Pasture management for sheep production systems

Pastures form the basis for ruminant production systems in the mid-Atlantic region and successful pasture management is central to productivity and profitability. Successful forage-livestock systems integrate "soil, plant, animal, environmental, and management factors …with the objective of matching the feed requirements of the livestock to the production and quality potential of the forage." The focus of this presentation is on the basics of pasture management in our region, which typically comes down to three things: soil testing, rotational grazing, and stockpiling forages.

It starts with soils

Soils are the foundation to any forage-livestock program. Virginia uses a four-tier system for classifying soils into different productivity groups. Pasture systems generally are found on lower quality Class III or Class IV soils. These soils are less productive but still can respond to management. Understanding key concepts about soil fertility is important for management in order to minimize over- or under-application of nutrients and negative impacts both on the environment and on the wallet. Maintaining adequate fertility also is important for keeping (or getting) the forages you want on your farm and for minimizing the ones you don't want. Species such as broomsedge can serve as indicators that either soil phosphorus (P) or ph or both are low; purpletop is associated with low K.

Almost all soil talks bring up Leibig's "Law of the minimum". This essentially states that a soil (and thus plant productivity) will be limited by the most limiting nutrient. E.g., if your soil has plenty of nitrogen (N) and phosphorus (P) but it is low in potassium (K), plant growth will be limited by the limiting level of soil K. So, adding more N and P won't make the soil more productive. Too often producers rely on simple fertility mixes, e.g., 10-10-10 or "triple 19" without really knowing what nutrients are in their soils. The blends aren't bad per se and may be cost effective, but they aren't prescriptive for the needs of different soils. E.g., you may have some soils that hold K, but other part of the farm may be more prone to leaching K. Adjustment fertilizer mixes for small acreages may not be a big concern, but a straight blend might be costly if you are over- or under-fertilizing large acreages.

Soil sampling is essential for really knowing what nutrients your soils need to support forage growth). It may seem a bit ironic, but more productive soils generally will need higher nutrient inputs – at least if they are managed for hay or crops where nutrients routinely are being removed from the system. In that particular case, the degree of nutrient removal also will depend on the forage species because of differences in productivity, nutrient requirements, or both.

Soils can be sampled any time of the year, and a general recommendation is to take the samples every two or three years to keep tabs on their status and to make adjustments to fertility applications as warranted. A couple rules of thumb should be followed when sampling. 1) Get a representative sample. One or two soil plugs pulled from a 20-acre field isn't adequate. Recommendations vary, but five "pokes" per acre with a soil probe is considered a reasonable minimum. On uniform fields, 20 pokes would probably be sufficiently representative. It's also important to distribute the sample locations across the field. 2) Because of the variation across the landscape, sampling should be done by field, by management unit or by landform. E.g., even if they're in the same field, you should sample the upland and lowland part of a pasture separately. If the fencing won't allow you to spread nutrients separately, the soil test information will at least help you determine the greatest need and where to send the

fertilizer truck. Also, avoid sampling nutrient-rich "hot" spots around feed troughs, campsites, or waterers.

Once you have soil test recommendations, follow them as practicable. With a limited budget and rundown soils, it may make better sense to build the nutrients up slowly over time. Getting pH to a reasonable level for the forages you need is probably one of the first best investments in soil fertility because it will help improve availability of nutrients already in the soil system. Adequate pH also is important to support legume growth, which can add N to the system for free.

As noted above, forages can vary substantially in fertility needs – and in management requirements. We have a lot of tall fescue pastures because tall fescue tolerates low soil fertility levels and overgrazing better than other species. Managing for greater productivity and better quality forages will require greater inputs in fertility but perhaps as importantly greater management in general, which is the topic of the next section.

Pasture management: forage choices and rotational grazing

Much of the current state of pasture management in extensive (vs. intensive) production systems comes down to a "least input" reflex. That may reflect a number of issues for the producer: lack of knowledge, lack of interest, lack of time, lack of resources, or a lack of return to inputs. To deal with time and resource challenges, some managers default to allowing their livestock make the management decisions. Unfortunately, livestock generally are terrible land managers – but they are great land management tools.

As noted above, forages can reflect the state of soil quality on a farm, but this in turn often reflects the state of forage management. Poor soil fertility can arise from repeated overgrazing. Overgrazing limits the ability of soils to absorb moisture; it also limits plant rooting, meaning plants have difficulty acquiring moisture and nutrients. This limits pasture growth and often results in open, exposed soils which become sites for weeds or undesirable forages. With repeated overgrazing over time, exposed soils are prone to soil and soil nutrient loss through nutrient erosion. Mismanagement in this case puts the system in a downward spiral. Overgrazing due to poor forage production in turn limits forage growth; this encourages weed encroachment and exposes soils; the resulting reduced forage production sets up the system to be overgrazed again.

In cases like this it's time for a new cycle. A rotation, really. Controlling the frequency and intensity of defoliation in pasture systems is the way to manage for both the forages and the productivity you want. First, it allows the manager to determine how severe the defoliation will be. When livestock remove almost all of the leaf area from a plant, the plant must build all the new photosynthetic "machinery" from scratch. If some leaf is left, the recovery process starts quickly, increasing productivity. Managing the defoliation also helps support the types of forages in the pasture. Closer defoliation will encourage more tall fescue, bluegrass and ryegrass than orchardgrass. Of course ryegrass and bluegrass are great forages for sheep, but the knock on these forages is that they will not be productive in hot, dry conditions. Rotational management can allow a producer to graze tighter in spring to encourage desired cool season grasses and then back off or reduce grazing pressure in summer when grass growth slows.

Allowing forages more time to recover has some additional benefits. Keeping a canopy above the ground allows for more root growth belowground. This means plants have better opportunity to search

for and take up soil nutrients and moisture. The canopy also keeps soils cooler, reducing evaporative moisture losses. Cooler soil conditions also help forage growth by keeping the canopy cooler, which is better for cool season plants. The forage canopy also helps capture rainfall and keep nutrients in place.

Along with all these benefits, rotational stocking allows managers flexibility for dealing with difficulties such as long dry spells. Many managers in SW Virginia found themselves without forage this past summer due to a prolonged dry spell. These producers are likely to see low forage growth and more weed pressure in 2017 as a result of management decisions in 2016. At some point, it becomes appropriate to keep animals only in a sacrifice lot and feed hay rather than overgrazing the whole farm and setting all the forages back. By allowing pastures to rest during drought, recovery will be faster following rainfall. As well, the system will be better able to capture rain that comes in short, heavy summer showers if there is grass on the surface to slow and channel the droplets to the soil and roots in the soil to take the moisture up.

As noted above, grazing management can drive pasture composition, and rotational grazing is an important tool for that purpose. We often first think of using rotation to allow plants to recover from defoliation. That is important for the plant and for pasture composition as a whole. An overgrazed pasture which has the forage canopy opened up and exposed soil presents a great opportunity or weed encroachment. On the opposite side of the equation, rotational stocking can be used to address weed issues. Using rotational grazing allows a manager to keep animals on a site longer to force them to clean up less desirable forages and weeds.

Rotational grazing also may some benefit for dealing with intestinal parasites. If pastures can be avoided for 60 to 90 days following a grazing event this can help reduce potential worm burden because of lower survival over time. It may also allow managers to keep grazing events higher off the ground and away from the parasites.

Rotational grazing also may be important as a way to manage *for* certain forages. Species such as alfalfa, birdsfoot trefoil, and lespedeza all will benefit from rest and recovery that may not be possible in a continuously stocked pasture. Grazing trefoil and lespedeza also has been shown to help reduce worm burden due to the anthelmitic effects of their condensed tannins.

Stockpiling

Hay feeding is one of the biggest costs for livestock producers, and we can reduce this need through good forage management. Stockpiling is key to this, and stockpiling is dependent on the ability to rotationally graze pastures. Although we often think of stockpiling for fall and winter grazing, there likely is opportunity to use this effectively in summer as well. During times when there is excess growth in late spring and early summer, it may be better to set aside some pastures for end of summer grazing rather than keeping them in the rotation. Having this grass on hand would be useful for dealing with dry periods and also will make it easier to set aside other pastures for fall stockpiling. Of course all of this must fit the objectives. Trying to fatten lambs on this forage would be a challenge, but it should work fine for dry ewes.

Stockpiling in fall is more of an opportunity in pastures that have abundant tall fescue, but even orchardgrass and bluegrass can be stockpiled. However, these softer grasses and legumes will degrade sooner during heavy freeze-thaw conditions, so they will not remain or be as nutritious into the winter.

Using rotation in conjunction with stockpiling can allow a producer to graze fields strategically. E.g., one might hold pastures with more durable fescue for grazing later into the winter. These pastures likely would also be best suited for frost seeding because the sheep would help work the seed into the soil and reduce competition for the seedlings in early spring.

Schedule

As you begin the year it may be very helpful to establish a grazing management calendar. Keeping a calendar to refer to is an excellent way to stay on top of management needs and decisions. A few things to consider for the coming year….

Do I need to soil sample? Plan to do this spring or fall, set up a routine time for this, and stick with it. If samples reveal problems, begin working to address through fertility applications and grazing management. If you have particular problem spots now, go ahead and start working on them.

If you need legumes, now into February is an excellent time to begin frost seeding legumes. Don't waste seed on low fertility ground. (That said, if you want to try lespedeza or trefoil, they are more tolerant of poor fertility and will be more successful if there is not strong grass competition.) Graze frost-seeded pastures a little closer in spring to provide more heat to the soil and to reduce competition to seedlings.

Have a drought management strategy for summer. Rotation is a great first line of defense. And, remember when it gets too dry – pull them off and feed hay. It's better to feed hay and not abuse your money maker (the pasture) than to not feed hay and lose your money maker. For folks in warmer areas, you may also want to consider having some warm season grass pastures – which would be another talk!

Late summer and fall is the time to set up the stockpiled forage, as discussed earlier.

Of course, all the management decisions and activities come back to the needs and abilities of the producer. Getting the fundamentals in place may take a bit more time or money up front, but they can save time and improve productivity over the long term.

often In many cases, producers start with a systemSupplemental feeds to meet livestock needs and cover deficits

Do we have a fescue problem?

Strategies:

Feed alfalfa or alt legumes in morning for fescue

French pasture management

Forage Options

Soils available? – thinking systems

Soils map

Soil testing – nutrient return slides from MC

Frost seeding

Buy/Build grazing calendar

Co-grazing

Supplementing endophyte-infected tall fescue or reed canarygrass with alfalfa or birdsfoot trefoil increases forage intake and digestibility by sheep

Animal Feed Science and Technology

Volume 147, Issues 1–3, 14 November 2008, Pages 116–139

Shrubby vegetation and agro-industrial by-products as alternative feed resources for sheep and goats

Beneficial and detrimental effects of dietary condensed tannins for sustainable sheep and goat production—Progress and challenges ☆

MANAGING SHEEP ON PASTURE

Animal performance and enterprise profitability depend, in no small measure, on how well the pasture is managed and utilized. Presented here are nine basic management practices that optimize the productivity of both the animals and the land they graze. How these practices can be applied to meet the forage needs of a 100-ewe flock on 30 acres is then discussed.

Recommended Pasture Management Practices

- 1.Subdivide large pastures into paddocks for rotational grazing at a high stocking rate. An electric fence can be erected at a reasonable cost and easily moved. Rotational grazing reduces internal parasite infestation of sheep.

- 2.Vary the stocking rate to coincide with pasture productivity. This should result in greater plant vigor, more forage production and less weed problems. Too heavy a stocking rate eventually decreases the pasture stand and forage yield, while too low a rate reduces carrying capacity and results in forage waste.

- 3.Reduce the intake of non-lactating ewes by restricting their grazing time. A pasture's carrying capacity can be increased greatly when non-lactating ewes are restricted to 50 percent of the normal grazing time each week. Increasing the stocking rate and rotating pastures during the non-lactating period also reduces intake.

- 4.Adjust the lambing season to coincide with maximum pasture growth periods in the spring or fall. Cool-season perennial grasses reach their maximum growth in May and June and a second but smaller peak period in the fall. Ewes lambing in March or April make better use of spring pasture growth than ewes that lamb in January or February. These winter lambing ewes must be fed harvested feeds during the period of greatest nutritional needs. Ewes that lamb in September or October make good use of fall pasture growth during lactation. After weaning, which is the period of lowest nutritional needs, these ewes can be maintained on winter pasture, reducing the need for harvested forages.

- 5. Regardless of lambing time, provide additional energy in the form of shelled corn to "flush" at breeding, during the last 4-6 weeks of pregnancy, and in the first 8 weeks of lactation. If low-quality forages are used, protein supplements are also recommended.

- 6. Separate ewes with single lambs from those with twin lambs, and creep feed the twin lambs on pasture. To reduce internal parasite infestation in lambs, separate the ewes and lambs daily. Allow the lambs to graze clean pasture while creep feeding.

- 7. If you raise both cattle and sheep, consider grazing them together. Sheep prefer shorter and more tender grasses, while cattle will consume less tender growth. In addition, cattle may help in reducing predator problems. A ratio of 3-5 sheep for each beef animal will insure that the pasture is well utilized. Ewes nursing lambs may graze first and then be followed by cattle.

- 8. Control weeds and thistles. Although sheep will consume 90 percent of the weeds in a pasture, thistles and some other weeds will be left alone. Non-grazed weeds should be mowed when the animals are rotated to another area or controlled with an approved herbicide.

- 9. Fertilize pastures according to soil test. Optimum pasture production can only be attained with a proper fertilization program.

Manage pasture for parasites

Veterinary Parasitology

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The effect of birdsfoot trefoil (*Lotus corniculatus*) and chicory (*Cichorium intybus*) on parasite intensities and performance of lambs naturally infected with helminth parasites

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