

Breeding Habits of the Ewe

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Introduction

Reproduction is the beginning of a series of significant events involved in the production of lambs for market. Obviously, the higher the reproduction rate in ewes, the greater the chances of achieving maximum profit. For example, with 100 percent lamb crop sold (one lamb per ewe) the labor requirement is 3.5 hours per ewe or 28.6 lb. of lamb sold per hour of labor (assuming one lamb is marketed per ewe at 100 lb.). On the other hand, with 200 percent lamb crop sold, the labor requirement is only 4.4 hours per ewe or 45.5 lb. of lamb sold per hour of labor (assuming two lambs are marketed per ewe at 100 lb. each). A knowledge of the mating (breeding) habits of the ewe can improve the chances for higher reproductive rates, marketing more pounds of lamb per ewe, increasing the efficiency of labor use, and ultimately increasing the chances of greater profit.

The Ewe

Female sheep can reach puberty as early as 5 to 8 months of age. Estrogen (a hormone produced by the ovaries) secretion will be high enough to stimulate the ewe lamb to receive the ram in mating. However, from a practical standpoint, she is too young at 5 to 6 months to become pregnant. All ewe lambs should be at least 7 to 8 months before even given a chance to become pregnant.

The length of time when the ewe will accept the ram in mating is the **estrous period** (heat). This time period ranges from 20 to 42 hours (average = 30 to 35 hours). If the ewe is not allowed to mate with a ram or fails to conceive from a mating, it will be 16 to 17 days later before she will exhibit another estrous period. This 16- to 17-day period (from beginning of one estrous period [heat] to the beginning of the next) is called the **estrous cycle**. **Ovulation** (dropping of the egg from the ovary into the infundibulum of the reproductive tract) occurs during the last 6 to 10 hours of the estrous period.

Hormonal Relationships

Ewes in Kentucky typically are bred in August or September of each year. The hormonal relationships for an estrous cycle during this time of the year are shown in Figure 1.

Day 1 is the start of a 30-hour heat that occurs every 16 to 17 days. Let us assume that conception did not occur during the 30-hour heat on August 1 and 2. The corpus luteum on the ovary produces **progesterone**, which suppresses **FSH** (follicle-stimulating hormone) and **LH** (luteinizing hormone) production. The corpus luteum then atrophies and progesterone production decreases to day 1 of the next heat period (estrous period) on August 16 to 17. On about day 14, FSH production is increased and this stimulates growth of a follicle that holds a developing egg (**ovum**) to develop to maturity. The follicle ruptures and the ovum falls into the infundibulum at ovulation. Estrogen production increases on August 16 to 17 to stimu-

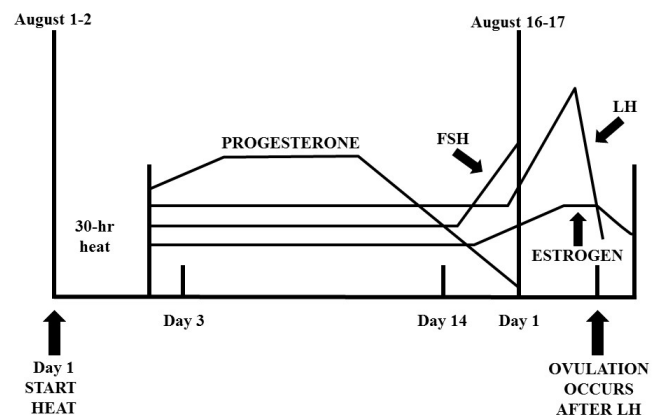


Figure 1. Hormonal relationships for an estrous cycle of the ewe.

late the ewe to receive the ram near the time of ovulation so fertilization can occur. After fertilization, the corpus luteum of the ovary, instead of atrophying, produces progesterone, which performs the following functions during pregnancy:

- Keeps other ova from being released from ovary (thus, keeps the ewe from exhibiting any heat during pregnancy)
- Reduces LH production
- Keeps the ewe pregnant (prevents abortion)
- Stimulates mammary development

Seasonal Breeders

In general, ewes are **seasonally polyestrous**. That is, they exhibit recurring estrous cycles if no conception occurs, but only in certain seasons of the year. The normal breeding (mating) season for ewes in Kentucky is in the fall of the year (October/November). This normal breeding season for ewes of all breeds has been expanded from August 15 to January 15 of each year. Today, breeding seasons for ewes are described as long (6 to 8+ months), medium (4 to 6 months), or short (fewer than 4 months) around the October/November normal breeding season. Table 1 shows the theoretical breeding seasons for ewes of some sheep breeds.

Ewes with long breeding seasons will typically mate (breed) during a year, at times other than the August 15 to January 15 period. Some of these ewes may breed throughout the year. These are called **out-of-season breeders**. Other ewes with long breeding seasons may be in **anestrus** during the spring, begin to show estrous activity in July and continue to exhibit regular estrous cycles until becoming pregnant or going into anestrus 6 to 8 months later.

Medium-length breeders show estrous activity for 4 to 6 months around the October/November center. These ewes may begin showing heat (estrus) in August and continue to do so for 4 to 6 months if they do not conceive. Short breeding seasons are the most restrictive. Ewes in this group usually begin cycling in September and continue until January 1. They are usually in anestrus for the remainder of a calendar year.

Seasonal breeders are in anestrus (ewes in the medium and short breeding seasons) in the spring and early summer. That is, they will not even cycle during this time. Other types of anestrus are pregnancy, post partum, and lactation. Progesterone prevents a return to estrus during pregnancy. After lambing, an average of 17 to 21 days is usually required before the reproductive tract will return to normal so ewes can begin to show estrous activity, if in the season of the year that will allow it. All ewes are in anestrus for at least 17 to 21 days after lambing, regardless of

Table 1. Breeding seasons for some ewes.

Short Season (<4 mos)	Medium Season (4 to 6 mos)	Long Season (6 to 8+ mos)
Columbia	Border Leicester	Barbados Blackbelly
Corriedale	Cheviot	Dorper/White Dorper
Hampshire	Cotswold	Dorset
Montadale	East Friesian	Finnsheep ^a
Shropshire	Icelandic	Katahdin
Southdown	Jacob	Merino
Suffolk	Lincoln	Navajo-Churro
Texel	Oxford	Polypay
Tunis	Romney	Rambouillet
	Shetland	Romanov
		St. Croix
		Navajo-Churro
		Targhee

^a In most cases, long breeding season implies onset early in the year; Finnsheep have a late onset (August/September), but a long season thereafter.

the season. Even if the season does not prevent heat 17 to 21 days after lambing, lactation probably will. It is assumed that ewes will not exhibit heat during lactation, although exceptions may occur.

The biggest reproductive problem in ewes is the **seasonal anestrus**. Most ewes will breed only in certain seasons of the year, making for cyclic lamb births, slaughter lamb marketing, and, thus, lamb meat availability. These cyclical occurrences cause significant differences in market prices of lambs throughout a given year. If all ewes would breed out-of-season, the supply of lambs for slaughter and, thus, for lamb meat consumption, could be spread more evenly throughout the year. Synchronization of estrus with exogenous hormones has attempted to stimulate greater out-of-season breeding. Although these hormones have produced enough success in research environments that some purebred operations have adopted their use, they have not been widely accepted in the commercial (non-purebred) sheep industry. This leaves these producers with two options: (1) manage ewes to try and promote as much out-of-season breeding as possible or (2) produce only ewes that will breed naturally out-of-season.

Factors Affecting Sexual Activity in the Ewe

Four main factors govern sexual activity in the ewe: daylight hours, temperature, relative humidity, and nutrition. **Daylight hours** is the primary factor. If the number of daylight hours is too long, ewes may not cycle. Since June 21 is the longest day of the year (daylight-wise), seasonal breeders will normally be in anestrus before this date. They will typically begin cycling when daylight hours become less than 14 after June 21. Maximum sexual activity occurs

when the daylight is 10 to 12 hours per day. **Temperature** is closely related to daylight hours. Ewes in anestrus will start to cycle when the average night temperature drops to 74°F. However, daylight hours may override this effect. **Relative humidity** is tied to temperature. For example, there will be more sexual activity at 90°F when the humidity is less than 50 percent than when greater than 50 percent. Although ewes may cycle in hot weather and may even conceive, they may not lamb. Why? Embryo mortality is highest in hot weather and this mortality is highest during the first five days after conception. Therefore, ewes may have a heat period, mate, and conceive, but not lamb. Shepherds may then conclude that long daylight hours and/or high temperatures prevented the occurrence of estrous periods (heats) in their ewes when it was actually embryo mortality.

Nutrition can also affect sexual activity. That is, if ewes are fed so their body condition is rising (gaining weight) at mating (breeding) time, we say we are **flushing** the ewes. Ewes typically ovulate 1 to 3, with an average of 1.5, eggs per ovulation. Flushing can increase ovulation rate and this can be manifested at lambing by increasing lambing percent by 15 to 20 percent. However, ewes that are fat when it is time to flush cannot be flushed effectively. Wise shepherds will “limit feed” their ewes instead of letting them get too fat prior to breeding. This feat is accomplished by

stocking pastures at heavy rates and/or allowing them to consume the poorest pasture possible. Then, about two weeks before turning the rams in with the ewes, begin to feed ewes 0.5 to 1.0 lb of concentrates (shelled corn, oats, barley, wheat) per head per day on the same pasture, or move the ewes from a heavily grazed, poor-quality pasture to a lush, stockpiled one, where they will remain for the duration of the breeding season.

Summary

A knowledge of the mating (breeding) habits of ewes can increase the potential for more profits for sheep producers. An appreciation for hormonal relationships within the estrous cycle of ewes can increase the understanding of behavioral patterns. Ewes of some breeds will have estrous cycles throughout the year (long breeding seasons) whereas others have restricted breeding habits (short breeding seasons). Although genetically controlled, these breeding seasons are further influenced by daylight hours, temperature, relative humidity, and nutrition.

Sheep producers probably can't do much to alter the forces of nature. But the more we know about these forces, the better our chances of being successful in working with nature to increase profitability. This seems to be especially true for reproduction in ewes.