Dr. Roughie's Questions and Answers

Sex and the Single Bitch

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It is estimated that greater than fifty percent of breeding failures are due to poor breeding timing. The essential problem in canine breeding management is that some bitches will stand to be bred as early as eleven days prior to ovulation, and sometime, in the case of fearful or inexperienced bitches, not at all. The true fertile period of the bitch is two to five days after ovulation. Missed breedings and small litters frequently result from poor breeding management. Serious breeders can greatly improve their success in canine breeding management by familiarizing themselves with the essentials of the canine heat cycle, learning the advantages and disadvantages of ovulation timing technology, and easiest of all, keeping good breeding records.

TIMING PROCEDURES

Vaginal smears: Vaginal smears reflect the presence or absence of estrogen secretion by ovarian follicles. Single vaginal smears are of little value for determining the ideal time to breed. The value of smears improves when smears are performed frequently and in series throughout the heat cycle. They are also useful for determining if a bitch has gone out of heat, making further breedings of no value. The determination of the first day the bitch is out of heat, called diestrus day 1, has some value for predicting whelping date. Bitches whelp approximately 57 days from diestrus day 1. Knowing the first day of diestrus is also helpful *retrospectively* in determining the day of ovulation, as most bitches ovulate 6 days prior to diestrus day 1. Vaginal smears may be used as the only means of breeding timing with natural breedings or with fresh artificial inseminations with a moderate degree of success. Unfortunately, many breeders fail to follow the bitch all the way to diestrus day 1, thereby missing a valuable tool for predicting whelp date with some degree of accuracy (plus or minus

3 days) and to obtain some approximation of when ovulation occurred.

Progesterone Assays: Progesterone assays may be performed on urine or blood, although blood assays are usually most reliable. Anestrus bitches (bitches which are not in heat and are usually greater than 60 to 85 days from the previous heat cycle) and bitches early in their heat cycles (proestrus) have progesterone values less than 1 ng/ml. Progesterone will remain below 1 ng/ml until the day before the LH (lutenizing hormone) peak. The LH peak precedes ovulation by about two days. Progesterone is therefore used to get some approximation of when the LH peak occurred. The day of the LH surge is associated with blood progesterone values of about 2.1 to 2.9 ng/ml. The day following the LH surge is associated with blood progesterone values between about 3. 1 to 3.9 ng/ml. The day of ovulation is associated with values between 4 and 8 ng/ml. Progesterone continues to rise thereafter and remains high *whether the bitch is pregnant or not* for 60 to 80 days.

Progesterone assays should be interpreted in conjunction with vaginal smears. Only then can it be determined that a bitch with a value of less than 1 ng/ml is in proestrus or anestrus. In contrast, a bitch with a value of 9 ng/ml may have ovulated 3 days prior to testing or may be out of heat. Only vaginal smears would differentiate these two.

Not all progesterone assays are created equal. The gold standard for blood progesterone analysis is the radioimmunoassay, also called RIA. RIAs are performed only at major private or university laboratories. The RIA is the standard by which the accuracy of “in-house” test kits is compared. RIAs offer the distinct advantage that as long as the sample is obtained, handled, and shipped properly, it is fairly free from technical error. Another major advantage is that a precise numeric value for progesterone is

obtained. This becomes of critical importance when interpreting values between 1.5 and 8 ng/ml. While “per test” costs are higher than with “in house” test kits, this is usually offset by not having to test as frequently. I rarely have to perform more than two RIAs when timing bitches in my practice. With a good breeding history, I often only need one. To be practical, results from the RIA should be available within 48 hours. If they are not, “in house” test kits may be more advantageous.

“In house” test kits for progesterone are based upon the same principles as at home human pregnancy test kits. These tests may be run at your local veterinary clinic, or in the case of urine tests, by the breeder. Overall, most of these test kits are subject to a 20 to 30 percent inaccuracy rate. This should be kept in mind if bitches fail to conceive using this technology. They also are disadvantageous because they only provide approximation of progesterone values with a certain range. Most are designed to detect the *change* from various progesterone ranges. These ranges are often broad, such as from 1.5 ng/ml to 7 ng/ml. Obviously, there is a world of difference between these two values as regards interpretation. It is therefore necessary to detect the first change from one range to the next. This requires frequent testing, starting early in the heat cycle. The tests are also very subject to minor technical errors, which may skew the result. For this reason, when I use these tests in my practice, I personally run them rather than risk unknown technical errors.

Progesterone values have great value for estimating time of ovulation and, if the breeding is successful, predicting whelp date. Bitches *consistently* whelp about 63 days from the day of ovulation. Therefore, progesterone testing, when performed properly, and particularly when RIAs are used, result in higher conception rates. Based upon the estimated ovulation date, I can also usually predict the expected whelp date plus or minus 48 hours. This can be invaluable when scheduling leave time for the

blessed event or when encountering whelping difficulties. To determine whelp date, count forward 63 days from the predicted ovulation date.

Luteinizing hormone or LH assays: Luteinizing hormone, or LH, is released by the pituitary gland. LH levels wax and wane early in the heat cycle, or proestrus. Ovulation in the bitch is preceded by a surge in LH levels by about 48 hours. This preovulatory surge in LH appears to be the most accurate prediction of when ovulation will occur. Until recently, LH testing was confined almost exclusively to university laboratories. International Canine Genetics, also known as ICG, has now developed an "in house" test kit for LH. This test kit is available to veterinarians and is a blood test that is technically easy to perform. A test kit containing six tests may be ordered from ICG and received within 24 hours. LH testing must begin early in the heat cycle, ideally by the fourth day from when vaginal discharge is noted. Testing for LH must be performed daily, as the preovulatory surge of LH is transient and easily missed. Ideally, bitches should be tested at the same time every day. Vaginal smears and progesterone assays should be performed simultaneously, although daily testing for these is not necessary. To date, I have been extremely impressed with LH testing and have been able to predict whelp date reliably within 24 hours. I presently feel that LH testing is a must for chilled and frozen semen breedings. LH testing may also be performed for bitches that are problem breeders or whenever an accurate prediction of whelp date is desired.

Having information on various timing procedures in hand, we are now able to discuss what you as a breeder can do to improve your breeding management program.

1. Good record keeping is the key to successful canine breeding management. Know and record heat start dates, whelp dates, results of vaginal smears and progesterone assays, and record

when the bitch appeared to go out of heat, either behaviorally or by vaginal smear. Even in the virgin cycling bitch, recording length and dates of heat cycles will prove useful at the time of future breeding.

2. Learn to perform vaginal smears or be willing to have them done frequently throughout the heat cycle. International Canine Genetics (ICG) provides both instructional materials and the tools necessary to perform vaginal smears. In some instances, I have taught breeders to collect smears, which I then interpret in groups at a later time. This saves on the need for daily hospital visits.

3. If breeding without timing procedures or prior breeding history, breed every second or third day from the time the bitch is in "standing heat" to when the bitch will no longer stand. Beware the stud owner who will only perform two breedings and does not provide availability to timing procedures! Many bitches will be missed if only bred twice without the benefit of timing procedures.

4. Utilize all tools available, i.e. prior history, vaginal smears, progesterone assays and possibly LH testing, if the bitch has prior conception failures, small litters, or if you have an important or expensive breeding.

5. If shipping your bitch a long distance, check on the availability of timing procedures and of artificial insemination before you book the breeding.

6. Remember that timing procedures are essential for chilled or frozen semen breedings, due to the decline in semen quality induced by these procedures.

Below is a summary of the various methods of determining the day of ovulation:

1. Count 12 days forward from the day of first bleeding (proestrus day 1). Accuracy poor!
2. Count 2 days forward from the onset of "standing heat" or from first estrus vaginal smear. Accuracy poor!
3. Count backward 63 days from whelping at previous pregnancy. Accuracy better than 1 and 2, as most bitches ovulate at a fairly constant time of their cycle throughout their lives. Disadvantage-must have previous pregnancy to evaluate.
4. Count backward 6 days from the first diestrus vaginal smear. Accuracy high, but information is retrospective.
5. Count forward 2 days from first rise in progesterone to a value of about 2ng/ml. Accuracy good, but dependent on method of progesterone analysis.
6. Count forward 2 days from the day of the LH peak. Accuracy very high. LH testing should be accompanied by vaginal smears and progesterone assays to cross check results.

Remember that one of the greatest values of timing procedures is the ability to accurately predict whelp date. Once the day of ovulation is determined, preferably by methods 4, 5, or 6 above, count forward 63 days to predict whelp date.