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An Introduction to Sheep

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The information in this fact sheet was developed to provide a quick reference to the most frequently asked questions about sheep and sheep production.

“Normal” Sheep

All “normal” (healthy) sheep share certain characteristics and behaviors regardless of their breed or production environment. Table 1 shows some normal vital signs for sheep. Vital signs are measures of various physiological statistics. They can help determine if the sheep is sick or stressed. Table 2 lists normal ranges for some important production characteristics of sheep.

Types of Sheep Operations

There are two types of sheep operations: **purebred** (seedstock) and **commercial** (crossbred). Before getting started in the sheep business, prospective sheep producers have to decide which of these production types best fit their resources (experience, time, management techniques, labor, land, facilities and feed resources).

Purebreeding is the mating of rams and ewes of the same breed. In purebred sheep operations, purebred animals are kept to generate breeding stock or “seedstock.” Purebred producers market

Table 1. Normal vital signs for sheep

Trait	Range	Average
Rectal temp, °F	102 - 103	102.5
Heart rate, beats/min	70 - 90	75
Respiratory rate, breaths/min	10 - 20	20

Table 2. Production characteristics of sheep

Trait	Range
Birth weight, lb	5 - 12
Mature weight, lb	
Rams	105 - 400
Ewes	75 - 250
Weaning age, days	60 - 120
Life expectancy, years	10 - 12
Age at puberty, months	6 - 8
Length of estrous cycle, days	16 - 17
Length of estrous period (heat), hours	20 - 42
Time of ovulation, hours before end of heat	12 - 24
Length of gestation (pregnancy), days*	143 - 150
Lambing rate (lambs born per ewe)	1.5
Number of ewes a ram can service**	
Mature rams	30 - 40
Ram lambs	20 - 25
Semen volume/ejaculate, cc	0.7 - 3.0

*Average: 147 days

**35 d breeding season

Sheep Facts

Sheep were domesticated approximately 10,000 years ago in Central Asia.

Raising sheep is the oldest organized industry in the world.

There are over 1 billion sheep in the world.

China has more sheep than any other country in the world.

There are approximately 5 million sheep in the United States.

The top ten U.S. sheep states are: Texas, California, Colorado, Wyoming, Utah, South Dakota, Idaho, Montana, Oregon and Iowa.

There are over 50 breeds of sheep in the U.S. and as many as 900 different breeds around the world.

Adult female sheep are known as **ewes**.

Adult intact male sheep are called **rams** or **bucks**.

Male sheep castrated before puberty are known as **wethers**.

Sheep less than a year old are called **lambs**.

The act of parturition (giving birth) is called **lambing**.

A group of sheep is called a **flock**.

Ewes of many breeds are **seasonal breeders**, which means they successfully mate only during certain times of the year.

continued

superior genetics, or breeding value, to other purebred producers. In addition, purebred operations are the primary source of high quality breeding animals for commercial flocks, particularly for crossing with commercial ewes. Generally, it is more expensive to start a purebred operation than a commercial one. Purebred sheep are more expensive to produce, and additional expenses are involved in advertising and marketing. Raising purebred animals can be challenging because of the competition to

raise superior animals. Records and performance testing are a must to help the producer identify the most productive sheep in the flock. Enrollment in a performance record keeping program or NSIP (National Sheep Improvement Program) is a necessary requirement.

Crossbreeding is the systematic mating of ewes and rams of different breeds. Commercial (crossbred) sheep operations emphasize market lambs, therefore most commercial producers utilize crossbreeding. This practice gives their sheep the advantage of **heterosis**. Heterosis, or hybrid vigor, is the ability of crossbred offspring to increase in productivity over the average of the breeds that went into the cross. This means, for example, that a crossbred lamb could grow faster than either of its parents.

Breeds of Sheep

Sheep are bred for two major purposes: production of high quality or specialty wool and production of high quality lean meat (lamb). In addition, some sheep are specifically bred for milk production. The various breeds of sheep are a result of several decades or, in some cases, centuries of selection for these purposes. Sheep breeds can be classified as general purpose breeds, specialized dam breeds, specialized sire breeds or dairy breeds. In addition, the type of fiber they produce, wool or hair, classifies sheep. Table 3 lists several common breeds, their classification, average weights and outstanding characteristics.

General purpose breeds provide a balance between wool and meat. They can be used as either sire breeds or dam breeds in mating systems. General purpose breeds are adaptable to a wide range of environmental conditions. These breeds are the best choice for small flocks where crossbreeding is not feasible.

Specialized dam (ewe) breeds are usually white-faced and have fine, medium or long wool. They are noted for reproductive efficiency, mothering ability, fleece weight and quality and longevity. They are adaptable to difficult environments. In crossbreeding systems, ewes from specialized dam breeds are mated to rams from specialized sire breeds to produce market lambs. Ewes of these breeds are of adequate size to produce lambs of desired carcass weights.

Specialized sire (ram) breeds are generally black-faced and are referred to as meat-type breeds. They have medium wool. They are raised primarily to produce rams for crossing with ewes from specialized dam breeds. Specialized sire breeds are noted for rapid early growth, superior muscling and desirable carcass characteristics.

Hair sheep, unlike the wool sheep described above, have coats consisting predominantly of hair fibers as opposed to wool fibers. True hair breeds are more resistant to internal parasites than wool breeds, and they require no shearing. They are adapted to warmer, more humid regions, are prolific and are known for lambing ease and mothering ability. However, they are small at maturity and produce lighter weight carcasses than are preferred by U.S. packers. In mating systems, they would be used primarily as specialized dam breeds. Composite (improved) hair breeds are derived from hair × wool crosses. They are relatively wool free and generally do not require shearing. They are larger (improved) in mature size than the true hair breeds. In addition, composite hair breeds are generally more parasite resistant than wool breeds, and they do well in hot, humid climates.

Sheep Production Basics

Below are some considerations for prospective sheep producers. Some basic requirements for sheep production are summarized in Table 4.

Lambing Season

Lambing seasons (that is, when lambing occurs) vary based on the producer's goals and objectives, resources (feed availability, facilities for housing) and marketing opportunities. Breed is also a consideration. Sheep are referred to as short day breeders, meaning their normal breeding season occurs from August through January. Some breeds will breed at times other than the normal season (for example, Rambouillet, Merino, Dorset). These are called out-of-season breeders. Breeds that do not breed outside the normal breeding season are called seasonal breeders.

Sheep Facts, continued

Sheep have a field of vision of almost 360 degrees, which allows them to see behind themselves without having to turn their heads.

Sheep have eight incisor teeth at the front of the lower jaw and none in the upper jaw. Instead, they have a hard upper dental pad.

Sheep are **ruminants**, like cattle and goats, meaning they have four compartments to their stomach and they chew their cud. They are often referred to as **small ruminants** because of their size.

Sheep raised for wool production are shorn once a year.

The wool from one sheep is called a **fleece**; the wool from a flock is called a **clip**.

Fleece weights vary by breed, genetics, nutrition and shearing interval. The average fleece weight for sheep in the U.S. is about 7 pounds. The average price paid for wool sold in the U.S. in 2013 was \$1.45 per pound.

Australia is the world's leading wool producer.

Not all sheep produce wool. Hair sheep have more hair fibers than wool fibers. They do not require shearing because they shed their coats annually.

Common ways to identify sheep include ear tags, tattoos and paint branding.

Depending on the market, lambs are usually sold when they weigh between 90 and 130 pounds.

Sheep are **herbivores** that eat vegetation such as grass.

Sheep are considered **grazers**, which means they prefer to eat grasses and legumes low to the ground.

Sheep are more susceptible to internal parasites than cattle but less susceptible than goats.

The pasture-carrying capacity for sheep in Kentucky is generally two to three ewes and their lambs per acre.

Sheep are **gregarious**, which means they like to stay close to others in a flock. This behavior makes them easier to move together as a group.

Sheep prefer to walk into the wind and uphill rather than downhill and with the wind.

continued

There are three typical lambing seasons in Kentucky: winter (January, February), April and fall (September, October).

Winter. Ewes lambing in January and February are bred in August and September. Winter lambing is advantageous for producers who farm full-time because labor is more readily available in winter than spring when fieldwork begins. Lambs born during the winter can be marketed in the spring, taking advantage of historically high lamb prices during the Easter season. However, winter lambing has high overhead costs in terms of housing and feed requirements.

April. Ewes lambing in April are bred in November; thus, any breed of sheep can be used. With April lambing, sheep production is matched with forage production, allowing maximum use of spring grasses. Feed costs, labor and housing costs are lower than during the winter. April lambing also coincides with the natural breeding season; thus, breeding and lambing seasons tend to be shorter because ewes are most fertile during a November mating season and many will conceive during their first estrous period of the breeding season. Another advantage is that lambing rate is usually

higher. The biggest disadvantage to April lambing is that internal parasites can be a significant problem.

Fall. Ewes lambing in September and October are bred in April and May. Only out-of-season sheep breeds can be used for fall lambing. Fall lambing is ideal because fall forage growth corresponds with late gestation and lactation, the periods when ewe nutrient demands are highest. Weather conditions are good for pasture lambing, and there are fewer problems with internal parasites.

Table 3. Some common breeds of sheep in the U.S.

Breed	Mature Weight (lb)		Outstanding Characteristic
	Rams	Ewes	
General Purpose Breeds			
Columbia	250 - 350	150 - 210	Wool quantity
Dorset	200 - 250	130 - 180	Out-of-season breeding
Montadale	250 - 300	140 - 190	Carcass quality
Specialized Dam Breeds			
Fine Wool			
Merino	175 - 225	120 - 160	Wool quality
Rambouillet	200 - 300	140 - 190	Wool quality
Targhee	200 - 300	135 - 190	Wool quality
Medium Wool			
Corriedale	175 - 275	135 - 180	Wool quantity
Polypay	200 - 250	130 - 180	Mothering ability
Long Wool			
Border Leicester	175 - 300	140 - 195	Staple length
Finn	150 - 200	110 - 150	Prolificacy
Romanov	150 - 180	115 - 155	Prolificacy
Romney	225 - 275	130 - 180	Adaptability
Specialized Sire Breeds			
Heavy Weight			
Hampshire	250 - 350	160 - 220	Growth rate
Oxford	200 - 300	150 - 210	Growth rate
Suffolk	275 - 400	170 - 250	Carcass cutability
Medium Weight			
Shropshire	225 - 275	150 - 195	Carcass cutability
Texel	225 - 295	130 - 190	Muscling
Light Weight			
Cheviot	160 - 200	115 - 155	Hardiness
Southdown	180 - 230	120 - 160	Carcass quality
Dairy Breeds			
East Friesian	150 - 200	140 - 185	Milking ability
Lacaune	150 - 200	150 - 165	Milking ability
Hair Breeds			
True			
Barbados Blackbelly	105 - 125	75 - 120	Parasite resistance
St Croix	125 - 200	100 - 140	Parasite resistance
Composite			
Dorper/White Dorper	220 - 250	170 - 200	Muscling
Katahdin	180 - 250	110 - 160	Parasite resistance

Table 4. Basic production requirements for sheep in confinement

Requirement	Recommendation	
Daily feed (per animal)		
Ewe (150 lb)	Hay (lb)	Grain (lb)
Maintenance	2.5 - 4.0	
Breeding	2.5 - 4.0	0.5 - 1.0
Early gestation	2.5 - 4.0	0.5
Late gestation	2.5 - 4.6	0.5 - 1.0
Lactation	5.0 - 6.0	2.0 - 2.5
Ram	4.0 - 6.0	
Feeder lambs	0.5 - 1.0	2.5 - 4.0
Daily mineral supplementation (per animal)	0.3 - 0.5 oz of a complete mineral mix for sheep	
Feeder space (per animal, hand fed)		
	Space (in)	
Rams	18 - 20	
Dry ewes	16 - 20	
Ewes with lambs	16 - 20	
Lambs (weaning to 130 lb)	9 - 12	
Creep space (per lamb)	2.0	
Daily water		
	Water (gal)	
Adult sheep	1 - 2	
Lactating ewes	2 - 3	
Feeder lambs	1 - 2	
Baby lambs	0.1 - 0.3	
Waterer space		
Open tank		
	Animals/ft	
Ewes with/without lambs	15 - 25	
Feeder lambs	24 - 40	
Automatic bowl		
	Animals/bowl	
Ewes with/without lambs	40 - 50	
Feeder lambs	50 - 75	

Feed Supply

Forages can supply up to 90 percent of the total feed in a sheep operation. Under Kentucky conditions, ewes require approximately 0.3 ton of hay and 0.5 ton of pasture dry matter per head annually. The quality of forage needed for sheep is as important as the amount. The quality is related to the flock's stage of production. Nutrient requirements are highest for ewes in late gestation and early lactation. Winter lambing ewes need high quality hay, corn, corn silage, alfalfa haylage and/or wheat pasture, orchardgrass or bluegrass forage for grazing from mid-December to April. Ewes that lamb in April need similar diets from March to July. An equivalent feeding period for ewes that lamb in the fall extends from August to mid-December. Daily feed requirements for sheep in confinement are shown in Table 4.

Sometimes it is necessary to feed concentrates (for example, corn, oats, wheat or milo) in addition to forage in order to meet the sheep's nutrient requirements, particularly for ewes during late gestation and lactation. In addition, creep feeding and supplemental feeding of lambs on pasture has been shown to increase weight gains and time to market.

Creep Feeding

Providing lambs additional feed from that provided to the ewe and in an area constructed so lambs can enter but ewes cannot is called **creep feeding**. A creep-fed diet is usually all grain or concentrate. Lambs should be started on a creep diet by 7 days of age. By the time they are a month old, they will have consumed about 1 pound each. Daily creep feed intake increases dramatically during the next month, so by weaning at 60 days of age, lambs will be consuming about 1 pound per head daily. Lambs creep fed from birth to weaning will reach market weights of 100 to 130 pounds earlier than lambs that receive no creep feed.

Mineral Supplementation

Sheep, like all other livestock, have their own specific requirements for minerals. Requirements are generally based on the animal's total diet. Commercial mineral supplements for sheep

range from trace mineral salt with selenium to complete mineral mixes. Sheep cannot tolerate excess copper in their diets. Therefore, they should never be fed mineral supplements that have been formulated for other livestock because they contain copper.

Water Requirements

The exact amount of clean, fresh water required by sheep varies depending on ambient temperature or season of the year, stage of production (for example, gestation, lactation, growth, maintenance), size of the animal, wool covering, and the amount and type of feed consumed. Water should be maintained above 35°F in winter and below 55°F in summer.

Facilities and Equipment

Housing needs for sheep vary by lambing season (for example, winter lambing typically requires better housing than April and fall lambing) and management preferences (highly versus minimally intensive). Sheep can easily be housed in unused tobacco barns (Figure 1) or similar structures. Often, hoop barns (Quonset™-shaped structures with hooped, tarp roofs) are used. Inexpensive feeders, a water source and some small gates are all that are needed as basic equipment. As they lamb, ewes are separated into 4 ft x 4 ft lambing pens for 2 to 3 days after lambing. From these pens they can be moved to a nursery pen for a few days and then moved to larger mixing pens.

Basic fencing requirements can be met by using conventional woven wire or multi-strand high tensile electric wire for boundary (or perimeter) fencing and electric fence for cross or interior spaces. Boundary fences are the first line of defense against predators. Interior fences may be permanent or temporary but need to be good enough to keep sheep separated (for example, weaned lambs from their dams or rams from ewes).

Internal Parasite Control

In most areas of the U.S., internal parasites (primarily stomach worms) are the biggest health concern with sheep. In the past, anthelmintics (dewormers or anti-parasitic drugs) were used to

Sheep Facts, continued

Contrary to popular misconception, sheep are intelligent animals. They are considered to have a similar IQ level to cattle and are nearly as clever as pigs.

Sheep make different vocalizations to communicate different emotions.

Milk from sheep has higher levels of fat, protein, riboflavin, calcium, zinc, niacin and thiamine than milk from cows and goats.

The majority of income from a sheep operation will come from the lambs produced each year unless the producer has developed a niche market for wool.

control internal parasites. Overuse and unselective use of these drugs resulted in internal parasites that are resistant to them. As a result, producers have had to develop integrated programs for control. These programs include pasture management (including pasture rotation with adequate pasture rest and proper stocking rates), nutritional management and selective deworming according to the FAMACHA® system (a system developed in South Africa that uses eyelid color to determine severity of parasite infection as evidenced by anemia). Selection for animals that are more parasite resistant is probably the most important tool producers can use against internal parasites in sheep. Regardless of the breed, culling ewes that are persistently "wormy" can improve herd health.

Predators

In Kentucky, coyotes and dogs are the primary predators of sheep. The key to preventing sheep losses due to predators is to use management practices that keep sheep and predators apart. This can be done by fencing (for example, multi-strand high-tensile electric wire) or use of guardian animals (for example, dogs, donkeys or lamas). Guardian dogs are the most popular choice with sheep producers. The most popular breeds are the Great Pyrenees, Akbash and Anatolian. These large breeds have been selectively developed to protect livestock, but the dog must be handled and trained properly to be effective.



Figure 1. Sheep in a converted tobacco barn

Summary

Starting a successful sheep enterprise requires knowledge of basic sheep biology and an understanding of likely production systems. Before getting into the sheep business, prospective producers should decide whether purebred or commercial (crossbred) production best fits their resources (experience, time, labor, facilities, feed resources, etc.). Then, they must determine which sheep breed (or breeds) and which lambing season will

best enable them to meet their marketing objectives. Because not all breeds will breed outside the normal breeding season, choice of lambing season may be determined by choice of breed, or vice versa. Finally, prospective sheep producers must appreciate the basic requirements for feed, water, housing, equipment and parasite control. Learning as much as possible about sheep and sheep production before beginning a sheep enterprise will help ensure profitability.

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