



PROGESTERONE VALUES AND WHAT THEY MEAN

The following article is reprinted from the website of The Canine Semen Bank of Columbus with the permission of Dr. Mark McCloskey and Dr. Erik Weisgerber.

Most female dogs cycle twice a year with an average interval being 5 to 11 months between cycles. Breed variations do exist, with the extreme case being the African dog breeds such as the Basenji, that only cycle once a year. Variation also exists between the length of the "heat cycle", with the range being as short as 3 days all the way up to 3 weeks in length! The average time however from the onset of heat (proestrus) to the actual mating period (estrus) is 9 to 11 days. To make matters more confusing, some dogs have "silent heats" meaning little or no obvious signs of heat such as swelling or bleeding are ever seen. Another phenomena called "split heats" exists where dogs go into a heat cycle but stop short without ovulating then go into a fertile heat period weeks later. A female's fertile period can be different from heat cycle to heat cycle. Meaning that just because she was ready to be bred on the 11th day the last heat doesn't necessarily mean she will be "ready" on the 11th day this heat.

The variations presented above can present notable challenges in finding the correct breeding days. The type of breeding (type of semen) to be performed also must be considered when choosing the best days to breed. Fresh semen and natural breedings allow more room for error because the semen typically

lives for 5 to 7 days. However, with fresh chilled and frozen semen the timing of the breeding is much more critical- because the sperm has a much shorter life span. Our goal is to find the maximum overlap between the female's eggs (which live 2 to 3 days) and the male's sperm (lives less than 24 hours with frozen semen to 7 days with fresh semen). This is where progesterone testing (a blood test) and determining an exact ovulation date becomes paramount to our success. "In-house" progesterone tests only give a range based on interpreting the fading of dots in a test kit. While these are helpful, for maximum accuracy we use a quantitative test- meaning it measures the exact progesterone level and gives us a number.

Basically, progesterone is a hormone produced by the ovaries that rises as the heat cycle progresses. Early in the heat cycle the progesterone values will usually read less than 1.0 ng/ml. The first significant, sustained rise in progesterone usually coincides with the "LH Surge". The LH stands for luteinizing hormone and is released by the pituitary gland in the brain. This is important because ovulation occurs about 48 hours after the LH surge. The progesterone value at the time of the LH surge is usually about 2-3 ng/ml. The progesterone will rise to about 5-8 ng/ml

at the time of ovulation. Canine eggs are not ready to be fertilized at the time of ovulation and take about 2 days to mature. Once mature, the eggs remain fertile for 2 to 3 days and then begin to deteriorate. At the time of insemination, the progesterone can be in the teens and into the 20's (ng/ml). Progesterone stays elevated for about 2 months whether the bitch is pregnant or not. For accurate timings a baseline progesterone is helpful between day 3 and day 5 of the heat cycle or when vaginal cytology shows about 50% cornified cells. After interpreting the baseline number, we will decide when to resume testing and then test every 48 hours to best pinpoint ovulation. Some females will "hover" in the 2 to 3 range for longer the two days because of stress or just their own ovulatory pattern. It is important to see the progesterone level peak "5" ng/ml to feel confident that ovulation has occurred.

Fresh chilled breedings are usually performed 48 hours after ovulation and frozen breedings about 72 hours after ovulation.

LH tests are helpful, but need to be run daily and can get very expensive. The "old way" of doing vaginal cytology is based on rises in estrogen not progesterone. The vaginal cytology is still helpful but not accurate enough for frozen or fresh chilled semen.

Due dates can be determined by counting forward 65 days from the LH surge (LH surge is day 0) or 63 days from ovulation. This is accurate +/- one day.

A cesarean section can be safely performed if the progesterone is less than 2.5 ng/ml- Assuming full term.

Progesterone levels should be maintained above 2 ng/ml to support pregnancy. If a bitch is confirmed pregnant by ultrasound but cannot maintain a pregnancy, a progesterone test should be performed. Literature states that progesterone should be supplemented if it falls below 5 ng/ml. Supplementation can be performed either by a progesterone in oil injection at 2mg/kg every 72 hours, or an oral supplement (Regumate) at 0.088mg/kg (0.2cc/10 pounds daily). The oil can be measured in blood tests but the oral form cannot. Stop all supplementation 3 days prior to due date. Note that progesterone levels can drop as the result of other problems (fetal death etc) and it is often difficult to realize if the progesterone drop was the primary problem or secondary to something else. Any supplementation of progesterone should be discussed with your veterinarian and monitored closely. (Reference: Purswell BJ. Management of apparent luteal insufficiency in a bitch. J Am Vet Med Assoc 1991: 199:902-903.)

Summary

- LH surge coincides with first rise in progesterone -usually around "2" ng/ml
- Ovulation occurs about 2 days after LH surge- usually around "5-8" ng/ml
- Eggs take about 2 days to mature
- Eggs remain fertile about 2 to 3 days
- Fresh semen lives 5 to 7 days
- Fresh Chilled Semen lives 24 to 48 hours- occasionally longer
- Frozen Semen lives 12-24 hours post-thaw
- The fertile period begins two days after ovulation and lasts about 2 to 3 days