

LIVESTOCK NEWSLETTER

Hay Making Tips and Tricks

Steve Duckett, Buncombe County Extension Director

Hay is an integral part of most livestock production systems in the Southeast. Producers can either produce their own hay or purchase it from a hay producer. It is vital for livestock producers to understand the processes of growing, harvesting, and storing hay if they are producing their own hay or purchasing their hay. These processes influence the nutritive value of the hay which can alter livestock performance. By understanding the changes that can take place during hay production, the nutritional program can be altered to maintain livestock performance.

Prior to the hay season and before each harvest all hay equipment should be thoroughly examined and serviced.

All equipment should be greased, gear oil levels should be checked and filled, wheel bearings should be serviced, and tires should be checked and inflated. Mower sections and blades need to be sharpened or replaced prior to the start of the haying season and should be checked before each mowing. Failure to ensure that the haying equipment is in good working condition can delay harvest. We all know that a spring shower can pop up at any time and this broken equipment can affect whether or not you get your hay up in good shape. This delay in harvest results in an inestimable amount of damaged hay on a yearly basis.

Hay should be harvested at the point when quantity and quality are both optimized.

Factors such as weather, equipment failures, off-farm employment, and other obligations can lead to delaying the harvest of hay. Forage quality typically decreases with increasing maturity. As forages mature, the leaf-to-stem ratio decreases. Higher proportions of stem result in higher concentrations of fiber and lower concentrations of crude protein and digestible dry matter. The management of forage crops is not just limited to producing a single high-quality crop. Most forages that are utilized for hay need

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time for adequate regrowth to maintain the stand. Cool-season grasses such as tall fescue and orchardgrass should be harvested at the boot or early heading stages of growth for the first cutting and then at 45-60 day intervals thereafter. These harvest times should provide the best compromise between nutritive value and yield whenever possible.

Special attention should be paid to the height at which you cut your hay.

The height at which forages can be cut is dictated by where they store their growth reserves. For instance, alfalfa stores its growth reserves underground and can be mowed very close to the ground. Bermudagrass and white clover both store growth reserves in stolons or “runners” that lay on the soil surface and are unaffected by cutting height. In contrast cool-season grasses such as orchardgrass, smooth brome grass and tall fescue need a stubble height of 2 to 3 inches as they store their growth reserves in the stem base. When these forages are mowed too close to the ground the stand may be weakened.

Most summer annual forages require a higher (6-8 inches) mowing height for adequate regrowth. Another reason for increasing the cutting height in these forages is the accumulation of nitrates. Concentrations of nitrates typically are greatest in the lower portions of the stem, by increasing the cutting height, this portion of the forage remains as stubble. Maintaining a cutting height of at least 8 inches will encourage regrowth and decrease the risk of nitrate poisoning.

Hay Moisture

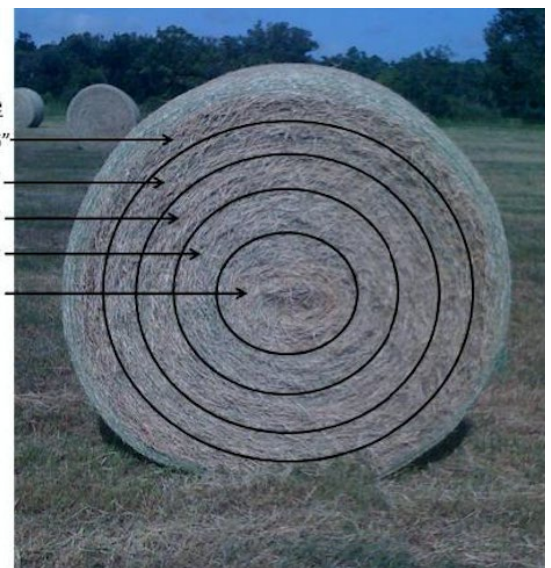
Hay moisture at baling is a critical factor in determining superior hay quality and long-term storage life. Moisture, in the form of dew or rain, can seep through the hay to some degree, while moisture in the hay stems will not. However, stem moisture at high levels can cause even more spoilage. Moisture for large square bales should be no more than 12 to 15 percent at baling. For round bales, 16 to 20 percent is acceptable. Moisture content for small square bales is similar at 18

to 20 percent. We should also avoid baling at very low moisture, as this increases leaf shatter which results in nutrient loss.

Hay Storage

Storage of hay at the edge of the hay field on the ground leads to greater deterioration of the hay, especially on the outside 6 inches. Approximately 50 percent of the storage losses can be attributed to the soil/hay interface when hay is stored outside and on the ground. Dry hay acts like a wick drawing moisture out of the soil and into the hay bale. Air movement may not be as great around the bottom of the bale as it is

In a 5.5 ft diameter round bale
 33.1% of the bale is in the outer 6"
 26.4% of the bale is in the next 6"
 19.9% of the bale is in the next 6"
 13.2% of the bale is in the next 6"
 7.4% of the bale is in the inner 6"



around the top. This can be affected by the shape, and density of the bale and the storage site. Improper storage can lead to moist conditions within the bottom of the bale that promote microbial activity.

Numerous methods have been used to elevate hay stored in the open. These include using telephone poles, pallets, railroad ties and pipe to raise the hay off of the ground. These bases should allow for some air movement under the bales and also prevent the hay from sitting in standing water. The storage site for hay stored outside should be in a sunny, breezy, well-drained area. This location should be near the top of a slope if possible and have a southern exposure. Rows should be oriented so they run up and down the slope, as rows running across the slope will trap runoff after a rainfall event. Bales should be butted up against each other within a row while adjacent rows should not touch, with a gap of at least three feet between rows.

To put storage losses in perspective, a Kentucky study (Burdine et al., 2005) evaluated five different hay storage methods and the effect each method had on dry matter loss:

Outside on the ground - 30% DM loss

Outside on gravel pad - 20% DM loss

Outside on gravel pad w/tarp - 10% DM loss

Plastic bale cover - 7% DM loss

Under roof - 5% DM loss

The data above shows that even if we do a near perfect job getting hay harvested, we can waste all that effort if we don't use good storage techniques. If you have questions on this topic, please call your local Extension Agent for more information.

Hay Sampling and Evaluation

Addison Bradley, Transylvania County Livestock Agent

Many may ask why it is necessary to test hay for quality. Is it possible to judge the nutritional value of hay simply by a visual inspection? Visual inspection is the first step in determining quality, but it is not the most effective. There is a variety of reasons to sample and test hay; the primary reason being economic benefit to the operation. However, another major benefit is improved animal nutrition, which improve overall animal health and production.

Multiple factors effect hay quality: species of forage, harvesting process, stage of maturity at harvest, soil condition, and percentage of undesirable species in the cutting. A few of these factors may be evaluated by physical inspection. If you purchase hay, rather than produce hay, be certain to weigh the bales. It is financially irresponsible to buy per bale if one bale weighs 600 pounds and the other weighs 800 pounds when the cost of each is \$40. The most effective means to purchase hay is to purchase by the ton, not the bale. When evaluating the color of hay, hay that is green or yellow (sun-bleached) generally has the best quality. If you notice black or brown spots, check for obvious mold. However, to be certain the hay is a valuable feed source for your animals, you must take samples and have the hay analyzed.

The first step in taking a sample of hay is to obtain a core sampler (forage probe). This tool allows for a more representative sample. You may borrow a core sampler from your county's Extension office. Next, determine the lot of hay you wish to sample. For example, if you harvest your own hay, a lot may be a certain field, if you buy hay, your lot may be a certain load received from a producer. Once the lot is determined, sample 10 to 15 bales, or enough to fill a quart bag. The core sampler should be inserted at a ninety-degree angle to the bale, on the string or wrapped side of a round bale and on the end of a square bale. If core sampler is not used, open multiple bales and grab from the most center of the bale and fill a gallon bag full. Once all samples are obtained, choose a testing center. There is a variety to choose from; however, N.C. Department of Agriculture will test hay for \$10 per sample. The instructions for mailing are available on the N.C.D.A. website. If you are unable to visit the website, your Extension office will be able to provide the form and shipping instructions.

The sample results will provide an as-fed and dry matter basis. The dry matter results are based upon the nutritive value after all water has been removed, and makes it possible to compare multiple lots of hay on an "even playing field". The sample results will include percentage of crude protein, acid detergent fiber (A.D.F.), total digestible nutrients (T.D.N.), along with many other values. The best way to use this information is to sort hay by highest quality to lowest quality, and then match the hay to your animal's needs (nutrient requirements). Nutrient requirements of animals fluctuate throughout the year and depend on stage of production, body condition score, and age of the animal. See Table 1 for nutritional value based on stage of production.

Table 1. Daily Dry Matter Intake and Diet Nutrient Densities for Beef Cows

Nutrient	Months since calving											
	1	2	3	4	5	6	7	8	9	10	11	12
1,000 Pound Mature Cow Weight (20 lbs peak milk)												
DMI, lb/d	24	25	25.4	24.4	23.5	22.7	21.1	21	20.9	20.8	21	21.4
TDN, %	59.6	60.9	58.6	57	55.4	54	44.9	45.7	47	49.1	52	55.7
CP, %	10.54	11.18	10.38	9.65	8.86	8.17	5.98	6.16	6.47	6.95	7.66	8.67
Ca, %	0.3	0.32	0.3	0.27	0.24	0.22	0.15	0.15	0.15	0.24	0.24	0.24
P, %	0.2	0.21	0.19	0.18	0.17	0.15	0.11	0.11	0.11	0.15	0.15	0.15
1,200 Pound Mature Cow Weight (20 lbs peak milk)												
DMI, lb/d	26.8	27.8	28.4	27.4	26.5	25.7	24.2	24.1	24	23.9	21.4	24.6

As I sit here writing this article, we are in the dog days of summer and the last thing we are thinking of is feeding our animals in the winter. One of the greatest expenses for livestock producers is winter feed costs. Profitability in most livestock operations is dependent on low feed costs. One way to lower these costs is to stockpile forages for fall and winter grazing.

In western NC, tall fescue is the most desirable grass to stockpile for late fall and winter grazing. During the fall, fescue produces higher yields of stockpiled forage and of superior quality compared to most other grasses. Stockpiled fescue is actually higher quality than the good quality fescue hay that you normally feed your animals in the winter. The fall-saved forage is very palatable, high in protein and in digestibility. Forage quality losses from leaf deterioration after frost are lower for tall fescue compared to most other forages. In the foothills, tall fescue will stay green and may even grow a little during our warm winter days. It forms a strong sod that is tolerant of trampling damage, which is common on wet pasture soils during the winter. Winter grazing has minimal influence on yield or quality of this grass the following season.

Tall fescue has received a bad reputation over the years because animals do not graze it readily during the summer months. Some of this

reduced summer palatability is associated with the presence of a fungus in the plant (endophyte). The fungal endophyte produces alkaloids that are toxic to animals and cause various animal health problems. The majority of our existing fescue stands are endophyte-infected, but the level of infection varies

concentrations. This fungus is found in higher concentrations in the seedheads and stems, so the amount of toxin consumed in the fall is less than in the spring and early summer. The cooler temperatures in the fall and winter also reduce the heat stress problems associated with endophyte-infected fescue.

Two components to consider when planning to stockpile tall fescue are the desired level of forage quality and yield. You should consider the type of animals that will be grazing the stockpiled fescue. Younger, growing animals and lactating animals, of course, will need higher quality forage. If you are grazing these animals, then you should focus on the quality. If your goal is yield, which will save you from feeding as much hay, then you need to consider boosting this stockpiled grass with a nitrogen

Stockpi

Jeff Bradley, Rutherford

application. You may be after a balance between soil health and productivity. Important management factors that will affect tall fescue are: (1) The date of the last summer harvest and the date applied, and (3) the amount of manure applied.

When do you begin to stockpile fescue? It is best to begin stockpiling tall fescue growth in late October or early November. A nitrogen application of 50-75 lbs/acre, the first of the year, in December, or at the time you would normally apply nitrogen to pastures that cattle are coming off of from summer pastures, is recommended. If fields are fenced and you can turn animals into the fields, this is ideal. If fields are not fenced, but this problem can be managed.

Stockpiling works best if you ration the forage. Use a temporary electric fence that you will move forward each day, and spread manure around that section. If you move a temporary fence forward each day, you will utilize the stockpiled forage more efficiently and get a more even distribution of manure. This daily rotation will also keep the cattle from lounging in an area of the field that still has good forage available. You will spend about the same amount of time moving a fence as you would feeding them hay.

If you have any questions concerning winter stockpiling, feel free to contact Jeff Bradley at the Rutherford County Cooperative Extension Center at 287-6022.

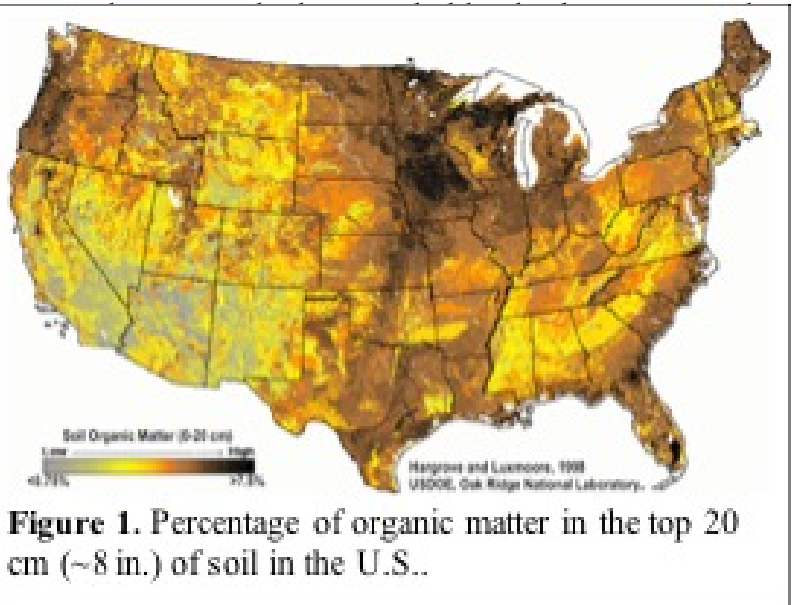


Figure 1. Percentage of organic matter in the top 20 cm (~8 in.) of soil in the U.S..

Pasture Health: Looking Below The Surface

Dr. Dennis Hancock, University of Georgia, Forage Specialist

The most important and least appreciated component of most farm operations is the organic matter in the soil. Some folks will read that first sentence, roll their eyes, and stop reading. For those who have continued reading, I'll let you in on a little secret. If you want to increase your farm's return on investment, focus on protecting and improving soil organic matter (OM).

What is Soil Organic Matter?

Scientifically speaking, soil OM is a collective term that refers to the amount of

carbon-based material in the soil. In a sense, soil OM quantifies the living component of the soil (i.e., roots, fungi, bacteria, earthworms, etc.). Many do not realize that the soil is alive. It is a bustling metropolis of activity. Healthy soils have more species at work in one teaspoon than there are people in our whole country. The number and type of these organisms are an indication of how much productivity is occurring in a soil. There is a tremendous amount of diversity in the OM levels in the soils of the U.S. (Figure 1). It is no accident that the most productive farmland in

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species in the cutting. A few of these factors may be evaluated by physical inspection. If you purchase hay, rather than produce hay, be certain to weigh the bales. It is financially irresponsible to buy per bale if one bale weighs 600 pounds and the other weighs 800 pounds when the cost of each is \$40. The most effective means to purchase hay is to purchase by the ton, not the bale. When evaluating the color of hay, hay that is green or yellow (sun-bleached) generally has the best quality. If you notice black or brown spots, check for obvious mold. However, to be certain the hay is a valuable feed source for your animals, you must take samples and have the hay analyzed.

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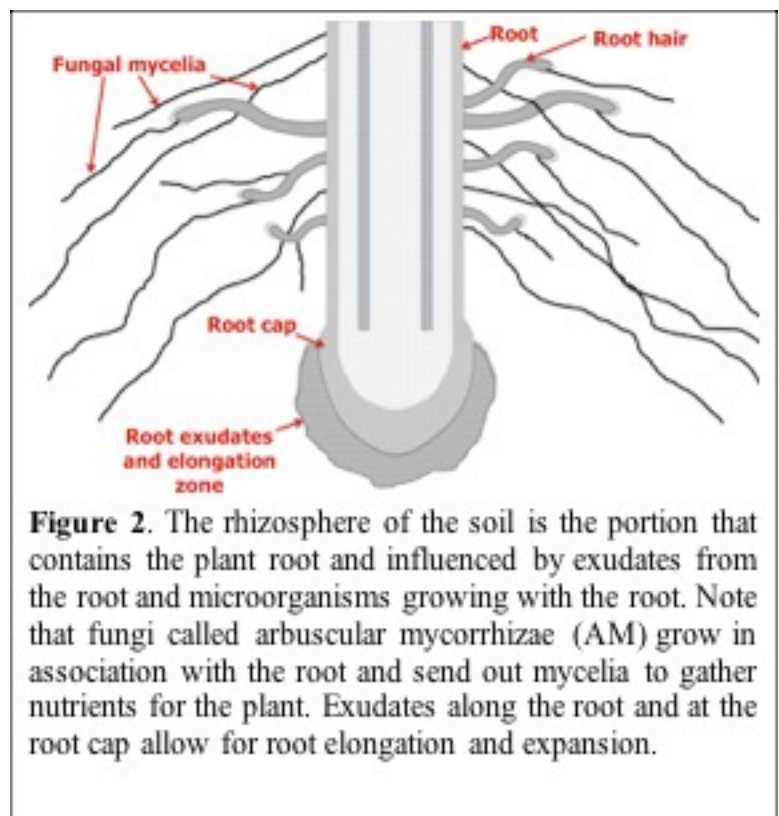


Figure 2. The rhizosphere of the soil is the portion that contains the plant root and influenced by exudates from the root and microorganisms growing with the root. Note that fungi called arbuscular mycorrhizae (AM) grow in association with the root and send out mycelia to gather nutrients for the plant. Exudates along the root and at the root cap allow for root elongation and expansion.

wish to sample. For example, if you harvest your own hay, a lot may be a certain field, if you buy hay, your lot may be a certain load received from a producer. Once the lot is determined, sample 10 to 15 bales, or enough to fill a quart bag. The core sampler should be inserted at a ninety-degree angle to the bale, on the string or wrapped side of a round bale and on the end of a square bale. If core sampler is not used, open multiple bales and grab from the most center of the bale and fill a gallon bag full. Once all samples are obtained, choose a testing center. There is a variety to choose from; however, N.C. Department of Agriculture will test hay for \$10 per sample. The instructions for mailing are available on the N.C.D.A. website. If you are unable to visit the website, your Extension office will be able to provide the form and shipping instructions.

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Soil OM also provides a major improvement in the structure of the soil. Soil OM helps soil particles to aggregate or clump together. These large aggregates are a sign of healthy soil. Soil with larger aggregates allows water to infiltrate faster, absorbs more water, and decreases runoff. Because the soil more readily absorbs water, greater OM levels also can substantially decrease erosion.

Get to the Root of the Matter

To better understand soil OM, one needs to better understand the rhizosphere. The rhizosphere is the portion of the soil that is penetrated by the roots of plants and subjected to exudates secreted from the roots and

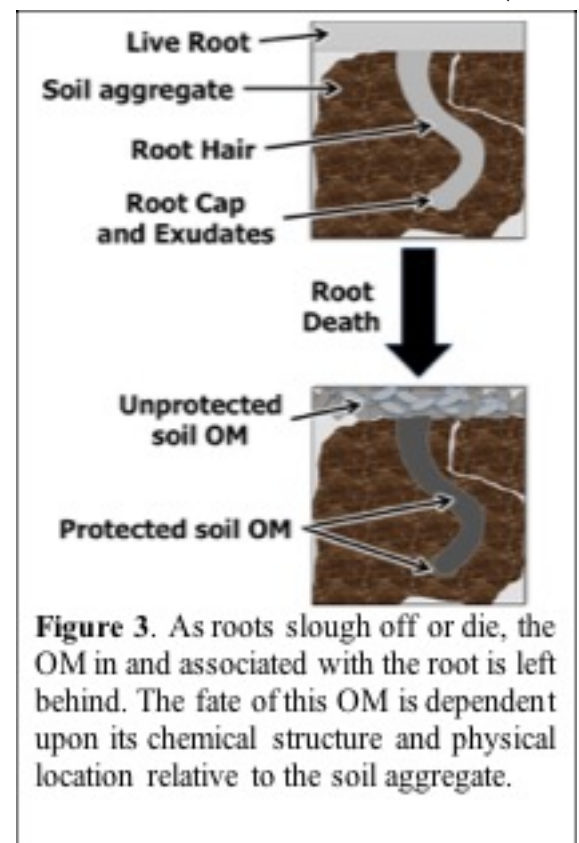


Figure 3. As roots slough off or die, the OM in and associated with the root is left behind. The fate of this OM is dependent upon its chemical structure and physical location relative to the soil aggregate.

micro-organisms associated with the roots. A basic depiction of a rhizosphere is provided in Figure 2.

The reason the rhizosphere is so important is that approximately 80% of soil OM is believed to be derived from roots, root exudates, and associated microorganisms. There are two basic types of root-derived exudates along the root and in the root elongation zone: 1) water-soluble exudates, such as sugars, amino acids, and humic, fulvic, and other organic acids and 2) water-insoluble materials, such as decaying cell walls and other root debris, along with a biopolymer called suberin, which is a lubricant that roots exude to grease a path into or through a soil particle.

Growth of new roots, especially fine roots and root hairs, also results in an increase in fungi that live in association with the roots. These fungi, broadly referred to as arbuscular mycorrhizae (AM), live in a mutually-beneficial relationship with these new roots and root hairs. The root provides the AM with energy and nutrition and the AM gathers mineral nutrients from the soil for the plant. The AM also exude a glycoprotein called glomalin. Glomalin is a glue-like compound that holds soil particles together into aggregates. Glomalin is literally the glue that holds the soil together. Soil scientists believe that glomalin may be one of the most important contributors to soil OM, as it is estimated that it makes up around one-third of all carbon in the soil.

Stimulating Root Production and Turnover

To produce more soil OM, one must stimulate new root growth. The roots of grasslands, whether in a pasture, hay, or silage field, are regularly turned over. The frequency of this turnover is dependent upon how frequently the crop is cut or grazed. Each time a forage crop is grazed or cut, the root system dies back. As regrowth begins, new roots are formed and a new flush of exudates is released. But, don't worry about the root exudates from the last growth cycle. Research suggests that many of the root exudates may last for over 50 years in the soil, if it remains in grass and is not tilled or aerated. Even the roots themselves take a while to deteriorate, as their lignin content is more than 2 times greater than the lignin concentration in the above ground mass.

But, not all defoliation is the same. Work in Georgia has shown that grazing bermudagrass can raise soil OM in the surface 2 inches by 50%+ in 5 years, while haying it only increases soil OM by 10% and leaving the land fallow will only increase it by 20%. In that study, intensively managed grazing at a land's carrying capacity resulted in the top inch of soil having a 2.2-fold increase in microbial biomass.

The effect of grazing is not always the same. A different study of the effects of grazing on soils in Georgia showed that soil OM in row crop land increased from about 1.0% to over 3.5% within 8 years of conversion to intensively-managed, rotationally grazed dairy pastures. However, research done on the shortgrass and tallgrass prairies on the Great Plains show that grazing increases the number of fine roots in the top 4-6 inches of soil in shortgrass prairies, but not in tallgrass prairies. In fact, grazed shortgrass prairies were observed to have slight increases in total (fine + coarse) root

2018 WNC Small Ruminant Workshop Roundup

Brent Buchanan, Area Specialized Agent, Dairy

Nearly 30 enthusiasts of sheep, goats, llamas and alpacas plus around a dozen Cooperative Extension staff gathered on a Saturday in May for a series of informative presentations held at the Western NC Regional Livestock Center in Canton. Topics included: controlling predation, health and animal management, marketing, genetic selection, forages and nutritional management, identifying parasites, trimming hooves, and tips on deworming. It was a full day that included displays from several sponsors, ample time for asking questions and interacting, as well as the opportunity for hands-on learning.

Seth Brown, USDA Wildlife Services from Arden, NC discussed the various programs that his office assists with (including beaver management, rabies vaccines for wildlife, migratory birds, wildlife hazards at airports and technical assistance). He mentioned that determining if you have a predator problem is an important task since predators can cause changes in behavior of livestock which may be a pre-cursor to death loss events. Torn up ground, shredded ears or nervousness can all be signs to look for. Local dog predation may be discovered by comparing their more rounded footprint, relative to a coyote's, which is more oval. Also, dogs will generally be involved in multiple kills (more for sport) but often don't eat the carcasses. Whereas coyotes will generally kill a single animal and will eat the carcass from the inside out, preferring the innards as the most nutritious meal possible. Interestingly, Seth mentioned that coyote's canine teeth are

always 1 inch apart, unlike attacking dog's, which are typically wider apart. So, you might make a determination on the attacker from observing flesh wounds.

Best methods of deterring predators were suggested as well. Fencing is the number one predator deterrent on Seth's list, preferring a 4-5' high woven wire perimeter fence. Secondly, night penning within a 100% coyote-proof fence, especially during the vulnerable kidding/lambing times, was suggested. Third on the list is to deter through your human presence, where physical harassment (chase them, shoot over their heads, use solar LED predator guard lights, etc.) can move them to easier targets someplace else. Fourth is guard animals (dogs, donkeys, llamas, etc.) and fifth is trapping and shooting coyote predators. Seth can assist you in any of the above and is happy to have a conversation with you.

The next presentation was the keynote speaker from VA Tech, Dr. Scott Greiner. As their beef and sheep specialist, he discussed various health issues common to small ruminants and how to manage them. Managing parasites is a primary concern where a customized plan must be put in place for each individual farm system, since it's not a one-size-fits-all type problem. He mentioned the three primary classes (benzimidazoles, macrolides, and imidazothiazoles) of dewormers and suggested that the current advice is to use one product/class consistently until it no longer is effective, then switch to another class. Additionally, he recommended only treating those animals who need de-worming by conducting a regular FAMACHA scoring

program. The primary life-threatening parasite of small ruminants is the barber pole worm (*Haemonchus contortus*), a blood-sucking, anemia-creating, silent killer. FAMACHA scoring will assign a numerical rank relative to the coloration of the ocular mucous membrane (capillary bed of the lower eye lid) of a small ruminant. Treatment protocols can be enacted based on the results of the FAMACHA test, which should be performed on a regular basis (weekly if grazing lambs and perhaps every three weeks for larger animals). Additionally, pasture-management, attending to herd or flock genetics, appropriate culling, proper management of new animals entering the farm, and proper weight estimates for proper drug dosing are all important considerations for parasite management.

Foot health was discussed where Dr. Greiner mentioned the importance of controlling foot rot through good hygiene, biosecurity (segregate since it is so contagious) and proper treatment (trimming, footbaths, antibiotics and topicals). Reduction of diseases causing abortions can be largely accomplished through good flock biosecurity and a proper vaccination program against *Chlamydia* and *Campylobacter* organisms. Prevention can be assisted by keeping the first lambing ewes separate from the rest of the flock, not feeding on the ground, disposing of afterbirth and any death-losses immediately, isolating sheep who abort, and by feeding antibiotics or Rumensin (by a vet's prescription and not the Rumensin variety used for cattle).

General nutritional or metabolic diseases affecting small ruminants comprise a large list of maladies that can be combated through a proper diet, feeding various supplements, and through a good vaccination program. By understanding the issues surrounding these diseases, you can target your resources. Overeating disease (enterotoxemia) can be a problem in fast-growing lambs or kids but can also affect heavy-milking dams. Vaccination and good feed management to keep animals from getting too hungry between meals, can keep this clostridia organism at bay. Paying attention to energy, protein, calcium, phosphorus, and sulfur needs as well as maintaining the proper body condition score can help to keep other metabolic conditions away (ketosis, milk fever, dystocia). This often requires keeping more than one pen, to be fed appropriately for their class of animal.

For breeding programs, Dr. Greiner suggested that the ram have a breeding soundness exam performed and that a marking harness be employed with a new marker color every 17 days. This lets you know if he is finding new ewes in estrus, or is he simply re-breeding the same ones (likely his infertility issue). Typically, ewes do not cycle in May and June (long days). Keep records on marked ewes to place in appropriate management group at expected lambing time. Flushing ewes two weeks prior to breeding season by supplying them with a pound of grain per head per day can significantly increase the eggs ovulated. However, this works better on slightly thin ewes as opposed to fatter ones.

When processing lambs and kids, if docking and/or castration are done, the sooner the better (2-5 days of age) to limit stress. Wool sheep really should be tail docked to prevent fly strike, but hair sheep don't need to be. If rams are kept intact for 90 days and then marketed, no need to castrate. However, if rams are kept longer, separate facilities are warranted to keep growth rate up and not have unwanted pregnancies of ewe lambs. Tetanus toxoid vaccines and/or the anti-toxin should be part of the management protocol when castrating.

Markets for sheep and goat meat in the US are small (less than 1 lb per capita). However, ethnic markets in Atlanta makes NC a logical choice for raising sheep and goats. Markets range from stock yard, direct-sales, freezer trade, ethnic or religious, retail grocers, restaurants, 4-H Club sales, breeding stock and specialty products. One must consider freight, shrink, fees & commissions, supply, demand, weight, grade, and type as they can all impact the price you receive. Most regions somewhat near New Holland, PA send livestock there since the prices are consistently higher than other markets. But distance from NC to PA is a deterrent and reinforces looking towards Atlanta. A wool pool exists for marketing wool collaboratively with VA and NC. The next event is July 11 at the WNC Regional Livestock Center when collected wool will be shipped to Ohio and eventually marketed.

Genetic selection was also discussed where Dr. Greiner suggested that hair sheep tend to be more parasite resistant, relative to wool sheep. Overall, genetics can influence lambing season, lambing rate, growth rate, feed efficiency, as well as parasite impacts. Since parasite resistance is heritable from .3 to .5, it is passed on to offspring at a rate similar to growth rate. So, writing down fecal parasite egg count data for individual animals can allow you to use this information to help you cull out those who consistently carry a high worm load. At VA Tech, they maintain an annual ram lamb evaluation that follows a simultaneous deworming protocol using one product from each of the three dewormer classes. Rams that test positive for parasites after the treatment are immediately removed from the study. Then they give the rams a measured, consistent dose of worm larvae and those who require further treatment with a dewormer are also removed from the study. Thus, those tested for carcass quality and growth attributes are proven to be able to handle a certain parasite load and still be productive. Genetics can help, even with parasites! The rams from this test are made available to be purchased, and command a good price.

The next speaker was Dr. Deidre Harmon, Extension Livestock Specialist with NC State, who covered forages and nutritional management. The five basic needs of livestock nutrition: protein, energy, vitamins, minerals and water were touched upon. Interestingly, research has shown that cattle drinking water from a fresh water trough out-performed those drinking from a pond (calves gained .25 lb more daily and yearlings gained .33 lb more daily). Regarding vitamins, fat-soluble types (A,D,E, K) tend to have specific sources (A=leafy green forages, D= sunlight, E=forages but sometimes needs supplementation, K=rumen microbes supplies). Vitamin C and B-complexes are also synthesized by rumen microbes. Minerals can be the cause of health issues, depending on whether they are present or not, and whether the ratios are appropriate. For example, calcium:phosphorus ratios are preferred to be 2:1 and overall levels play a role in disease conditions (milk fever, urinary calculi, etc.). Copper excesses are possible, leading to toxicity, especially in sheep. But enough copper is necessary to prevent disease as well. Sulfur imbalances can invoke polio-like conditions. So, paying attention to vitamin and mineral nutrition can be a great step towards good overall health.

Dr. Harmon discussed that forages come in both the fresh (pasture) and stored (dry hay and fermented) varieties. In pastures, there are two basic camps: non-intensive (continuous) and intensive. Intensive pastures when properly managed can increase forage productivity, increase persistence of desirable plants, while reducing the number of weeds. Further, intensive pastures can increase nutrient distribution (manure), increase utilization of forages, increase the stocking rate, and so can increase the gain per acre. One important feature that intensive pasture management

provides is an increased rest period which in turn helps the plant recover from being grazed, keeps roots vigorous and healthy, increases water and soil nutrient uptake, and increases the amount of growth the plant is capable of. Studies have shown that lambs were worth \$30 more when grazed intensively, rather than continuously.

Stored forages, can lose nutritional value if improperly stored. Ideally, hay should be stored inside, but next best is covered (tarp) and up off the ground (like on a pallet). Some traits of properly-stored, high quality hay can be recognized by look, feel, and smell; but other traits may not be so obvious and require sampling and testing.

Addison Bradley (Transylvania County Livestock Agent) and Jeff Bradley (Rutherford County Livestock Agent) tag-teamed on the next topic of identifying, testing, and allocating your forages properly. It is very difficult to guess the nutrient content of forage, so getting a proper, representative sample and sending it out to an appropriate lab for analysis is important. Only then can you label, segregate, and appropriately target which livestock get which forage and which animals need particular supplements for good health and efficient productivity. When sampling, be sure to run the sampling probe (available typically from your Extension Agent) through the largest cross section of the bale to get the most composite sub-sample possible and combine samples with others from the same field. Once you get your hay analyzed, you can better estimate what your hay needs will be and plan accordingly.

An exercise for a door prize was conducted where everyone learned that only the hay dealer in the crowd was able to accurately guess the weights of small square bales. So, sample, test it, and weight it for best results. When buying supplements, comparing price (per unit of weight preferably), moisture content (because water isn't always free) and nutrient content (because we are buying particular nutrients or stand-ins for nutrients, like crude protein, TDN, etc.) is the only way to maximize your hard-earned dollars. One rule to take home: "Unless you test, it's just a guess!". One bad joke to take home (credit a 4-Her): What do you get when you cross a sheep and a cow? An animal with a baaad mood!

Michelle South, Area Livestock agent in Mitchell and Avery Counties demonstrated use of a microscope and McMaster Method Microscope slides to count parasite eggs from fresh manure samples. Using a computer-linked camera and flat screen, all could observe what she saw under the 4x-10x magnification from the scope. Equipment included the microscope, the McMaster slide, a gram scale (or a volumetric guide, like a 2 cc syringe or other container to measure a consistent 2 gram sample), a stainless steel sink drain screen (from dollar stores to strain out inert debris), fecal float solution (vet supply or home-made from epsom salts), stirring stick, a 1 cc syringe or a pipette (to transfer liquid from the top of the float solution to the reader slide), and small disposable cups. Local Extension offices might be able to help with the microscope part if you don't have one yet.

The process, in all, went something like this: take a fresh sample that is unadulterated (fresh out of the animal if possible). For goats: take ten pellets, cattle: one gloved handful, horses: two large (that's how they come) pellets (we used to call them road apples when I lived in Amish Country) and refrigerate or place in a cooler immediately if not floated right away. Weigh or measure out a 2 gram or 2 ml sample (typically equals about two goat pellets) and place in disposable cup, then add 28 ml of the fecal float solution. Mix thoroughly, being careful to crush up

and liquefy all of the fecal sample into the salt solution. Next, pour the slurry through the stainless sieve into a second cup (separates debris from the sample material of interest) and stir again. Parasite eggs will gradually float to the top of the solution, so wait another 1-5 minutes before pipetting (or syringing) off 1 ml from the top-most portion of the cup. Hold the McMaster slide at an angle, then smoothly add the fluid to fill one chamber, then the next, of the slide. The trick is to fill them without bubbles and without letting the solution run right out the other side of the slide. Next, you place the slide under 4x and move to 10x magnification, start on the bottom right of the grid and zig-zag up one row and then one column at a time until the entire section is counted. Don't be confused by pollen, which looks like a Mickey Mouse head/ears. You are looking for parasite eggs only. Once you count one chamber, count the other chamber and add them together, then multiply by 50. If lactating dairy animals, deworm if over 750 counts, if non-lactating (dry) adults, deworm if over 2,000 and if growing lambs or lactating non-dairy animals, deworm if over 1,000. Potential signs of worm troubles include: bottle jaw, coarse coat, emaciation, bloat, or a bad FAMACHA test.

The next hands-on portion of the day was led by Noah Henson (Agriculture Agent in Henderson, Polk, and Buncombe Counties) and Craig Winger (Agriculture Agent in Clay County) and demonstrated proper hoof trimming and hoof management techniques in goats. They suggested using a small pair of bypass shears for trimming small hooves and keeping a sharpener handy to ensure they are sharp at all times. Restraint for the animal can be had by using a turn-table or a fitting or a milking stand. Such devices get the hoof closer to a height that benefits the humans, too. Otherwise a simple halter can help in enough restraint to get the job done.

By removing small amounts of hoof at a time, you can look for a pink color that will appear as you approach the active blood supply of the hoof. This lets you take enough off to be effective, yet ensures you stop short of drawing blood. You want the hoof to sit flat on the floor, be stable and not rock once you are done trimming. Since the outer wall grows faster under higher nutrition conditions, and can be softer under moist conditions, the need for trimming can vary with the seasons. Hoof diseases, such as foot rot can be diagnosed by observing a limp as well as by the bad odor the bacterial infection gives off. Noah and Craig suggested using disposable gloves for hoof work since the potential bacteria are unpleasant and the products typically used on hooves can stain your hands. Commercial products such as Kopertox, zinc sulfate, Hoof 'n Heel, and some antibiotics can be effective in helping to cure some hoof conditions such as foot rot or foot scald. Timely observations and subsequent treatment are important since foot scald left untreated can lead to foot rot, and that bacterial infection in-turn can be passed on to other animals in the herd or flock.

The final presentation of the day was led by Ethan Henderson (Livestock Agent for Haywood County) and Adam Lawing (Livestock Agent for McDowell County) and the topic was deworming. The barber pole worm is the largest concern for small ruminants as it is a blood feeder from inside the intestines of sheep or goats and can extract as much as one tenth of the animal's blood per day! Signs to look for include un-thriftiness, poor body condition, and possibly diarrhea. The environment as well as the stage of production of the animal can have a significant impact on parasites. Monitoring with a weigh tape or scales is very helpful. FAMACHA scoring (where the eye/lid is gently pressed in with one thumb and the other thumb is used to move the lower eye mucous membranes downward, exposing the bed of the membranes so that color determinations can be made for both eyes), can help determine if deworming is necessary. An increasingly white

coloration of this area corresponds to a higher FAMACHA score, and a greater potential for anemia. Treatment is suggested if the score is a 4 or 5 and may be necessary if a 3 under certain conditions. A deeply red or red membrane bed is indicative of a 1 or 2 score and suggests that no treatment is required. Scoring of both eyes and treating based on the worst of the two eyes is recommended.

Ethan and Adam detailed the three main classes of deworming products available: 1) white _azoles (least effective with most resistance in parasite population, 2) macrolides which include Ivomec and Cydectin products (safe with little overdose issues, but often not labeled for goats where their higher metabolism rate requires a greater dose than labeled for sheep), and 3) Levamisole products (strong and can have over-dose issues if an accurate weight is not determined for treatment). Again, it was emphasized that control of the barber pole worm is the primary concern in small ruminant production. Fed dewormers sold as a pelleted grain mixture can be difficult to manage since attaining the proper dose must take into account an animal's appetite and whether or not you group house with some dominant grain hogs in the bunch, which can skew the dosages individuals receive. The most reliable method is to use an oral drug (pour-ons don't work well for sheep due to their lanolin coating preventing penetration to the skin and can wreak havoc on washers and seals in your dosing guns). Use of a proper dosing tool is recommended to get the

product over their tongues, yet not so far down their throats that causes damage (so, just insert to the crook in the tube). O-rings of dosing equipment may require an occasional lubrication with mineral oil or other product to keep them from degrading.

An exercise was conducted where we guessed the actual weights of several goats and a ram housed in adjacent pens. Most of us realized that we weren't as accurate in guessing live weights as we need to be to consistently give the proper effective dosage without overdosing. Once you know the live weights (weigh tape or scale) you must rely on your dosing equipment to deliver what you expect. So, it's a good idea to check the calibration periodically to ensure accurate dosing.

The attendees were given a complete set of slides of all the presentations and these were well-used for note-taking and I'm sure they will be a valuable reference resource at home. Plenty of excellent discussions were generated and I'm sure attendees will be looking forward to the next educational event offered.



polled. Twenty-five percent of the estimated 30.5 million beef cattle in the United States undergo the dehorning process, which is a considerably large number. If seedstock producers expand the practice of utilizing homozygous polled cattle, the need for dehorning could be completely eliminated and would save time and money for other producers in the future. If cattle no longer have horns, producers would not have to spend money on dehorning equipment, labor, and anesthetics if used. They also would not need to spend time running animals into the chute for dehorning or spend time and effort overseeing and maintaining a healthy healing process. Dehorning causes stress to animals, but cattle that have been identified to be polled will not have to experience this stress. Polled cattle will therefore avoid stress-related weight loss, decrease likelihood of infection or death after the

started selectively breeding for cattle that do not have horns. Although there are some breeds that are highly recognized for their early dehorning can save producers a lot of trouble down the road. Producers who dehorn their cattle early avoid horn-related injuries and stress related weight loss in their herds. The figures from the 1992 National Beef Quality Audit mentioned above show that dehorning cattle early could bring the sinus cavity to the outside environment and increases the risk of severe infection. Additionally, there is less blood loss during disbudding; once the horn buds attach to the sinus, they begin to receive blood supply. Furthermore, younger calves are easier to

Some producers choose not to dehorn their calves because it is time consuming and some producers when considering all of the facets they do not see it as a direct benefit to their only have time and money to gain from dehorning

Student Spot

Kelly Moore and Grace Undergraduate Students in the College of Agriculture, NC State University

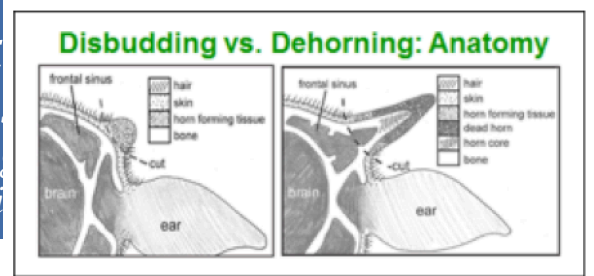


Fig. 1: Disbudding vs. Dehorning: Anatomy
 Disbudding (left) involves removing the horn bud before it attaches to the frontal sinus. Dehorning (right) involves removing the horn after it attaches to the sinus and receives blood supply.

month of age in order to prevent complications. Dehorning at an early age reduces the likelihood of infection or death after the procedure. If done prior to 8 weeks of age, it is termed disbudding. After 8 weeks of age, the horn buds become attached to the sinus and it is termed dehorning (Figure 1). Dehorning once the horn buds attach to the sinus exposes the sinus cavity to the outside environment and increases the risk of severe infection. Additionally, there is less blood loss during disbudding; once the horn buds attach to the sinus, they begin to receive blood supply. Furthermore, younger calves are easier to

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- Halifax Pasture Renovation Project
August 29, 2018
Halifax, NC
- Summer Forage Management Workshop
August 30, 2018
Second Chance Farms
Deep Run, NC

Agendas and registration information will be available soon.

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Up Coming Events

Alfalfa Bermudagrass Workshop

Date: August 23, 2018 (2:00 p.m. – 6:00 p.m.)

Location: Harnett Commons Area

NC BEEF Cattle Field Day

Date: October 6, 2018 (8:00 a.m. – 12:30 p.m.)

Location: Upper Mountain Research Station

NCBA Stockmanship and Stewardship Event

Date: August 24 and 25, 2018

Location: Clemson University's Ed Garrison
Arena

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