LIVESTOCK NEWSLETTER

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 are 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 improves 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

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obtained, choose a testing center. There are 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
TDN, %	58.7	59.9	57.6	56.2	54.7	53.4	44.9	45.8	47.1	49.3	52.3	56.2
CP, %	10.1	10.69	9.92	9.25	8.54	7.92	5.99	6.18	6.5	7	7.73	8.78
Ca, %	0.29	0.31	0.29	0.26	0.24	0.22	0.15	0.15	0.15	0.26	0.25	0.25
P, %	0.19	0.21	0.19	0.18	0.17	0.15	0.12	0.12	0.12	0.16	0.16	0.16
1,400 Pound Mature Cow Weight (20 lbs peak milk)												
DMI, lb/d	29.5	30.5	31.3	30.3	29.4	28.6	27.2	27	26.9	26.8	27	27.6
TDN, %	58	59.1	56.8	55.5	54.1	53	45	45.8	47.3	49.5	52.6	56.6
CP, %	9.76	10.31	9.56	8.94	8.29	7.73	6	6.2	6.53	7.04	7.8	8.88
Ca, %	0.28	0.3	0.28	0.26	0.24	0.22	0.16	0.16	0.16	0.27	0.26	0.26
P, %	0.19	0.2	0.19	0.18	0.17	0.16	0.12	0.12	0.12	0.17	0.17	0.16
1,600 Pound Mature Cow Weight (20 lbs peak milk)												
DMI, lb/d	32.1	33.1	34	33	32.2	31.4	30.1	29.9	29.8	29.7	29.9	30.5
TDN, %	57.5	59	56.7	55.3	54	53	45	45.8	47.5	49.7	52.9	60
CP, %	9.5	10.1	9.3	8.7	8.05	7.5	6.05	6.25	6.55	7.1	7.9	8.95
Ca, %	0.27	0.29	0.27	0.25	0.23	0.21	0.16	0.16	0.16	0.27	0.26	0.26
P, %	0.17	0.18	0.17	0.16	0.15	0.14	0.1	0.1	0.1	0.15	0.15	0.16

Compare your forage sample results with the chart to determine if your cattle are receiving adequate nourishment. Testing hay has the potential not only to save your farming operation money, but also to ensure the nutritional requirements of your animals are being met for maximum production. For further information regarding hay testing and sampling, interpreting your results, or nutritional needs of cattle, contact your county Extension office.

CONTROLLING THISTLES AND BUTTERCUPS DURING WINTER

Damon Pollard, Burke County Extension Agent-Agriculture

One of the most misunderstood weeds in our WNC pastures are thistles. A biennial, most of us don't really give them a second thought until they send up their stalk with those gaudy pink flowers and spread those downy seeds hither and yond. Usually, once we recognize the stalks and flowers they have already produced viable seed.

Those old stories about grandpa spending his winter days grubbing thistles, here appear to have merit. Thistles are not difficult to control with herbicides when they are treated at the proper stage of growth, but once they bolt and send up that woody stalk, control is not so easy, so treating thistles while they are in the immature rosette stage is critical.

Identifying thistles, and buttercups as well, can be difficult when the plants are immature, however, this time of year they can be identified fairly easily, as they are low to the ground, and very dark green, in a circular form, and have spiny points at the ends of each leaf. You can also use Google to find images of "musk thistle" or any other thistle, as well as buttercups.

After identifying the thistles and the numbers present, you'll need to decide if an herbicide application is warranted. If few are present, you may simply dig them out like grandpa. If they are sparsely located, you may be able spot spray with a wand or backpack. If you have a large number of rosettes you will probably want to treat the entire hayfield or pasture with a broadcast herbicide spray. Be sure that temperatures are sufficient for herbicide treatments. For 2-4-D you need an ambient temperature of 60 degrees Fahrenheit, and less than 85 degrees Fahrenheit, to avoid problems. Also avoid windy days where drift can cause problems.

There are many herbicide options for treating thistles in grass pastures and hayfields. Not many available for legumes such as alfalfa or clover, so be careful when treating in or near these crops. For treating thistles in grass pastures and hayfields in November and February, 2-4-D is the herbicide of choice, as it is readily available, and is the most cost effective. There are other options, but for thistles and many other weeds at this growth stage, 2-4-D will do an adequate job, and be less expensive. Always read the label and follow directions. 2,4-D applied in February will give control of many other broadleaf weeds such as mustard, chickweed and some buttercups.

Many herbicide labels recommend a surfactant in the tank mix to enhance their effectiveness, so read the label and follow the recommendations. Surfactants help reduce surface tension on the leaf and enable the spray solution to penetrate the leaf surface easier so that it is taken into the plant. Some herbicides already have the surfactant premixed into the product so no additional adjuvant is needed.

Thistles and most other weeds are more susceptible to herbicides when they are young and actively growing, usually less than 3-4 inches tall. Make sure that the weeds are actively growing so that herbicidal treatment will be effective. For most winter weeds, consider spraying when you have several days in a row above 60 degrees Fahrenheit. Warm sunny days stimulate growth in cool-season weeds, and they will be actively growing and controlled by herbicide applications.

Buttercups are also a problem in cool-season grass pastures, and are easily recognized

in early spring by their bright yellow flowers. Buttercups possess several weedy characteristics that make it difficult to control in pastures. Populations are usually greater in low areas of fields that tend to remain wet for long periods, and in pastures with poor stands of grass. Overgrazing usually increases the buttercup populations. Buttercups will germinate in fall and will be actively growing over winter.

There are many species of buttercups, each with different characteristics. The bulbous, hairy and small flower buttercups tend to be more common in pastures. Pasture management techniques promoting the growth of pasture grasses will provide competition and inhibit the growth of buttercups. These practices include proper soil fertility and pH, avoidance of overgrazing, timely mowing and herbicide treatments. It is important to treat buttercups with herbicides before flowering, as treatments after flowering require higher rates and will not prevent seed formation. Try to treat buttercups when in the rosette stage, during November or February, or both if needed.

Recent evidence that some species of buttercup are not effectively controlled with 2-4-D alone has required a new strategy. With most weeds such as buttercups, there are many factors involved with herbicide control because of species variety, so control may involve several seasons. In particular, the bulbous buttercup, will not be controlled by 2-4-D alone, and control can be achieved with applications of Weedmaster (2-4-D + dicamba) or GrazonNext HL. Applications of either of these herbicides will offer sufficient control of not just buttercup and thistle species, but many more species of winter annual and perennial weeds.

By controlling thistles and buttercups now, you can economize your weed control, taking advantage of herbicide effectiveness on the immature stage of growth, while controlling additional weeds, allowing your grass pastures and hayfields to flourish.

SOIL ORGANIC MATTER: THE SECRET TO SUCCESSFUL FARMING

Dr. Dennis Hancock, Professor and Forage Extension Specialist, The University of Georgia

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 the U.S. is located on soils where soil OM is very high (greater than 5.0%).

Why Does Soil Organic Matter, Matter?

Soil OM matters for several reasons. First, soil OM holds up to 90% of its own weight in water, so it acts like a giant sponge. Soil scientists have found that a 1 percentage point increase in soil OM can increase the soil's water holding capacity by 20,000-27,000 gallons of water per acre, which is nearly 1 acre-inch of water. An acre-inch of rain can sometimes mean the difference in profit and catastrophic losses.

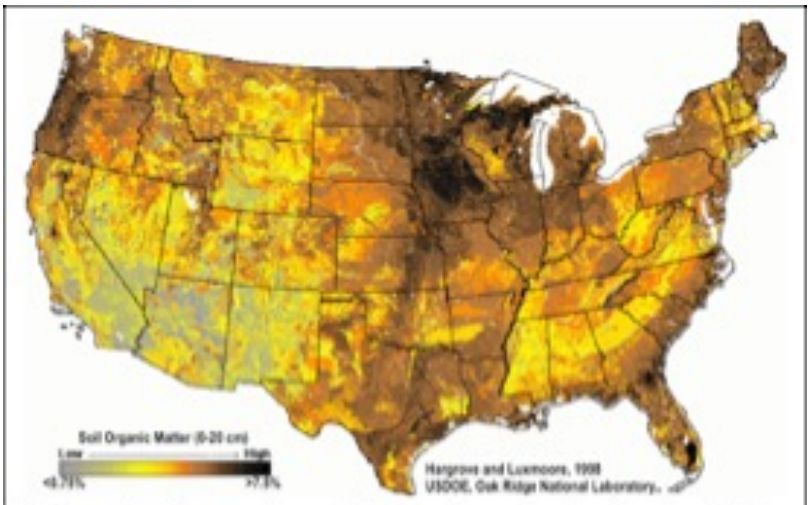

Figure 1. Percentage of organic matter in the top 20 cm (~8 in.) of soil in the U.S..

Soil OM is also a sponge for nutrients. It can hold up to 20 times more nutrients than an equivalent weight of sand, silt, or clay. As a rule of thumb, every 1% of soil OM will release 20-30 lbs of N, 4.5-6 lbs of P_2O_5, 10-40 lbs of K_2O, and 2-3 lbs of S per acre over the course of each year. Because this release is dependent upon biological activity, most of these nutrients will be released in warm weather (i.e., spring and summer) and may not be as beneficial to winter crops. Additionally, soil OM buffers against changes in soil pH. This means that soil pH of soils with high OM are much slower to decrease than low OM soils, allowing more years between lime applications.

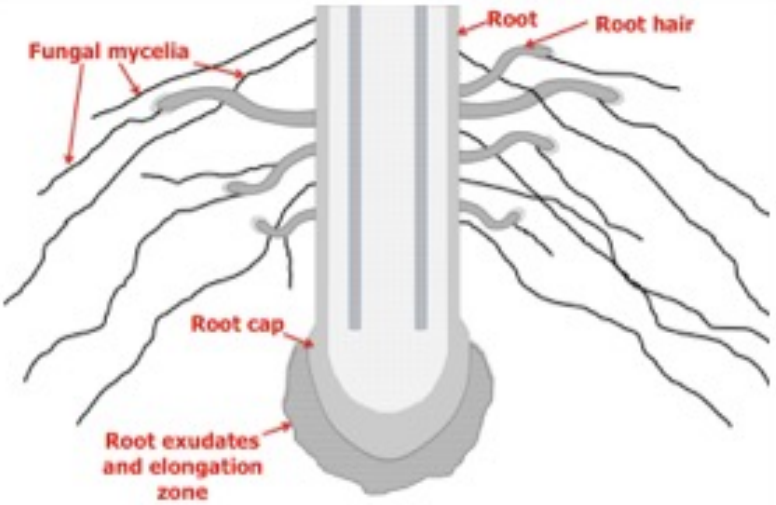

Figure 2. The rhizosphere of the soil is the portion that contains the plant root and influenced by exudates from the root and microorganisms growing with the root. Note that fungi called arbuscular mycorrhizae (AM) grow in association with the root and send out mycelia to gather nutrients for the plant.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

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 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.

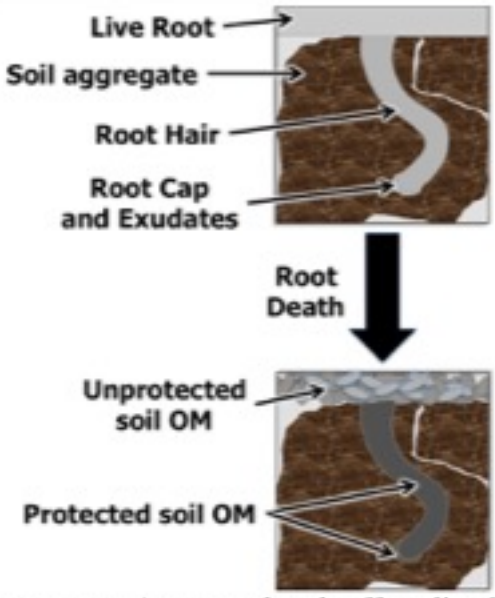

Figure 3. As roots slough off or die, the OM in and associated with the root is left behind. The fate of this OM is dependent upon its chemical structure and physical location relative to the soil aggregate.

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 biomass, but the same management of tallgrass prairies resulted in a decrease in total root biomass. Consequently, grazing resulted in increased soil OM in shortgrass prairies and a decrease in tallgrass prairies.

There are a number of other complicating factors. For example, heavily stocking pastures beyond their carrying capacity has been shown to rapidly deplete soil OM reserves. Recent research out of China has shown that as forage utilization rate goes above 50% due to overgrazing, forage yields and root production decreases. In that research, maintaining moderate stocking rates (i.e., at the land's carrying capacity) throughout the season optimized root production and soil OM. Even the location of shade and water sources can also play a role. In general, soils that are located closer than 200 ft from shade or water will have a measureable increase in soil OM over time.

Does Commercial Fertilizer Decrease Soil OM?

In pastures and range, commercial fertilizer has consistently been shown to benefit root production and soil OM in pastures that are managed for rotational grazing, but the impact on continuously stocked pastures is largely negative. The cycling of nutrients and regular re-inoculation of the soil with microbes via animal manure has a major positive effect. If manure is not added or it is poorly distributed across the pasture, the benefits of grazing are muted.

Recent reports from NE China on grasslands harvested as hay demonstrate these effects. They compared the long-term (25 years) effects of fertilizing with commercial N fertilizer; recommended levels of N, P, and K as commercial fertilizer; and manure with the balance of recommended fertility provided by commercial N, P, and K fertilizer. They found that the OM actually decreased in the top 8 inches of soil by nearly 15% when just commercial N or the NPK blend was used. However, if they used manure and added enough N, P, and K to meet the soil test recommendations, they increased soil OM in the top 8 inches by 33.4% and in the 8-16 inch depth by 47.3%! Manure is quickly decomposed, but this substantial increase in soil OM was not in the carbon fraction that is labile and quickly destroyed. The manure and NPK treatment bolstered the recalcitrant (stable) form of carbon in the soil. This is an indication of greater fungal growth and root development, as well as improved aggregate stability. The improvement is both to the benefit of soil OM and soil health.

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 foot print, 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 be able to determine 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 key-note 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 de-wormers 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 which 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 (tarped) 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 moood!

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 Wininger (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 and Forages 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 labelled for goats where their higher metabolism rate requires a greater dose than labelled 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.

DEHORNING OF BEEF CATTLE

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

One topic of Beef Quality Assurance (BQA) that has been debated for many years is the issue of dehorning cattle. Producers wonder whether dehorning is necessary when processing calves and if it is worth the trouble. Many producers have turned to polled breeds such as Angus and polled Herefords and have started selectively breeding for cattle that do not have horns. Although there are some breeds that are highly recognized for their horns, it appears that the majority of the cattle industry is headed towards breeding for polled cattle, and therefore eliminating a large amount of stress that calves experience during processing in the early stages of life.

Some producers choose not to dehorn their calves because it is time consuming and they do not see it as a direct benefit to their operation. However, a farm with dehorned cattle creates a safer environment for employees and the herd. Horned cattle are more likely to injure producers during handling as well as other cattle in the feedlots or during transportation. Injuries are more than welfare concerns because they can taint the carcass with bruising, create wasted meat, and lead to a loss in profit. When horned cattle are sent to market, they often receive penalties because of their increased risk of injury to humans and other animals. The 1992 National Beef Quality Audit shows that horned cattle result in a $1 loss for each animal slaughtered, with a total loss to the industry of $24.5 million that year. Therefore, horned cattle that make their way into feedlots can cause BQA related issues.

In addition to the number of producers who choose not to dehorn their cattle, many of the producers who choose to dehorn often do so too late. According to the University of Tennessee Agricultural Extension Service, calves should be dehorned before they are one 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 restrain than older calves and older calves have been shown to have a higher decrease in weight gain in weeks following the procedure. A NAHMS Beef survey completed for 2007-2008 shows 41.6% of cow-calf operations reported an average age of 154 days or more at dehorning, about 5 months of age, which is too old and there is a much higher risk for complications.

The development and identification of homozygous polled cattle is an advancement in the beef industry that could greatly benefit all producers. In cattle, the polled gene is dominant over the horned gene. Therefore, homozygous polled animals have two copies of the polled gene and will automatically pass a polled gene on to their offspring. However, if an animal is heterozygous polled, meaning the animal contains one polled gene and one horned gene, then on average, 50% of the offspring will be horned and 50% will be 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 in weight gain, and secondary infections.

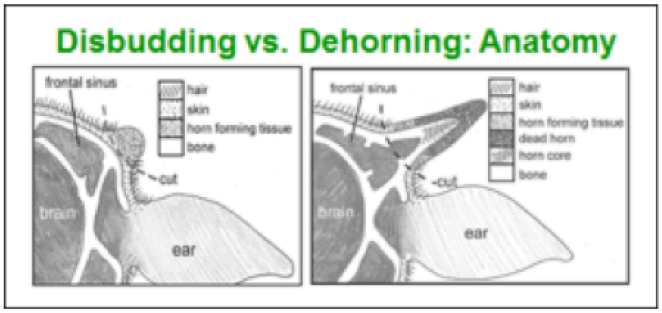

Fig. 1: Disbudding (left) involves removing the horn bud before it attaches to the frontal sinus. Dehorning (right) involves removing the horn after it attaches to the sinus and receives blood supply.

In conclusion, dehorning cattle is a topic that should not be neglected by producers. If done 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 millions of dollars to the beef industry, which can be crucial in our current volatile market. Furthermore, commercial cow-calf producers are not the only ones who can help the beef industry thrive from dehorning. Seedstock producers can greatly impact the beef community by furthering the production of homozygous polled cattle genetics. Dehorning cattle may seem insignificant to some producers when considering all of the facets associated with managing beef, but producers only have time and money to gain from dehorning their calves and promoting homozygous polled cattle.

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2019 Winter Conference Series

"Effective Weed Management in Pastures and Hay Fields"

Featuring
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Kathy Voth, Livestock for Landscapes

Also local producer profiles, NCSU Extension Update, trade show and much more!

Registration begins at 9:30 AM and the program from 10:00 AM—4:00 PM

January 22, 2019	January 23, 2019	January 24, 2019	January 25, 2019
WNC Regional Livestock Center 474 Stock Drive Canton, NC	Rowan County Center 2727 Old Concord Rd Salisbury, NC	Granville Co. Expo and Convention Center 4185 US-15, Oxford, NC	Mt. Olive University Raper Hall RB Butler Drive Mt. Olive, NC

Registration

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For more information: Teresa.Herman@ncagr.gov

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Pasture-Based Livestock Education Program

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Pesticide and Animal Waste Credits are available at this meeting

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(LEFT: Cattle grazing novel, RIGHT: Grazing KY31)

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NC Forage and Grasslands Council Winter Conference Series

- January 22, 2019
  WNC Regional Livestock Center, Canton, NC
- January 23, 2019
  Rowan County Center, Salisbury, NC
- January 24, 2019
  Granville County Expo and Convention Center, Oxford, NC
- January 25, 2019
  Mt. Olive University, Raper Hall, Mt. Olive, NC

NC Cattlemen's Association & Dairy Annual Conference
February 21-23, 2019
Hickory Convention Center, Hickory, NC

Piedmont Area Beef Conference
March 07, 2019
Guilford County Extension Center, Greensboro, NC

Fescue Workshop
March 12, 2019
St. Lukes Lutheran Church, Mt. Ulla, NC

WNC Small Ruminant Workshop
March 30, 2019
WNC Regional Livestock Center, Canton, NC

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