



Feeding Small Ruminants: Developing a Grazing System for Sheep and Goats

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Small farming operations are becoming more popular as the amount of land available for large livestock enterprises and row crops is reduced by urban sprawl. Small ruminant livestock systems such as goats and sheep fit well with small farm operations. Forages, whether are grazed or hayed, supply the major source of nutrition and a critical component to small farm enterprises to maintain sustainability. Many of these small farm owners are either newcomers to farming or people living in urban areas and see them as “hobby” farms. There is a critical need to educate them on the basic agricultural practices and forage utilization for this type of livestock management.

The grazing habits of sheep and goats differ from traditional livestock production and they can be incorporated into the grazing systems for cattle and horses. Goats tend to browse more while sheep tend to graze. Goats are efficiently used in pasture utilization controlling brush and weed, but they need higher quality forage than cattle because they cannot digest cellulose.

Pasture Management and Forage Selection

Sheep and goats offer an alternative to utilizing forage and vegetation which is otherwise “wasted” (**Figure 1**). In a pasture situation goats are “top down” grazers, consuming only the best parts of a wide range of grasses, legumes, and browse plants. Browse plants include brush, shrubs, trees, and vines with woody stems. This behavior results in uniform grazing and favors a first grazer-last grazer system using a goat flock as the first group and cattle as the last group. This management is most appropriate with lactating does or growing kids. The quality of feed offered is usually most directly related to the age or stage of growth at the time of grazing. Sheep do very well grazing annual cool-season forages like oats, annual ryegrass, winter wheat, or triticale. Annuals forages can be ready to graze approximately six weeks after seeding. Feeding some hay for the first week before grazing annual cool-season grasses provides fiber and reduces scouring. Portable cross fencing to restrict sheep to small paddocks will reduce trampling. Creep gates can be used to give lambs access to areas separate from the ewes.

Feed is the single largest cost associated with raising small ruminants, typically accounting from 60 to 65% of total production costs. Pastures /forages are the cheapest feed sources for both sheep and goat production. Therefore, they should use them to the fullest extent. Establish a grazing system using both cool-season species such as tall fescue and warm season grasses such as bermudagrass, bahiagrass, and dallisgrass in mixture with legumes (white, red clover, or alsike clover). For winter feeding, planting small grains (wheat, rye, oats and barley) and annual ryegrass in combination with crimson clover or arrow leaf clover reduces feed cost and the need for stored forage. The addition of forage legumes to grazing or haying systems provides additional protein, energy, and palatability to the feed produced. Further, legumes add nitrogen to the soil for grasses to utilize and assist in filling in the grass sward to inhibit weed growth. The selection of the “best” grass/legume system must consider both the adaptability of a particular type of forage to a specific site and soil, the nutritional needs of the animals, and the management goals of the producer.

Legumes such as alfalfa, clover, and lespedeza tend to be higher in protein, vitamins, and minerals (especially calcium) than grass hays. The energy, as well as protein content, depends upon the maturity of the forage when it is being grazed for forage. Maintaining an adequate grazing height is



important because these small ruminants eat in layers from top of the plant to the bottom. Pasture height and biomass will greatly affect intake, quality, and nutritional status of sheep and goats. Several studies have shown that intake by goats decline when forage availability is below 1000 to 1200 lb of dry matter per acre because the animal cannot get a “mouthful” with each bite. Overgrazing the pasture not only affects animal intake but also affects forage recovery time because the remaining leaf area for photosynthesis is minimal.

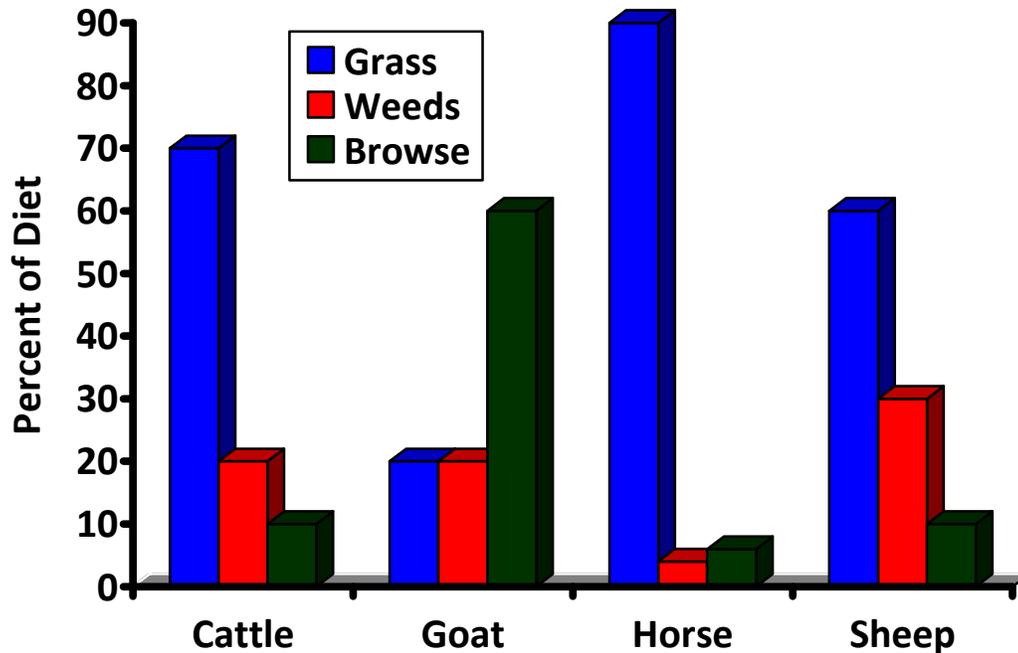


Figure 1. Dietary preference of different livestock species. Source: AnPeischel, 2005.

Managed grazing with sheep and goats usually results in a substantial increase in vegetative cover by favorable grass and legume species while reducing or eliminating unwanted shrub species. Since goats, cattle, and sheep prefer different forages, in many pasture situations these species do not compete for the same food. Therefore, they can be managed quite successfully in a multispecies grazing system, allowing the land to be used more fully and generate more income. Some studies have shown that land grazed by both goats and cattle returns 25% more than land grazed only by cattle. Adding sheep and goats to a grazing system will have weed control benefits. Goats will eat such weeds, therefore decreasing the need for commercial herbicides or mowing.

Sheep make efficient harvesters of forage crops. However, one of the biggest challenges of grazing sheep is the economical and effective control of internal parasites. *Sericea lespedeza* is a legume that grows in low fertility and acid soils and it has been associated with parasite control. *Sericea lespedeza* is a high-tannin forage that has been scientifically proven to reduce parasite loads in sheep and goats. Sheep and goats may need time to adjust to grazing *sericea*. Cattle will graze *sericea* if it is not too mature. Producers should not rely on *sericea* as the sole method for controlling internal parasites, but could be used as part of the parasite/de-worming program in small ruminants.



Understanding the nutritional needs of goats and sheep is important in developing a forage program (**Table 1**). Sheep and goats must consume a more concentrated diet than cattle because their digestive tract size is smaller relative to their maintenance energy needs. Average meat goats require about 10-14% crude protein and 60-65% TDN (on a dry matter basis) in the total diet. Pasture, forbs, and browse are usually the primary and most economical source of nutrients for sheep and goats (**Table 2**). In most cases, pasture is all small ruminants need to meet their nutritional requirements since they tend to be high in energy and protein when it is in a vegetative state. Rotating the pastures to keep plants in a vegetative state is important since palatability and digestibility decline as the plants mature. During the early part of the grazing season, browse (woody plants, vines and brush) and forbs (weeds) tend to be higher in protein and energy than ordinary pasture. Sheep are excellent weed eaters. Goats are generally considered a browse-consuming species and they have the unique ability to select plants when they are at their most nutritious state.

Table 1. Nutritional requirements for various classes of sheep and goats:

Livestock	Total Feed Intake (lb/day) ¹	Crude Protein (%)	Energy (TND) (%)
Sheep			
Maintenance (154 lb mature ewe)	2.6	9.6	57.6
Late Gestation (180 – 225% lamb crop expected)	4.0	11.2	66.7
Lactation			
Single	5.5	13.3	65.0
Twins	6.2	14.8	65.0
Early Weaned Lambs (66 lbs) Moderate to High Growth	2.5	14.5	75.8
Lamb Finishing (88 lbs)/4-7 mo	3.5	11.7	77.1
Yearlings (110 lbs)	2.5	9.1	57.6
Goats			
Bucks (80 – 120 lbs)	5.0	11.0	60.0
Dry Doe	4.5	10.0	55.0
Late Gestation	4.5	11.0	60.0
Lactation			
Avg. Milk	4.5	11.0	60.0
High Milk	5.0	14.0	65.0
Weanling (60 lb)	2.0	14.0	68.0
Yearling	3.0	12.0	65.0

¹90% Dry Matter Basis

Source: National Research Council, 2007.

Small ruminants (goats and sheep) should have access to clean, fresh water at all times in the pasture. A mature animal will consume between ¾ to 1 ½ gallons of water per day and water intake increase greatly during late gestation and during lactation of small ruminant. Water requirements also increase substantially when ambient temperatures rise above 70 °F and decline with very cold environmental temperatures.



Table 2. Nutritional content of various forages and browse plants commonly used for grazing sheep and goats.

Forage Type	Crude Protein (%)	Energy (TND) (%)
Hay		
Poor Hay	8	50
Grass Hay	12	58
Mixed Hay	15	50
Legume Hay	18	62
Pasture		
Alfalfa	18	62
Bahiagrass	8	51
Bermudagrass	10	55
Chicory	15	65
Clover Pasture	25	69
Cowpea	16	64
Kudzu	14	55
Mature Pasture	8	50
Millet (pearl)	27	63
Rye	16	69
Sudangrass	16	70
Switchgrass	10	61
Tall Fescue	12	62
Vetch (common)	19	59
Wheat	24	66
Browse Species		
Broomsedge	7	50
Brush	16	72
Curled Dock	13	74
Honeysuckle	13	69
Hackberry	14	41
Juniper (leaves)	6	64
Oak Skin	13	65
Mulberry (leaves)	21	72
Sumac	13	77

Source: National Research Council, 2007.

Summary

There is not just one type of pasture than can or even should, be used. It is good to have a diversity of cool- and warm-season grasses to minimize hay need. This is not to say that different plant species do not each have their own specific advantages and disadvantages. Maintain low stocking rates and graze sheep and goats with cattle, or in a rotation with cattle or horses. Provide tannin-rich forages, such as sericea lespedeza. The role of goats and sheep as biological control agents will become increasingly important in pastures in the future due to elevated costs of other control methods such as mechanical cutting and herbicide application, where energy utilization is an issue.

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