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187 Cooling Strategies to Improve Milk Production Under Heat Stress Conditions

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The aim of this study was to determine the best cooling strategy using spray and fans to improve milk yield and some metabolites in lactating Holstein cows under heat stress conditions. The experiment was carried out in a commercial dairy herd located in the Mexicali valley, Baja California, Mexico. Thirty two multiparous Holstein cows were blocked by milk yield and were assigned to one of four treatments: 1) control group, with cooling period before milking times; 2) in addition to 1, one cooling period at 11:00 h; 3) in addition to 1, one cooling period at 23:00 h; and 4) in addition to 1, two cooling periods, one at 11:00 h and the other at 23:00 h. Duration of cooling time before milking was 30 min and for the additional cooling period 45 min. The cooling system was installed in the roof of the holding pen, before the milking parlor and consisted of four fixed fans of 90 cm with a mist head located in the center that delivered 28 L/h of water. Cows were milked twice a day (05:00 and 17:00 h) and they rotated in all treatments. Period in each treatment was 21 d and data were collected on the last week of each period. The study included from June 20th to September 11th of 2006 and climatic variables were collected to estimate THI. Response variables were milk yield, fat and protein content, milk energy output, glucose, cholesterol, and triglycerides. The statistical model was a 4 X 4 Latin square that included block, period, treatment, cow nested into blocks, and block*treatment interaction. Orthogonal contrasts were used to compare treatment means. Average THI during the study was 83, with maximum of 88 and minimum of 78. The maximum temperature registered was 49 °C. These values are considered between moderate and severe heat stress conditions. Milk yield (21.12 ± 0.23 kg), fat (2.23 ± 0.27 kg), and milk energy output (13.6 vs. 12.6 ± 0.28 MCal) were higher (P<0.05) in cows of group D compared to control cows, respectively. There were no differences (P>0.05) in fat or protein content among treatments. However, glucose levels were higher (P<0.01) in control cows compared to D cows (4.8 vs. 4.31 ± 0.67 mg/dL respectively). Cholesterol and triglycerides levels were similar (P>0.05) among treatments. The cooling strategy with the best results was the one with more cooling periods (4), and represents an alternative to improved productivity of lactating Holstein cows in dry and hot regions.

Key words: dairy cattle, hot weather, milk yield, Mexico

188 Stress Responses in Adult Cattle due to Surgical Dehorning Using Three Different Types of Anaesthesia

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Objectives: Dehorning adult cattle is a surgical procedure causing distress of varying intensities that can be reflected in behavioural changes and alterations in plasma cortisol levels. Animal welfare considerations necessitate that the dehorning of cattle be done under conditions causing as little stress as possible. This study investigated the stress response to surgical dehorning in adult cattle, as expressed by blood cortisol levels and behaviour changes, using three types of anaesthesia.

Materials and Methods: Stress responses during the dehorning process were evaluated in 18 Red Pied cows. The cows were nested into 3 groups of six and kept in tie-stall housing. Those in the first group were dehorned under general anaesthesia (GA) induced by intravenous administration of xylazine and ketamine. The second group was dehorned under sedation and local anaesthesia (SLA) induced by intramuscular administration of xylazine and local anaesthesia with lidocaine. The third group was dehorned under local anaesthesia (LA) with lidocaine. Dehorning was performed with a foetotomy wire. Blood samples were taken 0.5 h before dehorning to determine cortisol levels, and, by means of a central venous catheter inserted into the jugular vein, during surgery, at 0; 0.5; 1; 1.5; 2; 2.5; 3; 3.5; 4; 5; 6; and 8 h post-surgery. Concurrently, occurrence of stress behaviours was assessed. Cortisol levels were measured by enzyme immunoassay (EIA).

Results: The lowest mean peak levels of plasma cortisol (82.53 ± 6.04 nmol l-1), the most rapid return of plasma cortisol levels to baseline values (1.92 ± 1.11 h), and the lowest occurrence of stress behaviours (2.38 - 5.83 %) were noted in the SLA group. The highest mean peak levels plasma cortisol (113.86 ± 25.65 nmol l-1), the slowest return of plasma cortisol levels to baseline values (3.83 ± 2.18 h) and the most frequent occurrence of stress behaviours (65.48 ± 28.72%) were observed in the LA group. There were significant differences between the SLA and LA groups in peak plasma cortisol levels (p = 0.011) and in occurrence of stress behaviours (p = 0.003).

Conclusions: Sedation induced by intramuscular administration of xylazine in conjunction with local anaesthesia with lidocaine is considered the most suitable method of anaesthesia when dehorning adult cattle. Local anaesthesia with lidocaine alone was least suitable.

189 Current Attitudes of European Veterinary Practitioners toward Pain and the Use of Analgesics in Cattle

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As a result of their history as a prey species there has been a strong evolutionary pressure on cattle to mask signs of pain and its implied weakness. Consequently, recognising the signs of pain in this stioical species represents a significant challenge for veterinarians and may partially explain why the use of analgesics in cattle has lagged behind that of small animals and horses. A questionnaire designed to assess the attitudes of respondents to pain and the use of analgesics in cattle was distributed to 12,764 practitioners in nine European countries (Belgium, Denmark, France, Germany, The Netherlands, Norway, Spain, Sweden and the UK) between 2004 and 2006. The questionnaire collected data on demographic availability of and attitudes towards analgesics, treatment regimes, estimated pain severity for a range of conditions and procedures in adult cattle and calves (assuming no analgesic agents were used) and their levels of knowledge in the field. Questionnaires from 2716 practitioners were returned (21.3%). Respondents graduated from one of sixty one Schools between 1957 and 2006; 82% were male and 18% were female. Forty eight percent of respondents considered they had adequate knowledge in the area. The proportion of practitioners who stated they never used analgesic agents for a procedure or condition ranged from 1% for caesarean section to 41.3% for dystocia in adult cattle and from 2.9% for umbilical hernia surgery to 55.1% following dystocia in calves. Based on the median results, mastitis (with clots only) and neck calluses were considered the least painful and claw amputation the most painful procedure or condition of adult cattle. Similarly the pain associated with dystocia was considered the least painful and surgical castration, burdizzo castration, distal limb fracture and umbilical hernia surgery the most painful procedure or condition of calves. The results generated from this study suggest that there are currently two principal factors hindering the use of analgesics in cattle: the limited number of analgesics (particularly local anaesthetics) licensed for use in food animal species in Europe and the belief amongst many practitioners that they have an adequate knowledge of pain management despite the fact that their use of analgesics in cattle is often limited. The authors would like to respectfully acknowledge the input of our late colleague Professor Ove Svendsen of the Royal Veterinary and Agricultural University in Denmark.

Key words: pain, analgesic, cattle, survey, welfare

Animal Behaviour and Welfare

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190 Improving Welfare and Health of Dairy Cattle through Structured design of Husbandry Systems

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Objective: Current husbandry systems for dairy cows are far from optimal. Reduced welfare, health problems and public discussions are typical problems encountered in traditional as well as in organic dairy production. An ideal husbandry systems should enable cows to express their natural behavior (limiting stress) and to maintain a good health status and enable the farmer to manage the herd and generate an income. The objective of this study was to design a husbandry system for a stable family herd of (dry) cows, calves, heifers and possibly a bull in which calves are not dehorned, calves can suckle, no external group changes occur and the needs of all animals are fulfilled.

Materials and methods: The structured design method (Siers, 2004) was used and the following steps were taken: Preliminary research: 1 Analysis of the needs of the actors in the system; 2 System analysis; 3 Identification of undesirables and set design objective; Problem definition: 4 Problem analysis; 5 List qualitative and quantitative aspects of the needs (Brief of Requirements); 6 Identification of key functions; Formulating solutions and concepts: 7 Find solutions; 8 Combine solutions into structures and design concepts; 9 Evaluate concepts; Detailed design and shaping

Results: In this paper we will focus on the results of specific steps. The brief of requirements focuses on the needs of all individual animals in the herd and the farmers’ need to make the system controllable within the rules that are laid down by law. The animal needs are based on the 5 freedoms (Brambell) and the EU project Welfare Quality®. A list of 13 key functions in the new husbandry system was identified. A selection: Individual cow recognition; • Provide and control feed per animal; • Access management; • Milk cows; • Enable suckling of calves.

Four concepts were designed: • Low cost; • Easy manageable; • Most animal friendly; • Mix of 1 to 3.

Elements of the final concept were: A central calf area to which only calves have access and are fed. A common space to which all animals have access at any time (calves can suckle their mothers here). All other animals are fed individually outside the common area, depending on lactation stage. Individual “cow parameters” are used.

Conclusions: By using the structured design methodology an innovative design for complex dairy farming system can be made. Further improvement of the design and testing in practice will be done in close interaction with farmers, veterinarians, advisors and other stakeholders.

Key words: welfare, innovative husbandry system, design

191 Lesions at Medial Side of the Hock in Dairy Cattle

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Hock lesions in dairy cattle are a well known problem in all kind of clinical presentations in dairy industry. These lesions are especially known originating from the lateral side of the tarsus and varying from loss of hair until serious arthritis. These lesions seem to be related with the duration of indoor housing, type of bedding and stall design. Lesions at the medial side of the hock are a relatively new phenomenon in dairy cattle. We hypothesized that the lesions were caused by incongruities between udder shape and leg movements. Two pilot studies executed in a private practice in The Netherlands have investigated prevalence, risk factors and some aspects of aetiology of these lesions. In a first pilot study performed in 40 dairy herds (75-100% HF), a herd prevalence and a cow prevalence has been estimated of 100% and 14% respectively and clear relation was found with parity and milk-production level. Compared to parity 2, for cows in parity 1 an OR has been estimated of 0.15 and for cows in parity 3 an OR has been estimated of 3.0; for cows with a production > 8000 kg, an OR has been estimated of 3.0. The lesions have been seen in cows during the second part of lactation and significant more frequently in cows with a low body condition score. In a 2nd investigation a case-control study has been performed in herds with high and low prevalence. As a diagnostic tool chalk markings have been applied on the hind quarters of the udder and special attention has been paid to the origin of the litter also. A clear relation has been found between the presence of hock lesions at the medial side and skin lesions at the hind quarter of the udder and the deepness of the udders. Lesions were also significantly more frequently present in presence of strong grazing litter in the cow’s cubicles. Hock lesions both at the lateral and the medial side are related with diminished animal welfare and are potential entraneces for all kind of bacterial infections with the risk of dissemination. Additionally, lesions at the medial side of the hock may also lead to secondarily infected udder skin and possible contamination of milk. For prevention of hock lesions at the medial side attention should be paid to the correct shape of the hind quarter of the udder, the use of soft dry bedding materials, prevention of loss of body condition and lameness.

Key words: hock lesions, bedding, animal welfare

192 Argentine Biotype Holstein and its High Plasticity, Based on the Production System

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The milky production in the Argentine Republic is obtained from Holstein argentine hybrids in a 95%. Having adapted to a pastoral system with supplementation, its productions are located in intermediate levels between New Zealand type and those from USA; but with more plasticity than both of them. Our research was based on an analysis of the different production conditions of the last years in our country and compare them with the productions of the countries named before. The Argentine Republic suffered an economic crisis with a milk price disvalue that reached a 30% of its original value, earning the producers 9 dollar cents in 2002, with the beginning of a price recovery in 2003, reaching prices of 15-18 dollar cents in 2004. We had to adapt us to both of this relative price conditions in such a brief time. We came to the conclusion that in favourable conditions our animals have a better respond than those from New Zealand but lower than those from USA. Either wise, when the conditions turn unfavourable the respond of our cattle is superior than USA’s but inferior to New Zealand’s. Several diets responds have been analysed, the effect over reproduction and the variation of the national production. It’s our belief that each country must take advantaged of the cattle that is better adapted to its ecologic conditions avoiding coping models.

Key words: milk production Holstein Argentine system

225 Survey Results on the Welfare of Dairy Cows in 250 Italian Farms

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Here we present the results of a survey performed to evaluate the welfare of dairy cows in more than 250 Italian farms (in the northern and southern Italy): our aim was to show the strong and the critical points regarding animal welfare and to verify the suitability of our method to extend the study on a wider number of (1027 other) farms. The survey has been conducted using a check list through
Most of the temperate and tropical beef cattle operations include mixed breed herds. However, studies on social organization in these herds are uncommon. The objectives were to assess the influence of breed on the establishment of social organization, and to determine the effect of breed and social order on the level of interactivity of a mixed breed herd. Angels (A; n=10), Brahman (B; n=10), and Senepol (S; n=10) cows were assigned to two groups of fifteen each containing equal breed numbers and placed into two separate pastures. Agonistic interactions were daily recorded on a win/loss basis for 45 days. Dominance values were estimated as the proportion of individuals dominated to total herdmates. Breed influenced (P<0.01) social order, with S cows being dominants (P<0.05) above A and B cows. Agonistic interactions occurred more frequently (P<0.005) between than within social orders (814 vs 310, respectively). Although dominant cows were involved in more agonistic interactions with cows from different social order than intermediate and subordinate cows (P<0.0005), the intermediate (100) and subordinate (157) groups generated more (P<0.0005) agonistic interactions within their own social orders than dominant cows (53). Some mutual segregation of A and B cows occurred, as interactions between A and B cows were less (P<0.0005) than interactions between A and S (53 vs 140, respectively). Within breeds, Brahman (152) and Senepol (182) cows had more (P>0.0005) agonistic interactions than A (107) cows. It was concluded that in mixed breed herds, breed is a factor influencing social dominance and the level of interactivity within herd is influenced by both breed and social order.

Key words: social behavior, social organization, beef cattle