: Control cows’ Least Square Means (LSM) of linear Somatic Cell Count (SCC) scores [log10 (SCC)] were significantly higher than and TMS cows’ LSM. Trace mineral supplementation significantly reduced SCC in the second month of lactation for second lactation cows and in the third, fourth and fifth month of lactation for third lactation cows. However, the treatment had no effect on primiparous cows’ SCC. Control cows had 1.31 higher odds of having subclinical mastitis than TMS cows. Multiparous TMS cows had 39% less chances of developing clinical mastitis than multiparous control cows; there was no significant difference between treatments for primiparous cows though. Control cows had 1.69 and 1.30 increased odds of having stillbirth calvings and endometritis, respectively. However, treatment had no effect on reproduction, survivability, milk production and incidence of metritis, retained placenta and displaced abomasum.

Conclusions: In conclusion, the administration of three subcutaneous trace mineral injections (at drying-off, 30 days prepartum, and 35 days postpartum) seems to have a positive impact on udder health, decreasing the somatic cell count and incidence of mastitis while, it may also decrease incidence of stillbirth calvings and endometritis. Therefore it could be a useful strategy, especially for farms with known serious udder health problems.
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UDDER HEALTH

of the cases, respectively. All 5 CNS species caused persistent IMI and certain strains were able to survive in the mammary gland through the dry period. Altogether 66 different CNS Pts were detected. However, no particular PT predominated, indicating limited capability for spread within the herds. Certain Pts persisted in infected quarters, and 11 S. chromogenes Pts, 9 S. simulans Pts, 5 S. epidermidis Pts, 4 S. haemolyticus Pts and 2 S. warneri Pts were isolated repeatedly over periods of months. The 119 selected S. aureus isolates were genetically diverse and comprised 25 Pts. Most S. aureus IMI persisted for months and were still present at the end of the study period. Two S. aureus Pts were found in all herds and 4 Pts in 2 herds. One PT predominated in persistently infected quarters in each herd and these 4 Pts demonstrated a much higher cow-to-cow transmission potential than all other CNS Pts and S. aureus Pts.

Conclusions: S. chromogenes and S. simulans were the most prevalent CNS species in this study. S. aureus and each of the CNS species were represented by a great number of Pts. Persistent IMI was caused by 5 CNS species and S. aureus and a great number of Pts were found among isolates from each species. Four S. aureus Pts were widespread in the different herds and appear to have properties which make them more contagious.

OC: 95

Systemic prepartum treatment of heifers with penethamate hydroiodide: effect on milk yield, somatic cell count, clinical mastitis incidence and culling hazard during first lactation

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Objectives: Prepartum intramammary treatment with antibiotics has frequently been proposed and evaluated as a practice to reduce the prevalence of intramammary infections (IMI) in heifers at calving. Long-term positive effects were either not studied or could not be demonstrated in every study. Moreover, most studies have focused on the therapeutic effect of intramammary treatment using either dry cow or lactating cow products and only rarely on the effect of systemic treatment of heifers prior to calving. Given the fact that prepartum treatment is not uniformly efficacious across herds, and in the light of the discussion on prudent drug use, prepartum antibiotic therapy in heifers as a universal strategy to control heifer mastitis is not warranted. The objectives of this study were to test whether systemic therapy with penethamate hydroiodide of preterm heifers on 10 Flemish commercial dairy herds resulted in long-term positive effects (milk production, udder health, culling hazard), and whether some herds benefitted more from prepartum treatment than others.

Materials and Methods: A randomized clinical trial was conducted on 10 commercial, well-managed dairy herds not suffering from heifer mastitis problems. Heifers were either treated systemically (during three consecutive days) two week prior to expected calving date with penethamate hydroiodide (n=76) or remained untreated (n=73). The study was designed to identify possible herd x treatment effects. For that reason, a monitoring period was included in the study design starting before the actual treatment period and in which only heifers (n=80) were sampled at calving for culturing. Data gathered from that monitoring period was aggregated as herd-level variables, and used to explain potential herd-dependent treatment effects. Linear and logistic mixed regression models were used to study associations between treatment (versus no treatment) and the different outcome variables.

Results: Quarters from treated heifers on all herds were less likely to be infected with all pathogens (P<0.05), coagulase-negative staphylococci (P=0.05), but not major pathogens (P=0.17) at calving. No long-term effects during the first 120 DIM but one were detected: treated heifers belonging to herds classified as having low yielding heifers (using the data from the monitoring period) out-produced control heifers interaction term: P=0.02.

Conclusions: Systemic prepartum treatment of heifers with penethamate hydroiodide resulted in less infected quarters with all pathogens. Nevertheless, on the long-term, only some herds benefitted more than others, indicated by a higher milk yield during the first 120 DIM.

OC: 94

Occurrence and persistence of staphylococcal species and genotypes associated with bovine intramammary infections

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Objectives: The aim was to investigate the occurrence, persistence, and genetic diversity of staphylococci from milk samples of dairy cattle.

Materials and Methods: Quarter milk samples from 4 herds were collected at 4 to 8-week intervals between March 2003 and December 2004. Bacteriological analyses were performed according to the International Dairy Federation. 351 staphylococcal isolates were PFGE-typed using SmaI. A subset of isolates of coagulase-negative staphylococci (CNS) was identified by sodA sequencing.

Results: Altogether 4030 milk samples were obtained from 206 lactating cows. From multiparous cows CNS and Staphylococcus aureus were detected in 16% and 3% of the samples, respectively. From multiparous cows CNS and S. aureus were detected in 12% and 5% of the samples, respectively. Of the 232 CNS isolates, S. chromogenes, S. simulans, S. epidermidis, S. haemolyticus and S. warneri comprised 32%, 25%, 14%, 13% and 11% of the cases, respectively. All 5 CNS species caused persistent IMI and certain strains were able to survive in the mammary gland through the dry period. Altogether 66 different CNS Pts were detected. However, no particular PT predominated, indicating limited capability for spread within the herds. Certain Pts persisted in infected quarters, and 11 S. chromogenes Pts, 9 S. simulans Pts, 5 S. epidermidis Pts, 4 S. haemolyticus Pts and 2 S. warneri Pts were isolated repeatedly over periods of months. The 119 selected S. aureus isolates were genetically diverse and comprised 25 Pts. Most S. aureus IMI persisted for months and were still present at the end of the study period. Two S. aureus Pts were found in all herds and 4 Pts in 2 herds. One PT predominated in persistently infected quarters in each herd and these 4 Pts demonstrated a much higher cow-to-cow transmission potential than all other CNS Pts and S. aureus Pts.

Conclusions: S. chromogenes and S. simulans were the most prevalent CNS species in this study. S. aureus and each of the CNS species were represented by a great number of Pts. Persistent IMI was caused by 5 CNS species and S. aureus and a great number of Pts were found among isolates from each species. Four S. aureus Pts were widespread in the different herds and appear to have properties which make them more contagious.
OC: 96
Nordic guide-lines for GBS eradication
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Objectives: The veterinary committee in the Nordic dairy industries (Animal Health group, NMSM) has submitted recommendations supporting the eradication of Streptococcus agalactiae (GBS) in dairy herds. The process began 2003 when GBS was identified as a major etiology to the dramatic increase in somatic cell counts (SCC) occurring in large farms with loose housing in Sweden and Denmark.

Materials and Methods: In these farms chronically GBS infected cows were common and treatment with penicillin G was unsuccessful. The Pathoproof® Immuno Assay PCR technology is now available in all the Nordic countries which will make screening and monitoring more sensitive and easily adapted. The herd prevalence is thought to be highest in Denmark and Sweden, varying between 5 and 8 percent in several bulk tank screenings with PCR.

Results: The guide-lines states that the highest hygienic strategies as well as a thorough check of the milking equipment must be implemented before the eradication starts. It is also advisable to consider the best timing regarding the calving’s and to make a rough economic cost benefit analysis for forthcoming culling.

Conclusions: The cornerstones in the action plan are 1. Screening 2. Segregating 3. Treating and 4. Culling. PCR sampling is regarded the best method; both on cow and herd level. Chronically infected cows must be culled as soon as possible. Newly infected cows should be kept separately and be treated IMM with penicillin G in all four quarters. A retest with PCR should be made after 4-8 weeks and the still positive cows should then be culled. Successfully treated cows should not be brought back to the healthy part of the herd. A herd can be classified as GBS Free after 4 negative subsequent monthly PCR samples from the bulk tank.

OC: 97
Efficacy and safety of a single injection of marbofloxacin in the treatment of bovine acute E. coli mastitis in a European field study
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Vetoquinol Research Centre, France

Objectives: The efficacy and safety of marbofloxacin administered as a single-dose treatment to dairy breed cattle with acute mastitis were evaluated in a masked, randomised, multicentre study conducted on commercial farms.

Materials and Methods: A total of 354 lactating dairy cows were enrolled with local and general clinical signs of untreated acute mastitis on one quarter and treated on day 0 with either marbofloxacin (10 mg/kg, intramuscular subcutaneous administration; n=178, Forcy®, Vetoquinol SA) or danofloxacin (6 mg/kg, subcutaneous administration; n=176, A180®, Pfizer AH). Milk samples were taken systematically for mastitis pathogen isolation prior to any treatment and all cows received an oxacillin intramammary treatment (oxacillin was chosen as it is not active against E. coli strains). E. coli positive cows were also sampled on day 15 and on day 27 or in case of relapse/failure. Cows were examined on days 1, 2, 3, 7, 15 and 27 following treatment. Among the 354 enrolled animals, E. coli was isolated from the milk of 194 animals (marbofloxacin, n=92; danofloxacin, n=102). Success rates (cure + clear improvement) were compared statistically using a non-inferiority approach.

Results: A high success rate was observed on day 15, and marbofloxacin was non inferior to danofloxacin (day 15 clinical success rate, marbofloxacin vs. danofloxacin: 86.1% vs. 81.6%, p<0.0001). Secondary parameters confirmed there was no statistical difference between treatments despite of a tendency towards better results in the animals treated with marbofloxacine. Indeed, clinical evaluation for clear improvement or cure on days 1, 3, 7 and 15 were 15.3, 63.9, 82.0 and 86.1% for marbofloxacin and 17.1, 58.6, 75.0 and 81.6% for danofloxacin (p=0.42). Also the bacteriological cure rates (day 15 + day 27) were 78.5% and 70.0% in the marbofloxacin and danofloxacin groups respectively (p=0.33), and the relapse rates were 1.6% and 6.5% respectively (p=0.36). E. coli strains isolated during the trial were highly sensitive to both antibiotics and resistant to oxytetracyclins. Both treatments were well tolerated with only 17 cows (9.6%) presenting an adverse event in the marbofloxacin group and 26 (14.8%) in the danofloxacin group (p=0.15). Local tolerance of Forcy® was good.

Conclusions: In conclusion, a single injection of marbofloxacin is safe and efficacious for the treatment of acute E. coli mastitis, confirming the PK/PD prediction.

OC: 118
A missense mutation in the CIC-7 chloride channel causes hamartomas with osteopetrosis in cattle.
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Objectives: Intensive selection for desired production traits, exacerbated by the extensive use of artificial insemination, drastically reduces the effective population size of livestock populations including cattle. This causes frequent outbursts of genetic defects, which are causing major economic and welfare concerns. We have established a heredo-surveillance platform in the Belgian Blue Cattle breed (BBCB) highly selected for meat production to (i) monitor the emergence of novel genetic defects, (ii) identify causative loci and mutations by positional cloning, (iii) develop and offer direct and indirect diagnostic tests.

Materials and Methods: We recently identified a new congenital defect in BBCB with gingival hamartomas and peri-natal lethality as most prominent symptoms.

Results: We mapped the causative gene by autozygosity mapping on the centromeric end of bovine chromosome 25 in a 1.3 Mb identical-by-descent (IBD) region encompassing more than 100 annotated genes. To speed up the identification of the culprit gene, we used genome-wide resequencing of cases. Produced reads were mapped on the bovine reference genome sequence and analyzed for DNA sequence variants (DSV) within the IBD region. After filtration, only a handful of variants remained, including a cluster of three private SNPs causing the substitution of the ultra-conserved tyrosine 746 into glutamine in the cystathionine ß-synthase 2 domain (CBS2) of the Chloride Channel 7 gene (CLCN7). Unexpectedly, deleterious mutations in this domain are known to cause a form of osteopetrosis in human. Indeed, a more detailed clinical examination of affected calves revealed a previously overlooked, severe osteopetrotic phenotype, strengthening CIC-7 causality. Functional studies shown that the Y746Q mutation does not inhibit the CIC-7/Ostm1 interaction or their correct co-trafficking to lysosomes. But it drastically transforms the channel behavior from a slow activation and relaxation kinetics to a so-called “fast mutant”.

Conclusions: Since December 2009, a haplotype-based test and in April 2010, a mutation-based test is available to avoid mating risks. As a result, we observed a rapid disappearance of affected cases and a slight decrease of carrier frequencies.
Objectives: Validate the stability of thrombocytes in calves younger than 4 weeks of age.

Materials and Methods: Blood samples (in K2EDTA treated vials) were taken from 5 calves and 5 cows on the same farm. Calves were younger than 4 weeks of age. Blood was immediately transported to the laboratory and within 2 hours after collection the samples were analysed on the CellDyn 3700, validated using cow thrombocytes. Samples were stored at 2 – 8 °C and at 20 – 25 °C and thrombocytes were analysed after 6, 24, 48 and 72 hours.

Results: The average count of cows thrombocytes was the same as in the previous validation: at 6 hours blood stored at 20 – 25 °C was 30 % lower compared to the initial count. But the average count of calf thrombocytes remained almost the same during storage at both temperatures during 24 hours.

Conclusions: Blood from calves can be stored for 48 hours at 20 – 25 °C or 2 – 8 °C before analysis of thrombocytopenia. It is therefore possible for veterinarians under field conditions to diagnose thrombocytopenia in calves with EDTA vials. It is currently unknown why a difference has been found in the stability of thrombocytes in young compared to older animals.

OC: 120

Epidemiology and pathology of the ‘unexplained stillbirth’ -- a diagnostic challenge for veterinary practitioners

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Teagasc, Ireland

Objectives: The ‘unexplained stillbirth’ is emerging as a new herd health problem challenging veterinary practitioners internationally. The objective of this study was to investigate dairy herds with a history of a high risk of perinatal calf loss.

Materials and Methods: A prospective, whole herd active surveillance model was used; all calves which died at fullterm within 48 hours of calving were included. Epidemiological data about 15 herds were collected in a questionnaire and the details of each calving where a calf died were collected on a carcass submission form. Necropsy examinations included gross pathology, morphometry and laboratory analyses (tissue selenium and copper assays, abomasal contents culture and nitrate, calf BVDV antigen, Leptospira hardjo, Neospora caninum and Bovine Herpes Virus calf antibody detection).

Results: In total 158 calves were examined (mean 11 calves/ herd; 4-26). The majority of calves were singletons (90%), sired by AI bulls (65%), from pluriparous (LN >2 63%), from HFx matings (57%) and male (51%). Gestation length and body weight averaged 279 days (260-302) and 33 kg (15-56), respectively. The estimated duration of stage two of calving varied between a few minutes and five hours. The timing of calf death was estimated as pre or peripartum (<1h) or postpartum (1-48h) from the farmers’ calving details (80 and 20%, respectively), the degree of pulmonary atelectasis (74 and 26%) and the degree of carcass autolysis (82 and 18%). Seven assignable causes of death were examined and classified as major or minor. The proportion of losses attributable to each was dependent upon the diagnostic criteria. For major causes, e.g. anoxia, this varied between 11% of calves with meconium staining to 41% with gingival cyanosis; for dystocia/trauma 1% with hepatic rupture to 24% with calving assistance score >3 (0-5 scale); for lethal congenital defects (CD) 12% (any CD 21%); for micro-nutrient imbalances 10% with goitre (thyroid gland weight >30g) and 21% with thyroid/body weight ratio >0.70 and 19% for malpositions. For minor causes, 4% of calves had omphalorragia-induced haemoptoenteron, for infections the proportion varied between 1% with BVDV PCR-positive tissue and 3% with abomasal pathogens and for intrauterine growth retardation 2% with low birth weight for date. No diagnosis was made in 13% of calves.

Conclusions: In conclusion, the majority of calves in these herds died within one hour of birth with lesions indicative of eutoxia, dystocia, bradytoxia, trauma, motocia or lethal defects.

OC: 121

First evidence for the involvement of the sire in the pathogenesis of Bovine Neonatal Pancytopenia

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Objectives: BNP is a disease of the immune and the haematopoietic systems affecting calves of different breeds up to an age of one month. It is clinically characterized by a bleeding disorder. BNP is caused by an alloimmune reaction elicited by maternal antibodies from colostrum that reacts against cell surface structures on bone marrow precursor cells, leukocytes and thrombocytes of the offspring. Various studies have shown the involvement of a distinct BVDV vaccine in the etiopathogenesis of BNP. We report here on epidemiological investigations in two neighboured farms belonging to one dairy operation severely affected with BNP.

Materials and Methods: Data of 558 German Holstein dams (Farm 1) and 781 dams (Farm 2) that calved between 2007 and 2010 and their offspring were included in the study. Housing conditions and diet were similar on both farms, but mixed colostrum was fed to calves on Farm 1, whereas on Farm 2 only the mothers’ colostrum was used. All animals were vaccinated again BVDV with the same vaccine following the producer’s instructions.

Results: Since July 2007 40 BNP calves (proven by clinical and haematological findings or necropsy) were born from 37 dams aged between 3.5 and 3.8 years. Up to now, no obvious differences were found between dams that had given birth to BNP calves and those ones with healthy calves regarding stillbirths, ancestry, and the number of immunizations against BVDV or age at gestation. The number of BNP cases on Farm 1 (n=26), where mixed colostrum was fed to the neonates, differed significantly from Farm 2 (n=14). Calves developed clinical symptoms on average at two weeks of age. The case fatality rate amounted to 82.5 %. Seven animals survived but showed retarded growth afterwards. 72.5% of BNP cases were observed between July and September in the respective years. Three dams on Farm 1 had two BNP calves. Two sires were significantly more often fathers of BNP calves than of other calves. Especially one sire stood out as the sire of nine BNP calves on Farm 1.

Conclusions: The results of this study support the assumption of an alloimmune phenomenon. Mixed colostrum increases the risk to develop BNP. No effects of the booster and the time of vaccination with respect to the calving time could be observed. For the first time it is shown that the paternal lineage plays a crucial role in BNP. The frequent occurrence of BNP in summer might be related to more evident symptoms due to haemorrhages from lesions caused by biting insects.

OC: 122

From bleeding calves to Bovine Neonatal Pancytopenia

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Objectives: Since the end of 2008 the number of “bleeding calves” reported by veterinarians and farmers to the Animal Health Service in Deventer (AHS) had increased significantly. The cause of the bleeding was unknown and an investigation was started. The aim was to describe the results from the investigation launched after the first cases of bleeding calves leading to the diagnosis Bovine Neonatal Pancytopenia (BNP).

Materials and Methods: From October 2008, the Dutch veterinarians contacted the AHS when a “bleeding calf” was encountered. Each reported calf was investigated following a standardised protocol. Blood samples were taken from the dam and the calf, if it was still alive. The blood samples from the calves were investigated for thrombocytes, leukocytes and BVD antigen BVDV antibodies. Dams were only tested for BVD antigen and BVD antibodies. A routine post mortem examination was performed including histological and bacteriological examination. From October 2008 farmers and veterinarians completed an extensive questionnaire.

Results: At the end of 2010, 476 reports were made concerning bleeding calves from 156 farms. Blood samples were collected from 207 cases. All had thrombocytopenia, with concentrations <72*109 thrombocytes/l in 201 cases. The remaining 6 cases had concentrations ranging from 99-141*109
thrombocytes/l. Almost all had additional leucocytopenia. BVD virus was not detected in any of the tested samples. Both dams and calves had a wide variety in BVD antibody titres. Some had no titres, but many calves had high titres (>256). Notably, 89% of the farms vaccinated against BVD, while only 5-20% of farms in the Netherlands vaccinate with BVD. No significant relation was found between the age of the dams and the occurrence of BNP calves. No hereditary similarity was found either. At necropsy, most calves had extensive internal bleedings, ranging from petechia and ecchymoses, to large haematomata. Histologically, the bone marrow of the affected animals showed a range of lesions, most cases showed severe depletion without megakaryocytes and only few precursor cells. The mortality of the disease in the Netherlands from 2008 until 2010 was 86%.

Conclusions: In 2009, other European countries also reported calves with haemorrhagic diathesis. At a meeting with researchers of the concerned countries in December 2009, the syndrome was named Bovine Neonatal Pancytopenia (BNP). Further research is currently conducted into the cause of this thrombocytopenia.

OC: 123

Management related between herd variations in metabolic parameters of newborn calves in dairy herds

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Objectives: Calf mortality differs markedly between herds: In 2010, 48 % of Thuringian dairy herds with > 30 calvings had calf mortality rates < 3 % and in 23 % of the farms it exceeded 10 %. To evaluate etiological factors, management and metabolic parameters of newborn calves were analyzed in a field study in 153 herds.

Materials and Methods: Jugular blood samples were taken from a total of 1039 newborn calves (2–10 d. p. n.) with an average sample size of 7 animals per herd. Serum was analyzed for concentrations of total proteins (TP) and gamma globulins (GG) using Beckman Coulter Synchron CX 5, the serum concentration of the trace elements iron (Fe) and selenium (Se) was determined with atomic absorption spectroscopy, Se in pools per flock. With reference to TP, GG and Fe herds were classified as category C1, if less than 20 %, as C2 if 21–49 % and as C3 if more than 50 % of the animals of a herd had serum concentration outside the normal range. A structured questionnaire was used to record about 50 management factors and rearing conditions. For management factors, homology of frequencies was tested by chi²-test with p < 0.05.

Results: Concerning TP 260 (25 %) calves had serum concentrations < 50 g/l, 83 herds (54 %) were classified in C1 and 22 (14 %) in C3. Herd with a. p. vaccination of dams against newborn diarrhea were less frequently in C3 (4 %) than herds without vaccination (26 %). 478 (46 %) calves had GG < 12 g/l, 41 farms (27 %) were classified in C1, and 70 (46 %) in C3 (p<0.05).

Mean calf mortality increased when first colostrum was fed later than 4 h. p. n. compared to 2–4 h. p. n. (10.7 % vs. 5.3 %) and when time intervals of calving supervision exceeded 2 hours (7.7 % vs. 5.9 %). Mean concentrations of TP and GG correlated on herd level with r = 0.759. Regarding Fe, C3 included 105 farms (69 %). Fe of 613 (59 %) calves was < 15 µmol/l. In 93 (79 %) flock pools Se exceeded 12 mmol/l.

Conclusions: Low TP demonstrates insufficient nutrient supply in a quarter of sampled calves, which is markedly improved by ante partum vaccination of dams against newborn diarrhea. The low GG in half of the calves lead to disturbed transfer of immunoglobulins via first colostrum because of late administration as a main etiological factor of enhanced calf mortality. Fe supply lacks in the majority of herds, whereas Se provision is mostly sufficient.

OC: 124

Study of the dynamics of the Bovine respiratory syndrome in dairy calves: Monitorization by physical examination, ultrasonography and post-mortem lesions

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Objectives: To monitorize the onset and the evolution of the bovine respiratory disease in dairy calves; To set a prognosis for replacing heifers in a dairy farm.

Materials and Methods: 50 Holstein-frisien calves from 4 weeks old were randomly chosen and submitted to physical and ultrasonographic examination (MyLab 5, 3.5-5MHz convex probe). Following examinations were carried out every month until the animals gave birth (around 24 months of age).

Results: As preliminary results, a low percentage of the animals showed at physical examination signs of broncopneumonia (elevated rectal temperature, moderate to severe increase of the vesicular sounds and decreased growth) and a higher percentage of the animals showed at ultrasonographic examination areas of hepatization of the cranial pulmonary lobes. These lesions were most of them chronic and persistent along the consecutive examinations. Final results will be available before congress.

Conclusions: Ultrasonographic examination can be a useful tool to diagnose chronic cases of pulmonary disease and therefore to help the veterinarian among the farmer to decide which animals to exclude from the milk production cycle still as calves, preventing economical losses with the treatment and culling of underproductive heifers.

OC: 125

Is calf rearing management related to the use of antibiotics?

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Objectives: Since the use of antibiotics in the Netherlands becomes more transparent, large differences are obvious between dairy herds. Data from 400 dairy herds from the University Large Animal Practice (ULP) over the last three years show a clear pattern. Three groups of antibiotic use farms can be distinguished: 1. always low, 2. sometimes high sometimes low and 3. always high. The objective of this study was to evaluate the general management rules about calf rearing and to investigate if management differs between the always high and always low antibiotic use farms.

Materials and Methods: From July until September 2011 low antibiotic use farms (n=31) and high antibiotic use farms (n=31) of the ULP were visited to fill out a questionnaire. General information about herd size, milk production and education level of the farmer was asked. Concerning calf rearing management information was gathered about colostrum feeding, housing, hygiene, disease management and antibiotic use. There after young stock and housing were visually inspected and hygiene scores were conducted. Results of the questionnaires were analyzed and compared to the general rules of calf rearing and to the antibiotic use of the farms.

Results: The high and low antibiotic use groups showed no differences between herd size and milk production level. General calf management of all the 62 herds reached by far not the rules. For example, only at 62 % of the farms colostrum was fed within 30 minutes after parturition and at 75 % of the farms first colostrum feeding was at least 2 liters. At 58 % of all the farms calves were fed with antibiotic milk. The high antibiotic use farms showed significant better calf rearing management concerning hygiene of the maternity barn and the calf hutchs. High antibiotic use farms disinfected significantly more often the umbilical cord and vaccinated against Rota Corona virus against non of the low antibiotic use farms.

Conclusions: Although the last decade improvements are made in optimizing young stock rearing there is still a lot to win. Farmers know that calves are the future of their herd, but bringing the calf rearing knowledge into practice is still not common sense. It seems that farms with a high antibiotic use have a better calf rearing management then the low antibiotic users. High antibiotic user farmers seem to be more alert and pro-active in their management. Further research should investigate if this relation is causative or just an effect.

OC: 126

Risk factors for mortality and reduced carcass weight in white veal calves

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Objectives: The objective of the present study was to determine influential
Factors for mortality and hot carcass weight in white veal calves in Belgium. **Materials and Methods:** A total of 3519 white veal calves, housed in 10 commercial veal herds in Belgium were included (2007-2009). Data on mortality and treatment were prospectively collected using necropsy and written treatment records. Hot carcass weights were obtained from the integrations. Herd level predictors were the number of calves per compartment, an origin index (= number of herds of origin/number of calves at arrival) and the presence of other food producing animals. Calf level predictors were: breed, gender, age at arrival, calf supplier, province/country of origin, order of arrival, number of treatments for bovine respiratory disease (BRD), previous treatment for diarrhoea, arthritis or diarrhoea and for hot carcass weight also drug use. **Results:** Total mortality was 5.6%, with the most important causes pneumonia (1.5%), ruminal disorders (0.6%), enterotoxaemia (0.6%), enteritis (0.4%) and idiopathic peritonitis (0.4%). An important breed influence was noticed for total mortality and pneumonia, with Belgian Blue and red Holstein Friesians (HF) being at a higher risk to die compared to crossbreeds or black HF’s. In the final multivariable model for total mortality, the calf supplier (P<0.01), the number of BRD treatments (P<0.01), previous treatment for diarrhoea (P<0.01) and arthritis (P<0.01) remained significant. A trend towards a higher risk for mortality in male calves was noted (P= 0.06). The average hot carcass weight was 171.0 kg, ranging from 61.0 to 277.3. The final mixed model for carcass weight consisted out of breed (P<0.01), gender (P<0.01), calf supplier (P<0.01), season of arrival (P=0.07), province/country of origin (P<0.01), drug use (P=0.02), number of BRD treatments (P<0.01), previous treatment for diarrhoea (P<0.01) and arthritis (P<0.01) and two interaction terms (breedseason and breedcalf supplier). Especially the effect of requiring individual treatment was devastating: -8.0 kg for calves previously treated for diarrhoea, -12.8 kg for arthritis and -7.7, -21.4 and -40.4 kg in calves treated 1, 2 or -3 times for BRD respectively. **Conclusions:** The present study illustrates the possible use of breed, calf supplier and requiring individual treatment as predictors for higher mortality risks. Especially the presence of diarrhoea, arthritis or BRD has a negative effect on hot carcass weight, next to an effect of calf supplier, province of origin and drug use.

**OC: 127**

Risk factors for neonatal calf diarrhea (NCD) in selected herds in the high altitude tropic in Colombia

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**Objectives:** The objective of this study was to determine the causal association between management, dam and calf factors with the presentation of NCD in dairy and dual purpose herds in high altitude tropic.

**Materials and Methods:** A prospective cohort study was performed in 21 selected herds which were selected based on acceptance to participate in the study. The experimental unit was the neonatal calf. The herds were located on the Colombian Andes at 2600 meters above sea level; interviews to the farm owner or manager with direct observation were done to determine each factor related to management, dam and calf. The epidemiological associations between these factors with NCD were estimated using Chi square (P<0.05), Odds Ratio (OR) (p<0.1) and Logistic regression (p<0.1).

**Results:** 620 calves born in the farms were followed up to 5 weeks to age during a year. 64 (10.3%) developed NCD. The highest incidence occurred in the second week of life (40.6%). The risk factors significantly associated with NCD using logistic regression were calves born in middle and small sized farms (OR:5.1 and OR:50.7, respectively), use nonchemical fertilizer (OR:22.9), 6 month interval between soil fertilizations (OR:53.4), cow feed supplementing (OR:1.6), non-kikuyu grass pasture (OR:15.4), vaccination against bovine neonatal complex (OR:29.8), non-Holstein dam (Angus: OR:10.3), Normand (OR:2.5), Brown Swiss (OR:3.3), non-Holstein Calf [Jersey(OR:4.9), Brown Swiss (OR:6.1), Normand (OR:2.9), Angus (OR:3)], male calf (OR:29.1), calf weight < 39kg or 45kg (OR:2.1, OR:1.7), naval dissection [no dissection (OR:5.9) or with non-iodine products (OR:9.6)], raising system different from stoke and rope on pasture (OR:3.7), no bucket feeding (OR:2.7), stored colostrum (OR:12) were the main risk factor associated with NCD. As protective factors, determined by logistic regression, were feeding concentrate to calf (OR: 0.05), dam vaccination for reproductive diseases (OR: 0.1), dam deworming with albendazole (OR: 0.08), dry period therapy (OR: 0.05) and professional assistance (OR: 0.7).

**Conclusions:** These results indicate that these are the main factors associated with NCD and that many of them are susceptible of being addressed to prevent the presentation of NCD in these and similar farms.

**OC: 128**

Ad libitum acidified milk in group facility in comparison with individual housing fed pasteurized hospital milk twice a day

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**Objectives:** The objective is to evaluate the effect of different housing system on calf health, growth and survivability. The individual housing system fed high temperature, short time hospital milk twice a day was compared with group housing facility fed ad libitum acidified milk. For the colostrum a batch pasteurization low temperature long time was compared with raw.

**Materials and Methods:** The study was conducted using 230 Holstein heifer calves from a commercial dairy farm located near Ithaca, New York. Colostrum was harvest twice a day and from that, treatments were set using; low temperature, long time pasteurization - LTLT (137°F for 60 minutes) and raw colostrum. Calves were enrolled randomize between the individual and group housing system receiving as first feeding two gallons of colostrum in between one to four hours of age. Calves were allocated in individual pens for the next 8 weeks of age and fed twice a day using hospital milk until 8 weeks the other calves were allocated in a group of 20 calves fed ad libitum acidified milk (pH=4.2) hospital milk. Each calf was weekly health checked (fetal score, temperature, hydration, attitude and appetite) until 8 weeks and the weight measurements followed until 14 weeks.

**Results:** The study found a significant difference (p<0.001) between the ad libitum (110kg +5kg) fed acidified milk in comparison with the individual housing (102kg +5kg) fed HTST hospital milk twice a day at 14 weeks and a significant difference at weaning as well between the housing systems ad libitum (80.1 kg + 2kg), twice a day (75.6 kg + 2kg). There was no other significant difference between the feeding systems over any other factor including diarrhoea and pneumonia. There was no significant difference over survivability between the feeding and housing systems.

**Conclusions:** Ad libitum feeding of milk allowed calves to consume more milk and as outcome calves fed more milk remained healthy and gained weight faster before weaning. The weight advantage of the ad libitum group persisted until the 14 weeks of the study. Calves on the ad libitum group system may facilitate group housing since the calves are grouped until weaning.

**OC: 129**

The effect of colostrum and hospital milk UV treatment versus pasteurization on calf health, growth and survivability

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**Objectives:** The objective is to evaluate the effect of different treatments of colostrum and hospital milk on calf health, growth and survivability. For the colostrum a batch pasteurization low temperature long time was compared with raw colostrum and UV treatment and the hospital milk between high temperature short time and UV.

**Materials and Methods:** The study was conducted using 900 Holstein heifer calves from a commercial dairy farm located near Ithaca, New York. Colostrum was harvest twice a day and from that, treatments were set using UV; low temperature, long time pasteurization - LTLT (137°F for 60 minutes) and raw colostrum. After each process the colostrum were stocked into a -50°C freezer for further feeding and samples were collected and immediately stocked (-20°C) for quality and bacteriology tests. Calves were enrolled randomize receiving as first feeding two gallons of colostrum in between one
to four hours of age. The calves were allocated in individual pens for the next 8 weeks of age. The calves were fed twice a day using hospital milk half of the calves receiving pasteurized (HTST) and the other half UV treated hospital milk until weaning. All the calves were fed 4 gallons a day for the first week and 8 gallons for the second week on until weaning period. Each calf had blood sample collected after 3 days of birth and weekly health checked (focal score, temperature, hydration, attitude and appetite) and weight measurements until weaning.

**Results:** There was no significant difference (p=0.1758) between hospital milk treatments and body weight gain until weaning 79.1kg (+2.2kg) for HTST group and 80.9kg (+2.3kg) for UV. Colostrum treatment had no difference (p=0.9995) for body weight gain at weaning 80.0kg (+1.63kg) for UV 80.5kg (+1.58kg) for LTLT and 80.8kg (+1.72kg) raw colostrum. Diarrhea was measured weekly and scored as absent or present no difference over the treatments either for colostrum (p=0.2825) or hospital milk (p=0.9286) was significant. The same data collection was made for temperature and no significant difference was noticed among colostrum treatments (p=0.4876) and hospital milk treatments (p=0.9976).

**Conclusions:** The UV treated milk should be considered a safe alternative considering that was no significant difference between the methods of treatment either for hospital milk and colostrum for growth, health and survivability.

**OC: 130**

**Evaluation of failure of passive transfer, morbidity and mortality in jersey calves**

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**Objectives:** Jersey cows are becoming more prevalent in dairy production. However, Jersey producers have a challenge raising their calves healthily through weaning time. Maternal antibodies supplied via colostrum play a crucial role in morbidity and mortality of young calves. The standard values of immunoglobulin G (IgG) and its proxy of total protein (TP) that are used to classify calves as having failure of passive transfer (FPT) are based on Holstein calves. The objectives if this study were to determine the correlation between IgG and TP in Holstein and Jersey calves, and the association with morbidity and mortality in Jersey calves.

**Materials and Methods:** Blood samples were obtained from 321 Jersey calves and 35 concurrent Holstein calves less up to 14 days-old. Serum TP levels were determined via refractometer and IgG levels via single radial immunodiffusion (SRID). Multiple regression analysis was used to evaluate the effect of breed and age on TP and IgG concentrations in serum. Additionally, average TP and IgG between healthy calves and calves with morbidity or calves that died were compared via Student’s T-test.

**Results:** Analyses showed that Jersey calves had on average 0.49 g/dl higher concentration of TP than Holstein calves (P=0.020) and that TP was highest on days 1 and 2 of life and decreased steadily (-0.09 g/dl per day) until day 7 in Holstein calves and until day 14 in Jersey calves. Using a typical cutoff point of <5.3 g/dl of TP to determine FPT would have resulted in 13.4% of Jersey calves classified as having FPT compared to 18.5% of Holstein calves. A cutoff point of <1,000 mg/dl resulted in classifying 9.8% of Holstein calves and 9.9% of Jersey calves with FPT. Morbidity and mortality (n=6) in Jersey calves was not associated with different TP or IgG levels.

**Conclusions:** This study highlights the differences between calves of the two major dairy cattle breeds. Based on these results, we conclude that Jersey calves should not be managed using the same cut-off values established for Holstein calves, because FPT may be underestimated. And although adequate amounts of quality colostrum gets calves off to a good start, results from our study emphasize the influence of good feeding and management past the first few days of life as a major factor in preventing morbidity and mortality.

**OC: 131**

**Comparison of samples to be tested to evaluate colostrum management in calves**

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**Objectives:** Monitoring failure of passive transfer (FPT) in dairy calves in small farms has intrinsic challenges. It may require sampling calves older than 48 hours, and possibly freezing samples for later batch analysis. Because of this, it may be advisable to take plasma samples as opposed to serum samples. Previous studies by this group have shown that total protein levels in samples that have been frozen show a decrease in total protein compared to those same samples tested prior to freezing. The objectives of this study were to assess whether plasma samples deliver similar total protein (TP) values compared to serum samples, and whether samples can be frozen without affecting TP levels.

**Materials and Methods:** In total, 266 Holstein and 411 Jersey calves up to 30 days old were sampled at 3 commercial dairy farms in Oregon. TP was assessed with a digital refractometer on fresh and frozen/thawed serum, and on fresh and frozen/thawed plasma. Correlation between serum and plasma, and between fresh and frozen/thawed samples was tested by Passing-Bablok regression analysis. Serum samples were collected from 10 Holstein and 10 Jersey calves and divided into 3 aliquots. One aliquot was submitted immediately for electrophoresis testing without freezing. The remaining two samples were frozen and submitted for electrophoresis testing two weeks and two months after the initial blood draw, respectively. Samples were frozen in a commercial freezer.

**Results:** Plasma samples tested consistently higher in TP compared to serum samples (Plasma = 1.36 + 0.87 Serum, P<0.05). However this relationship was not linear; there was more difference at lower TP concentrations. Freezing resulted in a consistently lower TP concentration compared to fresh serum (Frozen = 0.20 + 0.15 Fresh) but a consistently higher TP concentration in plasma (Frozen = 0.20 + 1.00 Fresh). Electrophoresis data showed that the main protein fraction that decreases during freezing is albumin (P<0.05).

**Conclusions:** The results of this study show that serum samples that have been frozen may have lower TP levels compared to fresh samples, which may incorrectly classify calves with FPT when in reality they are normal. As a bovine practitioner, it is important to understand the differences in TP levels between serum and plasma samples, as well as fresh and frozen samples. These data allow practitioners to use different samples to determine colostrum management in calves.

**OC: 132**

**Calf mortality is associated with individual colostrum quality and calf serum refractometer values on commercial dairy farms**

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**Objectives:** Monitoring colostrum quality and failure of passive transfer (FPT) on commercial dairy farms may assist in preventing newborn disease and mortality occurring from 24 h after birth to weaning. Commercial colostrum and calf serum refractometers are two “calf-side” tests used for measuring these values. Our objective was to identify and quantify associations between calf mortality occurring 24 h after birth and later and individual colostrum quality and calf serum refractometer values.

**Materials and Methods:** A one year long prospective study was carried out in five Israeli commercial dairy herds. Experimental unit was calf and a total of 539 observations were included. Colostrum quality was determined using a commercial colostrometer. All calves were bled 30-36 h post calving and blood samples were tested for globulin concentration using a temperature corrected refractometer as an indirect measure for efficiency of passive immunity transfer. Data were analyzed using t-tests and chi-square for simple comparisons, and logistic regression for multivariable analysis.

**Results:** Calf mortality > 24 h after calving occurred in two of the five farms.
Mortality was greater in male calves 12/230 (5.2%) than in female calves 6/300 (2.0%) (P = 0.074). Calf mortality in calves born during the summer months was 7.95% vs. 2.44% in calves not born during these months (P = 0.021). Using data from all farms, refractometer values of calves that died and of those that were weaned were 5.86 and 7.13 g/dl, respectively (P < 0.001). On the two farms with calf mortality, refractometer values of calves that died and of those that were weaned where 5.86 and 6.73 g/dl, respectively (P=0.0028). On the latter farms, an increase in one refractometer value was associated with a decrease of 52% in the odds for death (P = 0.001). Refractometer values on farms without calf mortality and with calf mortality were 7.47 and 6.67 g/dl, respectively (P = 0.001).

Conclusions: Male calves were at greater risk of mortality possibly due to body-size, gestation length, or both. Ranking colostrum quality and using only good quality colostrum could result in reduced calf mortality due to improved passive absorption. Poor colostrum quality and inadequate globulin absorption found in the farms that experienced calf mortality stress the great importance of proper colostrum management and care of the newborn.

**OC: 133**

**Evaluation of the efficiency of passive immunoglobulin transfer in calves fed serocolostrum**

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**Objectives:** Failure of transfer of passive immunity is associated with increased morbidity and mortality in calves. Colostrum replacers can be used as a source of immunoglobulins (Ig) when high-quality colostrum is unavailable. The aim of this study was to compare absorption of IgG in newborn calves fed either serocolostrum or natural colostrum.

**Materials and Methods:** Two serocolostrums with high IgG concentrations (114 and 116 g/L respectively) were obtained from pooled bovine colostrum using membrane fractionation processes. These products were devoid of casein micelles and fat but their mineral and peptidic compositions were close to those of the soluble phase of the original colostrum. Newborn calves were given a single dose (4.1 g/kg of body weight) of IgG six hours after birth either in the form of colostrum (group 1; n=4), serocolostrum S1 (group 2; n=5), serocolostrum S2 (group 3; n=6) or lyophilized serocolostrum S2 solubilized in whole milk (group 4; n=6). Blood samples were collected from all calves every 6 hours for the first 24 hours after the initial feeding and then once a day for 2 weeks. Serum IgG concentrations were determined by radial immunodiffusion assay and the rate of IgG absorption was calculated for each calf.

**Results:** In all groups, maximum serum IgG levels were reached within 12-24 hours after the colostrum or serocolostrum feeding. Mean serum IgG concentrations in group 2 and group 3 calves didn’t exceed 8.8 ± 1.1 g/L and 9.0 ± 3.3 g/L, respectively and remained significantly lower than IgG concentrations in calves fed colostrum. The mean rate of IgG absorption obtained with colostrum was two times higher (57 ± 10 %) than those of serocolostrum S1 (25 ± 7 %) or serocolostrum S2 (28 ± 7 %). Group 4 calves had IgG levels globally higher than group 2 and group 3 calves but the differences were not statistically significant, probably due to the low number of calves included in each group. The half-life of IgG was similar in all groups (12 days).

**Conclusions:** None of the serocolostrums tested in our study allowed calves to acquire serum IgG levels similar to those provided by the natural colostrum. Our results suggest that molecular fractions (caseins and/or fat) present in natural colostrum but lacking in serocolostrum are involved in IgG absorption. Additional experiments are ongoing to test this hypothesis.