ABSTRACTS

ISCFR 2012

July 26-29, Whistler, Canada

7th International Symposium
on
Canine and Feline Reproduction

In a joint meeting with

EVSSAR 2012

15th Congress of the
European Veterinary Society for Small Animal Reproduction

Editors: Gary England, Michelle Kutzler, Pierre Comizzoli, Wojciech Nizanski, Tom Rijsselaere and Patrick Concannon

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Time of ovulation relative to the onset of proestrus in a beagle colony

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OBJECTIVES AND METHODS: The duration of proestrus in our beagle colony ranges from 3 to 27 days (mean: 8.1±2.9 days) [1-4] and similar to that reported for other beagle colonies. [5-7]. After the subsequent onset of estrus, ovulation was determined to occur on about day 3 of estrus [2], with the time of ovulation after the onset of proestrus (serosanguinous vulval discharge) varying markedly among animals. Dog breeders, however, often schedule planned breedings for 10-14 days after the onset of vulval bleeding, and as a result pairings are often too early or too late, despite the long 7-10 day period for fertile matings and about 5 day period of peak fertility. Canine ova are ovulated in an immature state; the optimum mating period for bitches lasts for about 3 days beginning 2 days after ovulation with ovum maturation being completed at about 60 h after ovulation. However, the period of fertility lasts about 8-10 days, from 48-72 hours before to 108-132 hours after ovulation; canine sperm retain fertility for about 5 days in the female genital tract [3, 6, 7]. The variation of proestrus length within bitches has not been well characterized, and it is unclear whether the corresponding follicular phase of the canine cycle is consistent or variable within bitches. That information would be important for purposes of making decisions on planned breeding, and in conducting studies to determine the time in the follicle phase when follicles become selected as the follicles that will ovulate in the ensuing estrus. We therefore determined the day of ovulation day relative to the day of onset of vulval bleeding in a large number of bitches, and the variation among bitches and the effects of aging and length of the estrus cycle were investigated.

A total of 390 cycles in 102 female beagles aged 0.75-11 yr. were investigated during a four year period. The bitches were observed daily for pudendal enlargement, and the presence or absence of vulval “bleeding”, i.e. serosanguinous discharge. The first day of vulval bleeding, was considered the onset of proestrus. Bitches were then monitored daily for signs of estrus (lordosis, tail deviation and standing for a male) and blood was collected every other day from day 6 of vulval bleeding. Plasma progesterone concentrations were subsequently determined and the day of ovulation day was estimated to be the day when progesterone increased to above 2 ng/ml. [4].

RESULTS: Ovulation occurred at 11.1±0.2 (SEM) days after the onset of vulval bleeding, range 3-31 days, and was unrelated to cycle length. Ovulation occurred at 9-13 days in the majority of cycles (65%); a split estrus was noted in 3 cycles (0.8%). In 10 animals in which 7 or more estrus cycles were observed, the ovulation day after vulval bleeding neither lengthened nor shortened, showing no specific tendency. In 57 animals in which ovulation was observed 4 or more times (312 ovulations), the day of ovulation after proestrus onset did not markedly vary. For subsequent analysis, the bitches in which ovulation occurred routinely at 9-13 days after bleeding were considered as the average group (14 animals), and the remaining animals were divided into a “late ovulation” group with a long (14-31 d) intervals between proestrus onset and ovulation (17 animals), an “early ovulation” group with a short (3-8 d) interval (16 animals) and an “early and late ovulation” group (10 animals; mixed average, long and/or short proestrus length). Variation in the ovulation day after proestrus onset was small, being consistent and mostly within 1-3 days, in all animals except for 14 animals including the 10 in the mixed group. In the mixed proestrus length group, the day of ovulation after proestrus onset was (a) generally early or average (13 days or earlier) and only late (15-25 days) in a single cycle in 7 of the 10 animals, or (b) generally late and only early (5 day) in a single cycle in one animal, or (c) randomly early or late, in 2 animals.
DISCUSSION AND CONCLUSION: The 11.1±0.2 day mean, and 3-31 day range, in time of ovulation from proestrus onset was similar to those estimated from progesterone concentrations in 10 female Labrador Retrievers where the range was also considerable at 8 to 18 days after onset of vulval bleeding [5], suggesting that the variation in proestrus length is not specific to beagles but common to all dog breeds. The present study is the first study to evaluate variability in the interval from proestrus onset to ovulation within bitches in a large number or animals. The results demonstrate that proestrus lengths are not only less variable within bitches than among bitches, and apparently do not change with age, but that they also have a very low variability within the majority of bitches. The results may be comparable across most or all breeds although only one breed was considered in this study. If the ovulation day after onset of vulval bleeding of bitches intended for breeding can be grouped into an early or late ovulation group, it may help planning matings and allow reduction in the frequency and number of matings for fertility. Critical in such application is the accurate detection of the onset of proestrus by frequent, and sufficiently early monitoring of the vulva. The results also suggest that in dogs with accurately determined and relatively consistent proestrus to ovulation intervals, studies could be designed to characterize when during the follicular phase maturing follicles become selected to be the ovulating follicles versus follicles destined to undergo atresia.