

THE PROGRESSION OF THE ESTROUS CYCLE IN COWS

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Annotation: *This article provides a detailed overview of the phases of the estrous cycle in cows, including their duration and clinical-biological signs. The physiological and external characteristics of sexual excitement, estrus (heat), ovulation, inhibition, and quiescence phases are described. Furthermore, synchronous and asynchronous estrous cycles are distinguished, and the difficulties in identifying them are discussed. The paper also analyzes the estrus discharge phenomenon, follicular status, changes in sexual receptivity, and the impact of these conditions on the reproductive health of cows. It emphasizes that proper evaluation and management of the estrous cycle can prevent infertility and improve breeding practices.*

Keywords: *Cow, estrous cycle, sexual excitement, estrus, ovulation, estrus discharge phenomenon, corpus luteum, follicle, synchronous cycle, asynchronous cycle, infertility.*

The durations of the estrous cycle phenomena described below mainly apply to virgin cows; in cows that have mated several times, the duration of estrus is shorter, and ovulation occurs sooner.

In cows, the estrous cycle lasts **18–22 days**, with an average of **21 days**. Cows are polyestrous animals, and when properly cared for and fed, their cycles repeat throughout the year. Sexual excitement is more pronounced in the spring. The sexual

excitement phase usually appears **18–25 days after calving**, and the absence of estrus **30 days postpartum** may indicate anestrus or some type of infertility.

The sexual excitement stage lasts **3–5 days**, averaging **98 hours in summer** and **84 hours in winter**. During the estrus discharge phenomenon, the vulva swells, the vaginal vestibule and vaginal mucosa become hyperemic, the cervical opening slightly dilates (sometimes allowing 1–2 fingers), the vaginal portion of the cervix loosens, and the folds flatten slightly, with occasional post-coital bleeding. A clear, viscous, stringy mucous secretion emerges from the vaginal slit, which has bacteriostatic and bactericidal properties. This secretion is observed from the beginning of estrus discharge, peaks in the middle, and sharply decreases toward the end. Toward the end, the vaginal mucus thickens, becomes slightly turbid, and sometimes contains blood, which is more common in younger animals. Estrus discharge can sometimes be detected by dried mucus around the tail or perineum. Smears prepared from vaginal mucus contain many flat epithelial cells with barely visible nuclei or traces of nuclei; the pH ranges from **7.4–8.4**, with an average of **7.8**. Estrus discharge is more pronounced in cows kept on pasture compared to those confined in one place.

Signs of sexual excitement: Behavioral changes occur: the cow becomes restless, frequently vocalizes, avoids lying down, raises her tail, while appetite and milk production decrease, body weight slightly drops, body temperature rises by **0.8–1.2°C**, and heart and respiration rates increase. Milk resembles colostrum and has a mild laxative effect on young calves. Hemoglobin levels remain stable, though mild leukocytosis may occur. Cows frequently assume urination posture, mount other cows, and do not resist being mounted. Many authors mistakenly consider these behaviors as signs of estrus. Such cows often resist mounting by bulls.

Estrus (heat) lasts **10–23 hours**, typically **13–17 hours**, averaging **16 hours**. During winter, estrus is slightly shorter, averaging **13.8–14.8 hours**. In beef cows during lactation, estrus is shorter. In Aberdeen and Hereford breeds, estrus lasts about **12–14 hours**. During estrus, cows approach bulls, adopt mating posture, and do not resist mounting.

Ovulation typically occurs **10–15 hours after estrus ends** (approximately **28 hours after estrus onset**) and most often happens at night (**85.2% of cases**). Controlled cohabitation with bulls helps manifest estrus discharge, sexual excitement, and estrus behavior more clearly, accelerates ovulation, and shortens the estrus period.

Ovulation can be detected through periodic rectal examination by observing changes in follicle consistency. At the beginning of estrus, follicles are firm and elastic; near ovulation, they become fluctuating and enlarge to **2–2.5 cm**. After ovulation, a smaller depression remains at the site of the ruptured follicle. Within **6–8 hours**, the follicle becomes indistinguishable due to blood clot formation.

Formation of the sexual excitement phase: Typically, signs of estrus discharge appear first, followed **2–4 days later** by sexual excitement, and finally **4–15 hours later**, signs of estrus behavior emerge. Occasionally, sexual excitement appears first, followed by estrus discharge and estrus behavior. Therefore, two variants of the complete estrous cycle are recognized in cows: **synchronous and asynchronous cycles**.

With proper care, feeding, and management, estrus discharge, sexual excitement, and estrus behavior often occur simultaneously (**synchronous manifestation**). If the sexual excitement phase occurs asynchronously, the timing of these phenomena does not coincide. In such cases, if indicator bulls are not used, estrus in cows may not be detected in time, which can lead to artificially induced infertility.

The **inhibition phase** in cows lasts **1–3 days**. It begins with the disappearance of signs of sexual receptivity and sexual excitement and continues as the signs of the estrus discharge phenomenon gradually decrease. During this phase, the cow shows indifference to the bull and does not approach him. Upon rectal examination, in one ovary (rarely both), the site of a previously existing follicle may reveal a developing corpus rubrum (if ovulation has occurred) or a corpus luteum corresponding to the estrous cycle.

The **quiescence phase** lasts **6–14 days** and is characterized by the absence of fluid discharge from the reproductive organs. The vaginal vestibule and vaginal mucosa appear white to purple in color. The vaginal portion of the cervix protrudes slightly like a sponge. The cow's general condition remains normal, and her reaction to the bull is negative. Upon rectal examination, a relatively small, doughy-shaped corpus luteum can be palpated in a relatively large ovary. The surface of the ovary may show small nodules (minor follicles), and sometimes, alongside the corpus luteum, a pea-sized or larger fluctuating follicle may also be palpated.

Conclusion

The estrous cycle in cows lasts on average **21 days** and consists of five main stages:

sexual excitement, estrus (heat), ovulation, inhibition, and quiescence. Each stage is characterized by distinct external and internal signs. Accurate detection of the estrus and ovulation phases is particularly important for breeding purposes. The presence and characteristics of the estrus discharge phenomenon are directly related to the condition of the follicle. When a **synchronous estrous cycle** is present, the period of fertility in cows can be easily determined, whereas in **asynchronous cycles**, this process becomes more complicated. Proper feeding and management of cows play a crucial role in maintaining the regular rhythm of the estrous cycle.

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