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The Dog Heat Cycle Explained

Stages, Signs and Timing of the Estrous Cycle

The canine “heat” cycle — the bitch's estrous cycle — runs in four stages: proestrus, estrus, diestrus and anestrus.

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IN SHORT

The canine "heat" cycle — the bitch's **estrous cycle** — runs in four stages: **proestrus, estrus, diestrus and anestrus**. A bitch cycles roughly every 6–7 months, non-seasonally and monoestrously, driven by a rising-then-falling oestrogen curve, a single LH surge that triggers ovulation, and a long progesterone-dominated luteal phase. Knowing exactly where she is in the cycle is the key to timed breeding, spotting pyometra risk, and planning a spay.

KEY POINTS

1. The bitch is **monoestrous and non-seasonal** — one ovulation per cycle, roughly twice a year, at any time of year.
2. The four stages always run **proestrus → estrus → diestrus → anestrus**, each with a distinct hormone profile and behaviour.
3. **Proestrus** = rising oestrogen, bloody discharge and vulval swelling — but she still *refuses* the male.
4. **Estrus** = standing heat; the **LH surge** triggers ovulation and the switch to progesterone.
5. The bitch ovulates **primary oocytes** that need ~2 more days to mature — so peak fertility is several days *after* the LH surge, not at the start of estrus.
6. **Diestrus** is a long luteal phase (~2 months) whether or not she conceives — the basis of pseudopregnancy and of pyometra risk.
7. **Serum progesterone** is the practical tool for timing ovulation and the optimal breeding window.

01 What is the heat cycle? The canine estrous cycle

The "heat" cycle is the bitch's **estrous cycle** — the recurring sequence of hormonal and physical changes that prepares her to mate, ovulate and (if she conceives) carry a litter. Two features make the dog distinctive among domestic animals: she is **monoestrous** — a single ovulation per cycle rather than repeated cycles in a season — and she is **non-seasonal**, cycling at any time of year rather than only in spring or autumn.

A bitch reaches puberty and her first heat at roughly **6–12 months** (earlier in small breeds, later in giant breeds), then cycles about **every 5–7 months** for life — there is no menopause. Each cycle runs through four stages in a fixed order: **proestrus, estrus, diestrus and anestrus**.

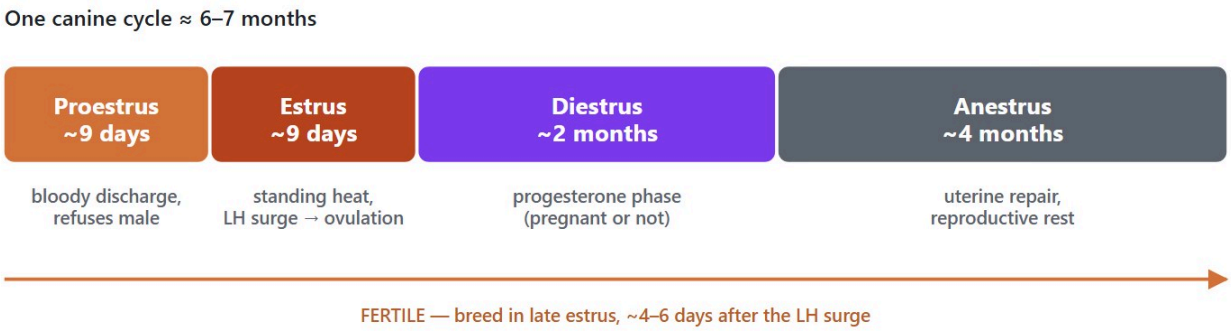


Fig 1 — The four stages of one canine cycle. Proestrus and estrus (the visible "heat," ~3 weeks together) are short; diestrus and anestrus make up most of the ~6-month interval.

02 Proestrus — the bleeding begins

Proestrus is the opening stage and the first sign owners notice. Under rising **oestrogen** from the developing ovarian follicles, the vulva swells and firms and a **serosanguineous (bloody) discharge** appears. This is the classic "a dog in heat" picture — yet behaviourally she *attracts* males but **refuses** to stand for mating.

Proestrus lasts about **9 days** but is highly variable (3–17). Through it, oestrogen drives the reproductive tract to prepare — endometrial proliferation, cervical relaxation, and the vaginal changes (cornification) that can be tracked on cytology to estimate how close estrus is.

03 Estrus — standing heat

Estrus is the fertile, receptive stage — "standing heat." The bitch now **accepts the male**, stands to be mounted, deviates her tail ("flagging"), and the discharge typically lightens from bloody to straw-coloured. Here is the point that surprises most students: oestrogen alone only makes a bitch *attractive* to males — it is the **rising progesterone at the LH surge**, acting on an oestrogen-primed brain, that actually makes her *receptive* enough to stand. The behavioural switch tracks the **oestrogen-to-progesterone hand-over**, not any single hormone.

The defining hormonal event happens at the proestrus–estrus transition: a sharp **luteinising hormone (LH) surge**. Estrus lasts about **9 days** (3–21). Crucially, behavioural estrus and the true fertile window do not line up exactly — which is why timing matters so much (see below).

PROESTRUS		ESTRUS (standing heat)	
VULVA	Very swollen, firm	VULVA	Softer, "crinkled"
DISCHARGE	Bloody (serosanguineous)	DISCHARGE	Lightens to straw-coloured
BEHAVIOUR	Attracts but REFUSES male	BEHAVIOUR	STANDS, flags tail
DOMINANT HORMONE	Oestrogen ↑	DOMINANT HORMONE	LH surge → progesterone ↑

Fig 2 — Proestrus vs estrus at a glance. The single most useful clinical distinction is behaviour: refusing the male (proestrus) versus standing for him (estrus).

04 The hormone curve through the cycle

Four hormones tell the whole story. **FSH** and **oestrogen** drive follicle growth and the proestrus signs. A single **LH surge** triggers ovulation. Then **progesterone** — from the corpora lutea that form at the ovulation sites — dominates the long second half of the cycle.

The dog has one quirk that sets her apart: progesterone begins to rise **before** ovulation, around the LH surge, because the follicles start luteinising early. That early progesterone rise is exactly what makes serum progesterone such a reliable breeding-timing tool.

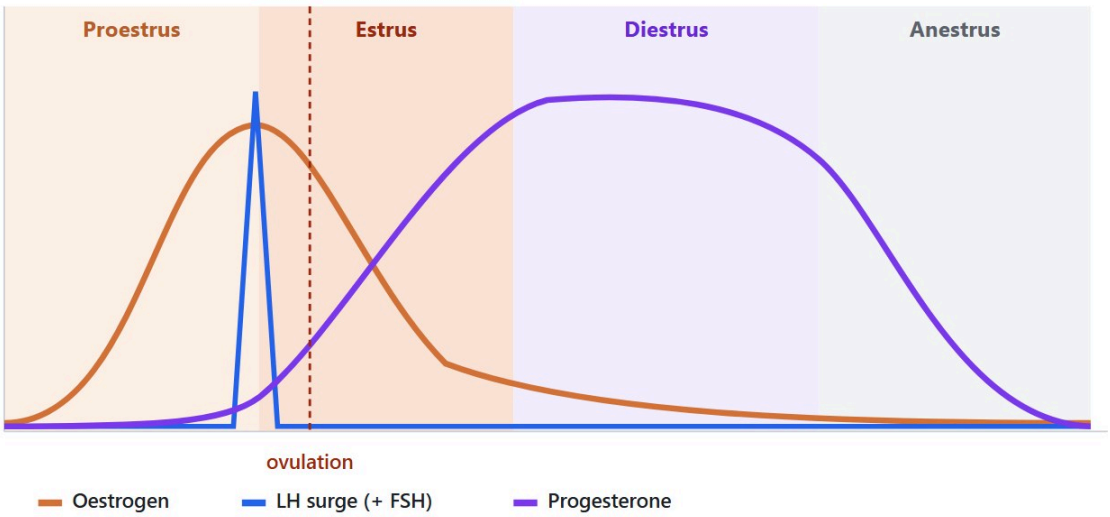


Fig 3 — Oestrogen peaks late in proestrus and falls; the LH surge spikes at the proestrus–estrus border; progesterone rises from the surge onward and stays high through diestrus.

For students Remember the order of dominance: oestrogen (proestrus) → LH spike (transition) → progesterone (estrus into diestrus). Behaviour follows the oestrogen-to-progesterone switch, not a single hormone.

05 Ovulation & the fertile window

Ovulation occurs about **2 days after the LH surge**. But the bitch is unusual: she ovulates **primary oocytes** that are not yet ready to be fertilised. They need a further **~2 days** in the oviduct to complete maturation. So the truly fertile window opens roughly **4 days after the LH surge** and lasts a few days.

This is why a mating on the first day a bitch "stands" can miss, and why breeders rely on testing rather than behaviour alone. The dog compensates for her late-maturing eggs in a remarkable way: **sperm survive an unusually long time — about 6–11 days** in the female tract — so they can effectively "wait" in the oviduct for the oocytes to ripen. That widens the window, but the principle holds: **peak fertility is several days into estrus, not at its start.**



Fig 4 — The fertile window relative to the LH surge: ovulation at ~Day 2, oocytes mature by ~Day 4, and eggs stay fertilisable through ~Day 7.

STAGE	DURATION	DOMINANT HORMONE	DISCHARGE	ACCEPTS MALE?
Proestrus	~9 d (3–17)	Oestrogen ↑	Bloody	No
Estrus	~9 d (3–21)	LH surge → progesterone ↑	Lightens (straw)	Yes — standing heat
Diestrus	~2 months	Progesterone	Scant / none	No
Anestrus	~4 months	Baseline (low)	None	No

06 Diestrus — the long luteal phase

After estrus comes diestrus, the **luteal phase**. The corpora lutea secrete **progesterone** for about **2 months** — and here is the dog's most clinically important quirk: this luteal phase is essentially the **same length and hormone profile whether or not she is pregnant**. The non-pregnant bitch has no "signal" to shorten it.

Two consequences follow. First, **pseudopregnancy** (false pregnancy) — the progesterone-then-prolactin pattern can produce nesting, mammary development and even lactation in a bitch that never conceived. Second, this prolonged progesterone exposure primes the uterus and is the physiological setup for **pyometra**, the dangerous post-heat uterine infection.

> ~2 mo The canine luteal phase runs about two months — roughly the length of pregnancy itself (~63 days) — and it plays out in *every* cycle, pregnant or not. That prolonged progesterone exposure is why pyometra so often follows a heat by 4–8 weeks.

07 Anestrus — reproductive rest

Anestrus is the quiet phase between cycles: roughly **4 months** of low baseline hormones during which the **uterus repairs and remodels** its lining, ready for the next cycle. There are no external signs. The length of anestrus is the main reason the inter-cycle interval averages about six months, and breed differences in anestrus length explain why some bitches cycle more or less often.

The transition out of anestrus into the next proestrus is driven by the slow return of FSH and pulsatile GnRH/LH — restarting follicle growth and the whole sequence again.

08 Clinical applications — breeding, pyometra & spaying

Timed breeding. Because the fertile window is several days after the LH surge, the practical standard is **serial serum progesterone** testing through proestrus/estrus. Progesterone is ~2 ng/mL at the LH surge, ~4–10 ng/mL at ovulation, and the **optimal natural or AI breeding window is ~2–4 days after ovulation** — when the oocytes have matured.



Fig 5 — Serum progesterone rises predictably, so it pinpoints the LH surge, ovulation, and the best breeding window far more reliably than behaviour or vaginal cytology alone.

Pyometra. The normal diestrus progesterone surge primes the endometrium; if bacteria (often *E. coli*) ascend, a pus-filled uterus develops, classically **4–8 weeks after a heat**. An entire middle-aged bitch with vulval discharge, lethargy and increased drinking after a season is a pyometra until proven otherwise.

Post-heat red flag

Lethargy, increased thirst, and vulval discharge in an entire bitch 4–8 weeks after her season = suspect **pyometra** — a surgical emergency. Don't "wait and see."

Spaying & silent heats. Spaying (ovariohysterectomy) is ideally done in **anestrus**, when the reproductive tract is quiet and least vascular. Some bitches have **"silent" heats** — they ovulate with minimal external signs — which is why owners aiming to breed are advised to test rather than rely on watching for blood.

09 Quiz: test yourself

Sixteen questions across the four stages, the hormone curve, the fertile window and the clinical consequences of a two-month luteal phase. Answers are beneath each question — cover them and work down.

1. At what age does a bitch first come into heat, and how often does she cycle after that?**Answer:** First heat at roughly **6–12 months** — earlier in small breeds, later in giant ones — then about every **5–7 months** for life. There is no menopause.2. What are the four stages of the cycle, in order?**Answer: Proestrus → estrus → diestrus → anestrus.** The order is fixed; only the durations vary.3. What are the signs of proestrus, and how long does it last?**Answer:** Rising oestrogen from developing follicles swells and firms the vulva and produces a **serosanguineous (bloody) discharge**. About **9 days**, but highly variable — 3 to 17.4. What defines estrus, and how does the discharge change?**Answer:** The bitch **accepts the male** — "standing heat" — stands to be mounted and deviates her tail (flagging). The discharge typically lightens from bloody to **straw-coloured**.5. Which hormones drive proestrus, and what event ends it?**Answer: FSH and oestrogen** drive follicle growth and the proestrus signs. The **LH surge** is the pivot into estrus and the reference point for everything that follows.6. How long after the LH surge does ovulation occur?**Answer:** About **2 days**. The LH surge, not the first day of bleeding, is the event worth timing from.7. Why is the fertile window not the moment of ovulation?**Answer:** Canine oocytes are ovulated **immature** and need a further **~2 days** in the oviduct to finish maturing. So the window opens roughly **4 days after the LH surge** and lasts a few days.8. How long do canine sperm survive in the female tract, and why does that matter?**Answer:** About **6–11 days** — unusually long. Sperm can effectively wait in the oviduct for the oocytes to ripen, which widens the practical breeding window.9. How long is canine diestrus, and what makes it clinically unusual?**Answer:** The corpora lutea secrete progesterone for about **two months** — and that luteal phase is **essentially the same length and hormone profile whether or not she is pregnant**. The non-pregnant bitch has no signal to shorten it.10. Roughly how long is canine pregnancy, and how does it compare with the luteal phase?**Answer:** About **63 days** — roughly the length of the luteal phase itself, which is why progesterone alone cannot tell you whether a bitch is pregnant.11. What is anestrus, and how long does it last?**Answer:** The quiet phase between cycles: roughly **4 months** of low baseline hormones while the uterus repairs and remodels its lining.12. What progesterone concentrations mark the LH surge and ovulation?**Answer:** About **2 ng/mL at the LH surge** and **4–10 ng/mL at ovulation**. Serial serum progesterone through proestrus and estrus is the practical standard.13. When is the optimal breeding window relative to ovulation?**Answer:** About **2–4 days after ovulation** — roughly 4–6 days after the LH surge — once the oocytes have matured.14. Why does pyometra characteristically follow a season, and at what interval?

Answer: Prolonged progesterone exposure through the two-month luteal phase primes the uterus; bacteria such as *E. coli* ascend and a pus-filled uterus develops classically **4–8 weeks after a heat**.15. An entire bitch is lethargic, drinking more and has a vulval discharge six weeks after her season. What is the working diagnosis?**Answer: Pyometra** until proved otherwise — a surgical emergency, not a wait-and-see.16. What is a silent heat, and what does it imply for breeders?**Answer:** A cycle in which the bitch **ovulates with minimal external signs**. It is the reason breeders are advised to **test progesterone rather than watch for blood**.

10 Dog heat cycle — frequently asked questions

What are the 4 stages of a dog's heat cycle?

Proestrus (bloody discharge, swelling, refuses the male), estrus ("standing heat," accepts the male, ovulation), diestrus (the ~2–month progesterone/luteal phase), and anestrus (~4 months of reproductive rest).

How often does a dog come into heat?

About every 5–7 months on average, with no fixed season and no menopause. The interval is breed-dependent — some (e.g. the Basenji) cycle only once a year.

When is a dog most fertile in her heat cycle?

In late estrus — roughly 4–6 days after the LH surge (about 2–4 days after ovulation), once the ovulated oocytes have matured. Serum progesterone testing pinpoints it far better than counting days or watching behaviour.

Can I download these dog heat cycle study notes as a free PDF?

Yes — these are complete canine estrous-cycle study notes, free to download as a PDF with no signup. For more, browse our veterinary physiology study notes.

When to refer

- Vulval discharge + lethargy + increased thirst 4–8 weeks after a season — suspected **pyometra**; emergency, refer for imaging + surgery.
- Prolonged proestrus/estrus (>3–4 weeks) or persistent serosanguineous discharge — ovarian cyst / follicular cyst / granulosa-cell tumour; refer.
- Primary anestrus — no first heat by ~24 months — endocrine + karyotype workup (intersex, hypothyroidism, ovarian dysgenesis).
- Failure to conceive despite mating in apparent estrus — progesterone-timed breeding workup ± brucellosis screen before the next cycle.

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