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Was She Bred on the Right Day?

A 3-year-old intact female Bichon Frise dog was presented for evaluation before being shipped for breeding by natural service.

She was a proven bitch and had been in proestrus for about 7 days when first presented (day 0; **Table**). Because of management constraints with the male, she was shipped for breeding while still in proestrus, before ovulation. She was bred twice (days 4 and 6 after initial presentation) and shipped back home after a brief delay. Upon arrival, the males with whom she was housed were very interested; the bitch was presented again to the veterinarian 1 day after the males stopped attempting to mount (13 days after initial presentation).

continues

ASK YOURSELF ...

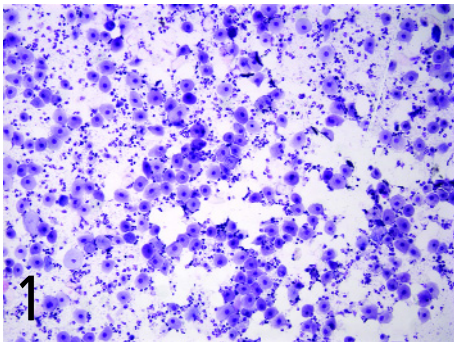
Which of the following statements is correct?

A. The bitch most likely was bred on the optimal day, based on serum progesterone concentrations and behavior of the male dogs.

B. The bitch most likely was bred on the optimal day, based on vaginal cytologic features and behavior of the male dogs.

C. The bitch most likely was not bred on the optimal day, based on serum progesterone concentrations and behavior of the male dogs.

D. The bitch most likely was not bred on the optimal day, based on vaginal cytology and behavior of the male dogs.



Diestrous vaginal cytologic sample. Note noncornified vaginal epithelial cells and large number of polymorphonuclear cells. Diff Quik stain; magnification, 100×

Table. Clinical Findings in Estrous Bitch

Day from Presentation	Physical Findings	Vaginal Cytologic Findings	Serum Progesterone Level ng/mL	Serum Progesterone Level nmol/mL
0	Vulva turgid, serosanguineous vulvar discharge	100% cornified, < 50% anuclear squames, no PMNs	1.1	3.5
3	Vulva turgid, serosanguineous vulvar discharge	100% cornified, < 50% anuclear squames, no PMNs	1.1	3.5
4	Bred by natural service			
6	Bred by natural service			
13	Vulva swollen and soft, mucoid vulvar discharge	See **Figure 1**	> 20	> 63.6

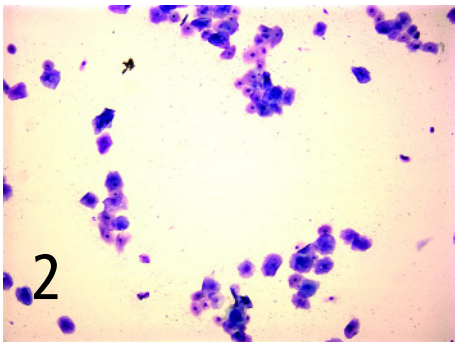
PMN = polymorphonuclear cell

Correct Answer: D
The bitch most likely was not bred on the optimal day, based on vaginal cytology and behavior of the male dogs.

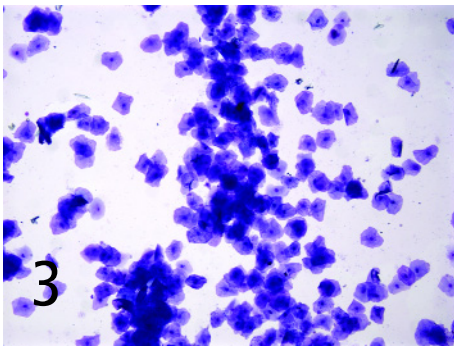
Assessment. Serum progesterone is a valuable tool in prospectively determining ovulation day in bitches. The hormone that actually stimulates ovulation, luteinizing hormone (LH), cannot be measured readily as of this writing. Serum progesterone concentration begins to rise at the time of the LH peak. Once this rise in progesterone, oftentimes in the range of 2 to 2.9 ng/mL (6.36–9.22 nmol/mL), is identified, ovulation is expected to occur 2 days later.

Serum progesterone usually is in the range of 4 to 10 ng/mL (12.7–31.8 nmol/mL) on ovulation day. Optimal breeding day is 2 days after ovulation in bitches. In this case, an inadequate number of samples were collected for measurement of progesterone to permit us to prospectively predict ovulation day. The final progesterone concentration, greater than 20 ng/mL (> 63.6 nmol/mL), verifies that ovulation occurred but does not permit retrospective assessment of ovulation day.

Cytology. Vaginal cytology is not a useful tool in prospectively predicting ovulation day. During proestrus, the percentage of cornified vaginal epithelial cells gradually increases from 0% to 100% (**Figure 2**). During estrus, or standing heat, nearly all the vaginal epithelial cells are cornified and more than 50% appear anuclear (**Figure 3**). Cornified cytology is maintained through estrus. Usually at 6 days after ovulation, the cornified epithelium is abruptly shed as the bitch enters diestrus; this is evidenced on cytology by reappearance of a predominantly noncornified epithelial cell population and, in the first few days of diestrus, a large number of healthy polymorphonuclear cells.



Proestrous vaginal cytologic sample from a bitch. Note variable population of noncornified and cornified vaginal epithelial cells. Diff Quik stain; magnification, 100×



Estrous vaginal cytologic sample from a bitch. Note cornified vaginal epithelial cells, most of which appear anuclear. Diff Quik stain; magnification, 100×

In this case, the final vaginal cytology specimen indicates diestrus. This, coupled with the behavior of the male dogs in the household, suggests that ovulation occurred approximately 6 days before that presentation to the veterinary clinic, or on day 7 after initial presentation. Since optimal breeding time begins 2 days after ovulation, this bitch was bred early. Whelping date was projected as 57 days from diestrus onset, presumed to be day 13.

Outcome. The bitch was verified as pregnant by using abdominal ultrasonography 30 days from the first breeding. She whelped 3 pups 56 days later. This litter size, while within normal limits for the breed, was small for this proven bitch; in this instance, small litter size was attributed to breeding before optimal breeding day.

See Aids & Resources, back page, for references, contacts, and appendices.

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TAKE-HOME MESSAGES

- Vaginal cytology cannot be used prospectively to predict ovulation day in bitches but can be used as a retrospective measure if the first day of diestrus is identified.
- Serial measurement of serum progesterone is useful only if enough samples are collected to permit determination of a rise in serum progesterone coincident with the LH peak and whether it continues to rise with ovulation.
- Breeding before optimal breeding day with good-quality semen will not automatically lead to conception failure but may be associated with small litter size.