Virginia Cooperative Extension

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Sheep Grazing Management

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Introduction

Forages constitute 75 to 90 percent of the total diet for sheep. Sheep are excellent converters of forage to meat and fiber and are capable of producing a USDA Choice carcass from forage alone. Sheep consume a wide variety of forages, and selectively graze numerous weeds and other pasture menaces such as multiflora rose and blackberry. Companion grazing of sheep with other species of livestock, such as cattle or goats, results in greater pasture utilization and higher quality pastures than when a single species is grazed alone. Sheep prefer to graze hillsides and steep slopes and provide a means for improving forage utilization and fertility on areas not accessible to farm equipment.

Class and stage of production of the animals dictate the type and quality of forage to be grazed. Lactating ewes with lambs are placed on the highest quality pasture available to promote desired levels of milk production and lamb growth. Dry, non-pregnant ewes or ewes in early to mid-gestation are placed on lower quality forages or serve as second grazers behind young, growing lambs. Strategies that match stage of animal production with type and quality of forage improves overall forage utilization while maintaining optimum animal performance.

Although year-round grazing programs are not attainable in most parts of Virginia, the combined use of permanent and annual forages can come within four to six weeks of a year-round supply of non-harvested feed. Strategic allocation of pasture forages through the use of controlled grazing provides a tool by which producers can lengthen the grazing season and improve overall forage utilization per unit of land area. The advent of high tensile electrified wire and electrified temporary fence has made the application of controlled grazing economical, practical, and profitable.

Nutrient Requirements and Stocking Rates

Animal classification (breeding ewe or growing lamb), stage of production (maintenance, gestating or lactating) and bodyweight determine the quantity and quality of forage required to meet the animals^{o} nutrient requirements. Recommended average dry matter intake, as a percentage of body weight, for 154 lb ewes is 1.7, 2.0 and 4.0 percent for maintenance, gestation and lactation, respectively. The digestibility (quality) of a forage affects dry matter intake. In general, sheep consume 1.5, 2.0 and 2.5 percent of their body weight in dry matter when grazing low, average, or high digestibility forages, respectively. By knowing the percentage of grasses and legumes in the pasture, the maturity of the pasture, and the approximate nutrient composition of the pasture, estimates of nutrient consumption can be made. Failure to meet nutrient requirements through grazing can be corrected by supplementing limited nutrients from other sources of feed. For flocks with lambing percentages exceeding 150 percent, supplemental feeding of grain is required in late gestation and early lactation. Because of limited rumen capacity in late gestation, ewes carrying twins or triplets may be unable to meet their energy requirements from forage alone. Failure to supplement grain may result in abortion and ewe death loss from pregnancy toxemia. In early lactation, adequate energy and, most importantly, higher levels of protein are required to support desired levels of milk production. Table 1 shows the TDN and Crude Protein requirements for ewes in mid to late-gestation and lactation.

Salt and mineral supplementation is required on a free choice, year-round basis. Failure to supplement salt and minerals results in low fertility, weak lambs at birth, lowered milk production, impaired immunity and numerous metabolic disorders. A variety of salt and

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Table 1. Daily Ewe Nutrient Requirements*

Ewe Bodyweight	DMI, lb			TDN, lb			CP, lb		
	FG	LG	L	FG	LG	L	FG	LG	L
154	3.1	4.0	6.2	1.7	2.3	4.0	.29	.42	.92
176	3.3	4.2	6.6	1.8	24.4	.3	.31	.44	.96
198	3.5	4.4	7.0	1.9	2.5	4.6	.33	.47	.99

*Abbreviations used: DMI=Dry Matter Intake; TDN=Total Digestible Nutrients (Energy); CP=Crude Protein; FG=First 15 weeks of gestation; LG=Last 4 weeks of gestation; L=First 6-8 weeks of lactation.

mineral supplements specifically formulated for sheep are commercially available. These supplements range from trace mineralized salt (TMS) fortified with selenium to complete mineral mixes containing all of the macro and micro minerals required by sheep. In general, TMS fortified with selenium is all that is needed during the spring and summer when sheep are grazing high quality pastures containing more than 20 percent legumes. Complete mineral mixes are recommended when grazing low quality roughages, at breeding time, and during late gestation and early lactation. Mineral supplements formulated for cattle and horses should not be used for sheep because they contain high levels of copper, which is toxic to sheep.

Stocking rate is determined mathematically by taking the number of acres used for pasture and hay production and dividing by the number of animals on the farm. Some of the most significant factors impacting stocking rate include: 1) the production system used (i.e. winter lambing vs. spring lambing); 2) the grazing system used (i.e. continuous grazing vs controlled grazing; 3) forage systems used (i.e. perennial pastures vs a combination of perennials and annuals); 4) forage types (i.e. cool season vs warm season); 5) soil type and fertility; and 6) climate.

Differences in farms and farm management drastically affect stocking rate. Long term stocking rate can only be determined by taking an integrated management approach to decision making. That is, defining the resources on the farm, both physical and human, setting goals, and determining the most profitable means for accomplishing those goals.

Past experiences on the farm help provide a benchmark for stocking rate. However, for farms where there is no history of stocking rate, information may be obtained from the USDA Soil Conservation Service which lists soil types on the farm and guidelines for stocking rates described on an animal unit (AU) basis. One AU is equivalent to a 1000 lb non-lactating cow, and represents the consumption of approximately 25 lb of dry matter per day. The animal unit equivalent (AUE) for sheep is 0.2 or, put more simply, 5 ewes are equivalent to one AU. The AUE for a ewe and her lambs is 0.3. Stocking rate is often listed in animal unit months (AUM), or the amount of forage intake of one AU for 30 days. The stocking rate per acre on an annual basis for permanent pasture with a soil classification of 6 AUMS would be 6 AUMS divided by 12 months or 0.5 AU/acre/year (2.5 ewes). For most typical cool season permanent pastures in Virginia, a stocking rate of 2 to 3 ewes per acre can be used as a starting point. With attention to management and the use of controlled grazing, stocking rates of 5 to 6 ewes per acre are attainable.

Fence

When constructing new fence or modifying existing fence, the value of the fence for both improved pasture management and predator control should always be considered. Subdividing large grazing boundaries into smaller units provides more flexibility for altering grazing management and increasing hay production. The importance of properly constructed fence cannot be overstated as a tool for protecting livestock from dog and coyote predation. Highly effective, safe, and inexpensive electric fencing systems has made fencing for pasture subdivisions and predator control more practical. High tensile (HT) smooth wire electric fence is cheaper and easier to construct than most traditional types of fence. Electrified boundary fence is one of the most effective tools used for predator control, and pro-

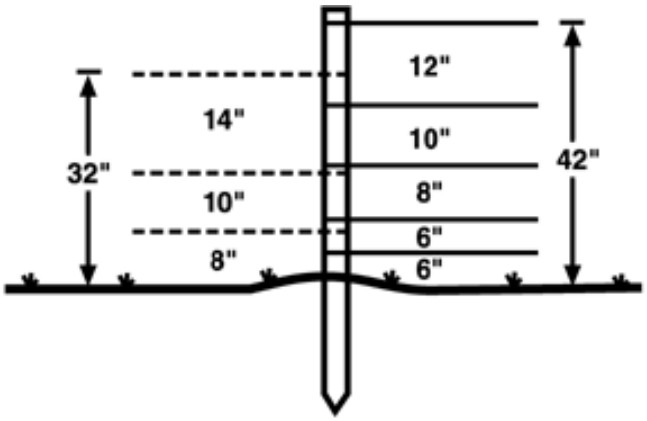

Figure 1. Appropriate spacing for three and five strand permanent and temporary electric fence.

vides the opportunity to tie in temporary electric fence to facilitate pasture subdivision.

Boundary fence for sheep should consist of at least five strands of electrified HT wire. Internal fence for pasture subdivisions requires a minimum of three strands of wire. Figure 1 shows the recommended spacings for three and five wire fences. Internal fence may be permanent or temporary. Types of temporary electric fence include: 1) polywire; 2) polytape; and 3) electric netting. Some of the benefits for temporary fence are: 1) flexibility to subdivide pastures for certain times of the year rather than year-round; 2) the opportunity to experiment before settling on the best combination of temporary and permanent pasture subdivisions; and 3) the opportunity to fence in front of and behind sheep when strip grazing. Temporary fence will not carry a charge as far as HT fence, nor is it as effective in controlling predators.

Factors influencing the effectiveness of electrified HT fence include: 1) proper construction of fence; 2) sufficient grounding (noted as the most common error by fencing experts); 3) the amount of vegetative growth coming in contact with the fence; and 4) quality and power of the fence charger. All fence chargers are not built to the same specifications. Unfortunately, a uniform set of standards for comparison of various makes and models of chargers is not available. Only high energy, low impedance chargers should be used. When purchasing a charger, producers should be familiar with the reputation of the company, their product, their warranty, and their dealer°s service record. The company representative should be willing and able to assist the producer in determining the charger that best meets their needs. In general, electric fence intended to control sheep should average 4000 to 5000 volts and carry a minimum charge of 2000 volts at all times.

Pasture Production

Pasture growth is seasonal rather than distributed evenly throughout the year. Approximately 60 percent of the annual dry matter production for most species of cool season grasses occurs in April, May and June. Cool season pasture productivity declines dramatically in July and August, and, depending upon weather, rebounds with a moderate surge of growth in September and early October. Failure to properly manage the large flush of pasture growth in the spring results in significant quantities of over-mature, low- quality forage that is neither fit for grazing or hay production. When spring pastures are not stocked heavily enough to utilize this abundant growth, sheep graze and regraze certain areas while other areas are left to mature and go to seed. This type of grazing behavior weakens those plants that are grazed more frequently and gives the less desirable plants that are not grazed as often a competitive advantage. Spring grazing management should be accompanied by a hay making component. Using intensive types of rotational grazing management to keep all the plants in the grazing system in a vegetative state while controlling seedhead formation is not feasible. Unless the number of animals grazing a given area can be increased to offset the excess in forage production during the spring, approximately one-third of spring pasture should be fenced for hay production. After a hay cutting, pasture should be given a three to four week recovery period before making it available for grazing the remainder of the year. Rotational grazing management of cool season pastures will be covered in a later section.

Summer and Fall Forages

Cool season pastures for sheep can be augmented in summer and fall by using summer and winter annuals or grazing alfalfa. These are very productive forages, and require high fertilization rates to acheive their growth potential. Dwarf pearl millet, a summer annual, produces a large quantity of forage, is high in protein, and works well for grazing lambs in July and August. It should be seeded May 15 to July 1, and is ready to graze in about 45 days or when it reaches a height of 12 to 15 inches. Rotational grazing management of millet works best, with sheep being moved once it has been grazed to a height of 6 to 8 inches. Adequate regrowth for grazing usually occurs within two weeks. Two-month stocking rates of 20 to 25 lambs per acre have yielded average daily gains of .3 lb per day.

Winter annuals such as rye and turnips are excellent sources of forage for October and November grazing. In order to produce enough forage for fall grazing, winter annuals should be seeded by September 1. Rye provides excellent late fall and early spring grazing for feeder lambs and gestating and lactating ewes. Turnips are a high yielding, high quality forage that work well for flushing breeding ewes and for growing and finishing feeder lambs. A minimum of six weeks after seeding should be allowed before grazing. One acre of turnips produces approximately 1,000 ewe grazing days, which is equivalent to 100 ewes grazing one acre for 10 days. It is recommended that turnips and rye be seeded together so that a cover crop remains after the turnips are gone. Turnips should be strip-grazed to limit losses from trampling.

Alfalfa can be used for summer pasture, or may be utilized throughout the entire grazing season. Its advantage for grazing must be weighed against its contribution as a cash crop harvested for hay. Strategic grazing of alfalfa during certain times of the year has been demonstrated to work well for integrated grazing and hay making systems. For example, results from spring grazing trials have indicated that beginning in April sheep can continuously graze alfalfa until May 20. This provides excellent pasture for lactating ewes with spring lambs and reduces the risk of a poor first hay cutting associated with weather related problems. In the fall, after a killing frost, or six weeks after the last cutting, alfalfa should be grazed by the ewe flock or used as pasture for feeder lamb production. Grazing alfalfa in the fall controls alfalfa weevil infestation in the spring because the eggs deposited in the stems were consumed by the sheep. Alfalfa should be grazed on a rotational basis with each rotation occurring within a seven day period to minimize grazing of regrowth. Lambs grazing alfalfa in late summer and fall typically gain 0.33 lb per day. Although sheep are not as susceptible to bloat as cattle, certain precautions should be used when introducing them to alfalfa for the first time. Most problems with bloat can be avoided by placing sheep on alfalfa pasture when there is no outside moisture on the plants. This is usually in mid-afternoon, which means that the sheep have already had an opportunity to graze for most of the day. If pasture is short, some producers will feed hay before turning sheep on alfalfa. Never adjust sheep to alfalfa by grazing for a few hours, removing the sheep and then grazing a little longer. Every time sheep are reintroduced to alfalfa the same challenge for bloat exists.

Stockpiled Fescue

Winter hay requirements can be reduced substantially through the utilization of stockpiled tall fescue. One acre of stockpiled fescue is capable of meeting the nutritional requirements of five gestating ewes for an average of 120 days. Pregnant ewes during the last six weeks of gestation should receive supplemental energy in the form of whole corn or barley. Lactating ewes on stockpiled fescue should receive additional protein and energy supplementation. Feeder lambs can be grown on stockpiled fescue. Lambs gain approximately 0.1 lb per day on stockpiled fescue alone, while supplementation with up to 2 lb of corn and protein supplement improves lamb gains by 0.3 to 0.4 lb per day.

Grazing Management

Grazing management systems can be categorized into two broad areas, continuous grazing and controlled grazing. Continuous grazing allows sheep unrestricted access to a fixed pasture-unit of land throughout the majority of the grazing season. Controlled grazing involves the strategic movement of sheep through multiple grazing units based on the nutritional needs of the animals and the general well-being of the forages being grazed. Continuous grazing requires few inputs, while controlled grazing requires a higher level of management and additional resources in the form of fence and water. Continuous grazing promotes improved individual animal performance through the opportunity for animals to s elect a large proportion of their diet, while controlled grazing balances individual animal performance with the opportunity to enhance greater production of animal product per unit of land area. Optimum forage utilization and quality is often sacrificed with continuous grazing, while the goal of controlled grazing is to increase forage production and utilization through the management of animal grazing behavior.

Various methods of grazing management for sheep have been studied. In general, if animals are in any stage of production other than maintenance, controlled grazing is preferred over continuous grazing. Studies evaluating the frequency of movement of sheep through a series of grazing paddocks have shown no economic benefit to intensive (every 1 to 2 days) movement of sheep versus more lax rotational systems where sheep are moved every 10 to 14 days. The practice of confining large numbers of sheep to small grazing areas to facilitate greater forage utilization within 1 to 2 days increases the rate of reinfestation from internal para-

sites and promotes a greater incidence of coccidiosis in young, growing lambs. Although the reasons are not fully understood, the routine movement of ewes and nursing lambs through a series of grazing paddocks in April, May, and June to control seedhead formation is only marginally successful and is detrimental to lamb gain. Changes in the diet of the ewe as well as the abrupt movement of lambs to new and unfamiliar locations may contribute to poorer lamb performance.

Application of controlled grazing practices for sheep is especially beneficial when used with spring-lambing programs. Spring-lambing gives producers the opportunity to take full advantage of the inexpensive gains attained from grazing lambs on spring, summer, and fall forages. Lambs born in March, April and May graze with their dams in the spring and throughout most of the summer. Research has clearly shown that lambs gain approximately .15 lb more per day when left on the ewe through late August versus weaning in July and grazing ewes and lambs separately. After weaning, lambs are left on pasture and remain there until marketed as slaughter lambs or feeder lambs in the late summer and fall. Retention of feeder lambs to graze fall pastures, aftermath hay fields, or winter annuals before placing them in a feedlot for grain finishing tends to be consistently more profitable than marketing lambs as feeders in late summer and early fall.

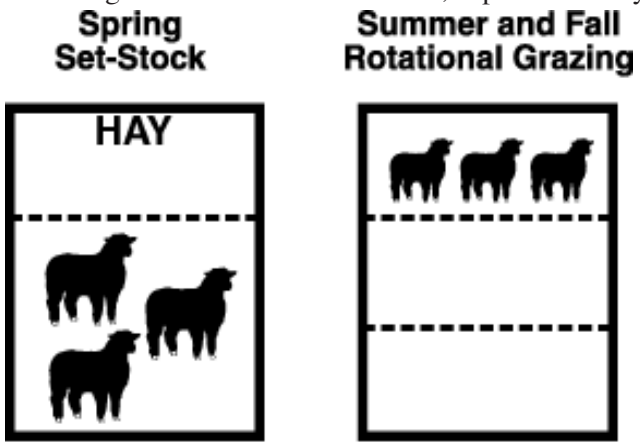

Figure 2. Spring, simmer, and fall grazing strategies for spring-lambing program.

After lambing in the spring, lactating ewes are set-stocked (not rotated) at the rate of four to six ewes and their lambs per acre until mid to late June. Set-stocking gives ewes and their lambs the opportunity to be more select ive in their grazing behavior, which promotes more desirable levels of milk production and greater lamb gains.

Set-stocking at relatively high stocking rates in the spring helps to control the spring flush in forage production, and allows hay to be made from approximately one-third (Figure 2) of the pasture that is not required for spring grazing. Rotational grazing programs designed for the movement of sheep every 10 to 14 days are instituted in late June and early July to improve both pasture and lamb production.

More intensive rotational grazing systems where higher stocking rates are used promote more complete forage

Table 2. Forage Species and Recommended Grazing Management

Rotational Grazing Height			
	Inches or Stage		Recommended Grazing System
Species	On	Off	
Bluegrass-White Clover	4-6	1	Rotational
Orchardgrass-Red Clover	6-8	3	Rotational
Fescue-Red Clover	6-8	2	Rotational
Stockpiled Fescue	10-15 (11/1)	--	Strip
Alfalfa	Bud	3*	Rotational
Alfalfa-Grass	Bud	3**	Rotational
Dwarf Pearl Millet (Summer)	12-16	8	Rotational
Turnips (Fall)	Full top	--	Strip
Small Grain (Fall & Winter)	6-10	1	Rotational

*Complete grazing within 7 days

**Complete grazing within 10 days

utilization, but also require greater input costs in the form of fence and water, and may result in higher levels of internal parasitism, increased risk of coccidiosis, and impaired lamb performance.

For successful controlled grazing programs, producers must know the forages their sheep are grazing and the appropriate time to move animals to ensure optimum production of those forages.

Movement from one grazing unit to the next is based on available pasture and never on the calendar (Table 2). To accomplish this, producers must monitor pastures on a daily basis. With experience, the overall average height of the forage for the grazing unit can be estimated to determine pasture status for movement of animals.

Lamb Gains on Pasture

Lamb gains are not uniform throughout the grazing season (Figure 3). In general, lamb gains exceed .60 lb per day in the spring, average approximately .30 lb per day in July and August, and are approximately .4 lb per day in the fall. In the summer, lamb gains can be improved by .15 lb per day by supplementing 1 lb of corn or barley per lamb per day.

Even though lamb gains on pasture are improved with grain supplementation, the additional cost of gain may not be offset because of the historically lower prices paid for slaughter lambs in September and October.

Internal parasitism can dramatically affect grazing lamb performance on spring, summer and fall pastures. Contrary to statements that rotational grazing helps control internal parasites, research has clearly demonstrated that internal parasite larvae are capable of surviving on pasture for more than a year.

Therefore, most short-duration rotational grazing programs (rest periods of 15 to 30 days) are not beneficial for the control of internal parasites. Beginning in May, lambs should be treated for internal parasites once every three to four weeks depending upon the anthelmintic being used. Treatment can be discontinued in late October after a killing frost or after lambs are removed from pasture and placed in a feedlot.

Reviewed by Scott Greiner, Extension specialist, Animal and Poultry Sciences

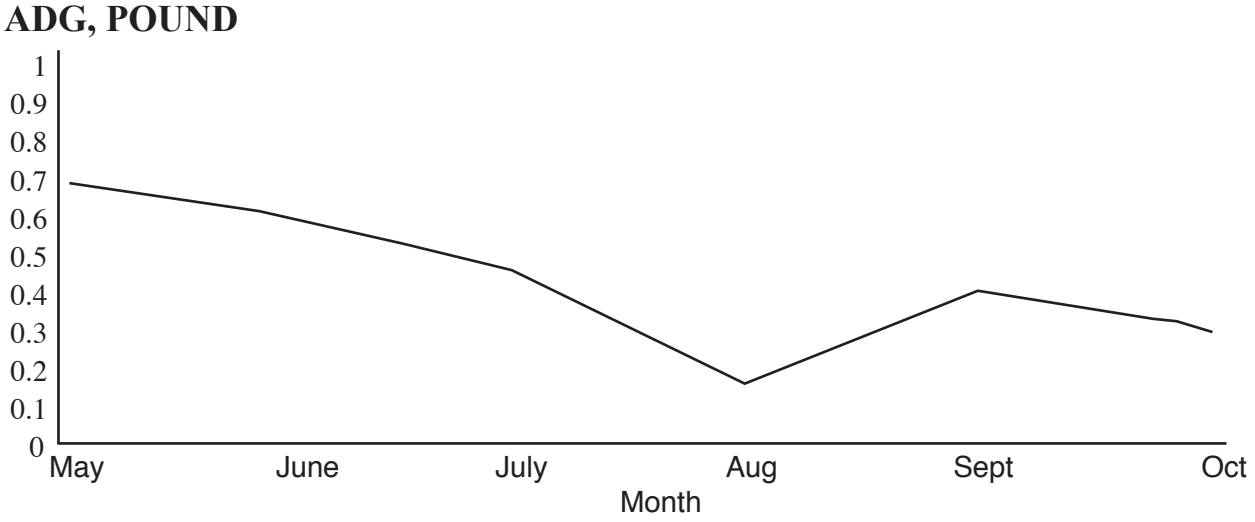

Figure 3. Monthly grazing lamb performance.