

**Winter 2021**

**BFCA Health Committee: Mayno Blanding, Paula Hendricks,**

 **Vickie Halstead, Amy Walters**

 **Laura Winston, Ginny Humphrey**

 **Nancy McDonald, chairman/editor**

**Correction to PPCP**

**Grant Update**

**Tips for Breeding (pp 2-9)**

**Chic 5\* (separate attachment)**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Purina Parent Club Program**: In the last issue of Health Times, it stated that to participate in the PPCP program, one needed to send in “circles” from the bag purchased. Evidently, someone was able to duplicate the circles. Consequently, one must now send in copies of the receipt.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**The grants BFCA supported in 2019**, **Grant 02653-A:** Evaluation of the Serum and Cutaneous Levels of Chemokines in Atopic Dogs, and **Grant 02518:** The Effects of Early Life Experience on Working Dog Temperament and Cognition are continuing with some limitations due to Covid 19. A detailed review will be available at the 2021 National Specialty.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Tips for Breeding:** Some persons receive paper copies of Health Times which is costly to mail. In addition, some digital copies are troublesome due to the length of the article. For those reasons, Tips for Breeding will be the only article included in this issue.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**TIPS FOR BREEDING TO ACHIEVE PREGNANCY AND OPTIMAL LITTER SIZE**

**Vickie Halstead RN, CVNS, CLNC, HTA-1, Reiki Master**

**Estrous cycle (heat cycle) of the bitch**

1. How often bitches have estrous cycles is determined by:
2. Breed of dog
3. Size of dog:  small breeds can cycle 3 times/year while giant breeds can cycle once per year
4. Young bitches can cycle irregularly, and become more regular after 2 years of age
5. Health and age of the bitch
6. There is no season of the year that corresponds to estrous cycles
7. Anatomy:  follicles are sacs in the ovaries that each contain an immature egg
8. Ovaries of bitches contain thousands of follicles at birth (a limited number), which decrease as the bitch ages
9. Each bitch has a lifetime limit of numbers of eggs that decrease after each ovulation
10. A similar number of eggs are produced with the ovulation of each estrous cycle
11. As each follicle and its egg develop, it causes gradual increase in estrogen
12. Stage 1:  Proestrus = preparing for mating, lasts about 9 days
13. Pituitary gland in the brain releases follicular stimulating hormone (FSH) that stimulates maturation of the follicles in preparation for ovulation
14. Estrogen is released from follicles 🡪 peaks 2-3 days prior to proestrus
	1. Prepares reproductive tract for breeding
	2. Causes a scent that encourages attraction of male to the bitch
	3. Causes vulvar swelling and vaginal discharge

4. Stage 2:  Estrus = time to breed, lasts about 9 days

1. Release of luteinizing hormone (LH) from the pituitary gland causes a surge of LH that triggers ovulation
	1. LH causes thinning of follicles that then rupture
	2. Eggs are then released from follicles into the fallopian tubes
	3. Flagging begins
	4. Progesterone begins to rise
2. 2 days after LH surge numerous immature eggs (ova) are released from the follicles **over a 24 hour period** (ovulation)
3. Release of eggs from follicles causes a further, rapid rise in progesterone
4. Eggs released require 2-3 days to mature enough to allow fertilization with sperm, which occurs in the tubes of the ovaries (fallopian tubes)

5. Stage3:  Diestrus = either a pregnancy or no pregnancy period, lasts about 60 days

1. Time of progesterone dominance
	* Stimulates secretion of nutrients to puppies prior to implantation
	* Stimulates mammary development
2. Fertilized eggs move into the uterus 8-9 days after ovulation
3. Placentas start to develop at about 14 days after ovulation
4. Fertilized eggs implant into the uterine wall 16-18 days after ovulation

6. Stage 4:  Anestrus = uterus is preparing for the next pregnancy, lasts 2-8 months

Period of reproductive inactivity



**Tracking heat cycles**

1. Note the number of months between heat cycles to predict her next season to help you plan for her next mating.  Bitches tend to keep regular cycles, except after having a litter (1-2 months late) or exposure to another bitch in season (1-2 months early).
2. Record date of the beginning of each heat cycle.
3. **Bitches tend to ovulate on the same day with each heat cycle**, but you need to find the actual beginning of the heat cycle by using a consistent method in order to be accurate.
4. If you detect the exact first day of her heat cycle, you will know which day she ovulates during her heat cycle.  Once progesterone testing determines ovulation day, and if you are vigilant with detecting the beginning of her heat cycle, you  may be able to determine ovulation day for her next heat cycle.  If successful, you will not need to spend money again on blood tests for ovulation timing.  If you miss the first day of her next heat cycle, you will need again to get progesterone levels for ovulation timing.
5. Determine the first day of bitch’s heat cycle by:
6. Being aware of when she is due to come in season
7. Checking her at least daily for a month prior to her next suspected heat cycle date
8. Observing swelling of vulva that usually precedes color changes in vaginal drainage
9. Watching for more frequent urination and cleaning/licking her vulva often
10. Noticing interest by males
11. Finding color (tan or light pink) on a Q-tip when inserted into vagina about 1/2 inch for small dogs and at least an inch for medium dogs = first day of heat cycle
* If the Q-tip shows red or you observe red drainage, you missed the first day

**Determine ovulation day to achieve pregnancy**

1. Most bitches ovulate on day 10-12 of their heat cycle, but many variations exist.
2. Obtain a progesterone level blood test on about day 3-5 after finding color in vaginal drainage, continuing every 2-3 days until the results reflect ovulation completed (>5.0).

**Progesterone values**    **US values ng/ml** **Canadian values nmol**

* + < 1.0 = anestrus or proestrus (early) 3
	+ 1.0-1.9 = should ovulate in 3 days 6
	+ 1.25-1.5 = rises faster after this level
	+ 2.0-2.9 = should ovulate in 2 days (LH surge) 8-12
	+ 3.0-3.9 = should ovulate in 1 day 12
	+ 4.0-4.9 = ovulation is in progress 12-24
	+ 5.0-6.0 = all eggs have been released > 24
	+ >10 = ovulation plus 1-5 days
	+ >20 = peak fertilization time
1. Ovulation failure can occur if progesterone does not rise to > 5.0-8.0
	* 1. Serial progesterone tests must be done to determine a trend
		2. Consider that a rise in progesterone to > 3.0 does not predict that the bitch will ovulate or when she will ovulate – some bitches can stall (plateau) for 1-2 days
		3. **Obtain serial progesterone tests to assure the value is > 5.0 prior to  choosing breeding dates!**
2. The LH surge (correlates to progesterone of 2.0-2.9) is a trigger for ovulation, another blood test that can be done. Ovulation begins 2-3 days after LH surge (2.5-3.8).  However, LH surge is short lived (24-48 hours) so can be missed.
3. Bitches **start labor 9 weeks (63 days) from ovulation day, ± 1 day.**  Knowing this allows you to schedule time to be available for whelping.  Keep in mind that the early stage of labor (nervous, nesting) may last 8-24 hours prior to the beginning of active labor (pushing).
4. Many breeders state that their bitch is due to whelp a certain number of days after the last breeding—NOT TRUE!  Some stud dogs will breed them too early or too late.  **The key to determining when she will whelp is to pinpoint the day of ovulation, not when she is bred!**
5. Bitches tend to ovulate on the same day of each heat cycle. If you did not do progesterone levels to determine ovulation day prior to a pregnancy, count back 9 weeks from the day that early labor began.  This will give you ovulation day, ± 1 day for the next time you breed her.  Again, you must know the exact first day of her heat cycle for this prediction!

**Pinpoint ideal breeding time to achieve pregnancy and optimal litter size**

1. After ovulation is completed, the bitch’s eggs live for 4-6 days.  2-3 days is required for eggs to be mature enough to accept sperm (ripeness).  The eggs remain fertile for another 2-3 days.
2. Eggs are ripe 2-3 days after ovulation is completed (progesterone > 5.0)
3. Eggs are ripe all day of day 4 after ovulation is completed (progesterone > 5.0)
4. Eggs are in the process of dying on day 5 after ovulation is completed

2. Fertile period is progesterone >20, 2-4 days after ovulation, and 4-6 days post LH surge

3. The prime time to breed is therefore 3-4 days after ovulation begins (progesterone 4.0-5.0)  or 2-3 days after ovulation is complete (progesterone > 5.0).

4.  Consider the life span of sperm when breeding

1. Fresh ejaculation at time eggs are ready to be fertilized is optimal
2. Live (natural breeding or side-by-side AI) 4-6 days
3. Fresh chilled with extenders after insemination 1-3 days
* semen extenders are used to protect sperm from toxins & bacteria, and to provide nutrients & cooling buffers
1. Frozen after surgical intra-uterine deposition 12-24 hours

5.  Typically after ovulation the vaginal drainage changes from red to a straw color, the bitch flags the male, and he is interested.  However, these signs are not reliable for accurate ovulation timing.

**Promote optimal health to achieve the largest litter size and to assure the bitch can withstand pregnancy, whelping, lactation, and raising puppies**

1. Feed a well-balanced diet
2. Provide access to clean water
3. Provide supplements:  fish oil, probiotics
4. Promote lots of exercise
5. Assure no parasites:  obtain tick borne diseases blood test (heartworm, lyme, etc) at least 1 month prior to breeding to allow time in case antibiotics are needed
6. Test for brucellosis (sexually transmitted disease)
7. Test for thyroid function (low thyroid causes issues with fertility, pregnancy, puppies)
8. Obtain veterinary wellness blood panel to detect hidden organ diseases (kidneys, liver, pancreas, diabetes)
9. Keep the genital areas clean of debris and hair to prevent infections

**Methods to diagnose pregnancy**

1. Palpation by a veterinarian at 4-5 weeks after ovulation--accuracy reported at 88%
2. Ultrasound can be done at 25 days after ovulation with 94-98% accuracy
3. Optimal time is at 4-4.5 weeks after most significant breeding (progesterone > 5.0), indicating day that pregnancy started
* If < 4 weeks of age pups may be too small to visualize
* If > 4.5 weeks of age pups may be large enough to hide other puppies, causing an inaccurate count
1. May be useful at 5-6 weeks after ovulation when timing is too late for palpation and too early for xray

3. Xray can be done at 6 weeks after ovulation, but preferably in the final week of pregnancy when puppies are fully mineralized (more visible on xray).  Xray is 100% accurate for pregnancy, and very accurate at determining litter size and position of puppies.  If fetal teeth are seen via xray, whelping is predicted in 3-8 days.

 4. Hormone assays (see chart below):

1. Relaxin (hormone released from the fetal/placental units) is specific for pregnancy.  Is most accurate at 4 weeks, and peaks at 6-7 weeks after ovulation.
2. Prolactin (hormone that stimulates and sustains lactation) is specific for pregnancy when it rises 4 weeks after ovulation (mid gestation), but tests may not be available.



**Below is a chart that may be helpful for your breeding program**

**BREEDING AND PREGNANCY CHART**

**SIRE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DAM \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**WHELPING DATE \_\_\_\_\_\_ NUMBER OF PUPPIES \_\_\_ SEX OF PUPPIES\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **DATE** | **RESULTS** | **COMMENTS** |
| **1st Day of Season** |  |  |  |
| **Progesterone #1** |  |  |  |
| **Progesterone #2** |  |  |  |
| **Progesterone #3** |  |  |  |
| **Progesterone #4** |  |  |  |
| **Vaginal Smear** |  |  |  |
| **Breeding #1      Tie?  AI? Surgical?** |  |  |  |
| **Breeding #2      Tie?  AI? Surgical?** |  |  |  |
| **Breeding #3      Tie?  AI? Surgical?** |  |  |  |
| **Ultrasound** |  |  |  |
| **Xray** |  |  |  |
| **Decreased Appetite** |  |  |  |
| **Mucous Vaginal Drainage** |  |  |  |
| **Whelping Date** |  |  |  |
| **Temperature** |  |  |  |
| **Temperature** |  |  |  |
| **Temperature** |  |  |  |
| **Temperature** |  |  |  |
| **Temperature** |  |  |  |
| **Temperature** |  |  |  |

**Created October 2008 by Vickie Halstead             Updated November 2020**

**The whelping window: predicting when puppies will arrive**

1. 62- 64 days after progesterone reaches > 5.0 (ovulation is completed)
2. 64-66 days after LH surge
3. Predictions are inaccurate if based on breeding dates
4. Runt pups are same age as other pups but placenta formation may have been inadequate.
	1. All eggs are released over 24 hour time period, are fertilized at almost the same time, and float free for 17 days until uterine implantation and formation of the placentas.
5. How litter size can impact early onset labor versus overdue labor
	1. Canine placentas only last so long and begin to deteriorate rapidly at the end of the whelping window.  Overdue bitches may need C-section.
	2. Very large litters are likely to arrive early or at beginning of whelping window
	3. Small litters are likely to arrive near the end of the whelping window
6. Signs that whelping will be within a week:
	1. Nesting begins
	2. Rectal temperature done 3-4 times per day remains >99 degrees
7. Signs that whelping will be within a day (Stage 1 labor):
	1. Progesterone drop to 1.0-2.0 = will whelp in 18-30 hours
	2. May last from 6-12 hours or up to 24 hours
	3. Temperature drops at least 1 degree, to < 99 degrees = labor will start in 8-24 hours
	4. Mild contractions that are not visible while cervix opens gradually
	5. Restless, nesting more vigorously
	6. May refuse food or vomit
	7. Shivering, panting, pacing
	8. Clear, mucoid vaginal discharge
8. Signs of Stage 2 labor
	1. Visible abdominal contractions to expel puppies
	2. Presentation of 1-2 round golf ball-sized sacs of tan or pale green water may precede puppy or may rupture before puppies arrive (may be the uterus horn sac, helps lubricate birth canal)
	3. Puppies are whelped
9. Stage 3 labor involves delivery of any placentas that did not arrive with the puppies
	1. Keep track of numbers – retained placentas can cause uterine infection
	2. Dogs instinctively eat them to keep den clean in the wild, thus preventing predators. Do not allow dog to eat placentas – they do not contain needed nutrition and often cause diarrhea if ingested.

**Created November 2020**

**Vickie Halstead, RN,** has been actively involved in breeding and showing Bichons since 1990, producing 35 litters and >50 AKC champions.  In 2005 her Bichon Asti won best in show at the Bichon national specialty -- handled, groomed, and bred by her.  She has been a member of the Bichon Frise Club of America (BFCA) since 1997, has been a member of BFCA’s Health Committee since 2001 and chairwoman 2003-2010, and was a member of the Board of Directors of BFCA 2005-2007.   She has published articles in the Bichon Frise Reporter, dog magazines, on [www.bichonhealth.org](http://www.bichonhealth.org), and newspapers.  Vickie purchased her first Portuguese Water Dog in 2017 who is almost a champion, with plans for breeding and performance competition. She is a member of the Portuguese Water Dog Club of America (PWDCA) and its health committee since 2018.  Vickie has been practicing as a Registered Nurse for 47 years, retired in 2017 after previous experience in ICU, flight nursing, ER for 25 years, legal nurse consultant, speaker for nursing classes/seminars, and Coumadin Nurse at a clinic (continues per diem).  Currently she operates a healing service primarily for dogs, but also humans, that offers energy healing (reiki, healing touch), aromatherapy & essential oils, canine nurse midwifery, puppy fostering, plus limited grooming and boarding.  <https://www.victoireshealingandbreeding.com>

**Selected References**

1. The Dog Breeder’s Guide to Successful Breeding and Health Management, 2006, by Dr. Margaret V. Root Kustritz DVM, PhD, DACT, Professor University of Minnesota Veterinary School.
2. Small Animal Theriogenology, 2003, by Dr. Margaret V. Root Kustritz DVM, PhD, DACT, Professor University of Minnesota Veterinary School.
3. The Joy of Breeding Your Own Show Dog, 1980, by Ann Seranne.
4. Canine Reproduction and Whelping, A Dog Breeder’s Guide, 2005, by Myra Savant-Harris RN.
5. Born to Win, 1997, by Patricia Craige Trotter.
6. <https://www.akc.org/expert-advice/dog-breeding/timing-ovulation/>
7. <https://www.vin.com/apputil/content/defaultadv1.aspx?pId=11372&id=5709846&print=1>
8. <https://www.akcchf.org/educational-resources/podcasts/podcast-transcripts/Whelping-and-Dystocia-Dr-Cindy-O-Connor.pdf>
9. <https://www.akcchf.org/educational-resources/podcasts/podcast-transcripts/Fresh-Chilled-Semen-Breedings-Part-II-Brood-Bitch-Dr-Scarlette-Gotwals.pdf>
10. <https://www.akc.org/expert-advice/dog-breeding/tips-for-success-with-fresh-chilled-semen-breedings/>
11. <https://www.vin.com/apputil/content/defaultadv1.aspx?pId=11165&meta=Generic&id=3848666>
12. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/semen-extenders>