FORAGE BITS

Fall 2012

Publication of the Maryland-Delaware Forage Council, Inc.

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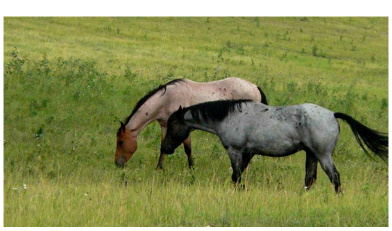
MD/DE Forage Council Board Meeting

December 11, 2012
10:00 A.M.
NRCS State Office Conference Room
Annapolis, MD



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DETERMINING THE EFFECT OF MOWING HEIGHT AND FERTILITY ON ORCHARDGRASS YIELD AND PERSISTENCE

ABSTRACT - During the last 15 years farmers across the eastern U.S. have reported reduced survival of orchardgrass hay stands. Recent surveys and discussions with county agents and forage specialists suggest that close mowing heights using disc mowers may be a major factor causing orchardgrass stand decline. We designed an experiment in the spring of 2011 to determine the effect of mowing height and fertilizer rate on orchardgrass yield and persistence. A well-managed orchardgrass hay field was subdivided into 5' x 20' plots with three cutting heights (1/2", 2", 4") and two fertility treatments in all combinations. The fertility treatments consisted of nitrogen (60 lbs/A) and potassium (100 lbs/A) applied after the 1st, 2nd, and 4th cuttings. Preliminary results showed a cutting height effect and a fertility effect even after the first two harvests. Orchardgrass stand persistence declined to less than 25% ground cover in all ½” cutting height treatments for both the control and fertility treatments. At the 2” cutting height the fertility treatment provided higher yield and stand persistence over the control and similar stand persistence to the 4” cutting height. Not surprising, the 4” cutting height with fertilizer produced the highest yields, but the 4” cutting height without fertilizer maintained an acceptable stand density. In summary, these results suggest that low cutting heights prevalent with disc mowers may be a primary reason for observed declines in orchardgrass stands.

(SOURCE: S. Ray Smith and Leah Saylor, Professor, University of Kentucky, and Senior Research Student, Asbury University, respectively IN AFGC Proceedings and Abstracts, Louisville, KY, January 2012)

FORAGE BRASSICA CROPS IN GRAZING SYSTEMS

Forage brassica crops such as turnip, swede, rape, and kale can be spring-seeded to supplement the perennial cool-season pastures in August and September or summer-seeded to extend the grazing season in November and December. Brassicas are annual crops which are highly productive and digestible and can be grazed 80 to 150 days after seeding. In addition, crude protein levels are high, varying from 15 to 25 percent in the herbage and 8 to 15 percent in the roots depending on the level of nitrogen fertilization and weather conditions.

Grazing Management – Grazing management is important to optimize the true potential of brassica crops. Strip grazing small areas of brassica at a time provides the most efficient utilization. Grazing large areas increases trampling and waste of the available forage. Rape is more easily managed for multiple grazings than are the other brassica species. Approximately 6 to 10 inches of stubble should remain after grazing rape to promote rapid regrowth. Regrowth may be grazed in as few as 4 weeks after the first grazing. Graze rape close to ground level during the final grazing. When turnips are grazed more than once, only the tops should be grazed until the final grazing when the whole plant can be consumed.
Like rape, regrowth of turnips can be sufficient to graze within 4 weeks of the first grazing.

For more information about establishing and managing brassica crops see: *Using Brassica Crops to Extend the Grazing Season*, Agronomy Facts 33, Penn State University (http://pubs.cas.psu.edu/freepubs/pdfs/us100.pdf) *(SOURCE: Excerpted from The AFGC Forage Leader Marvin Hall, Penn State University, Fall 2012)*

Maryland Department of Agriculture 2012 Free Grain/Forage Testing Program

The Maryland Department of Agriculture (MDA) is offering a free testing program to drought impacted Maryland farmers for nitrate and prussic acid in forage and for aflatoxin in corn grain. Prussic acid poisoning is mostly associated with sudan, sorghum and related grass species. The program is a cooperative effort between MDA and the University of Maryland Extension. Testing is done by the MDA State Chemist's Section.

Farmers can bring their samples to their nearest UME office so that UME can assist them with paperwork and make sure the samples and paperwork are properly prepared. MDA will pick up the samples daily (Monday through Friday) and fax results to the UME office usually within 24 hours.

Instructions for preparing and packing samples for testing are below. Use one Sample Identification and Information Sheet (attached) for each sample submitted. Place samples in a plastic bag and refrigerate or freeze as soon as possible, especially if held overnight, and keep on ice during transport. Each separate field should have its own paperwork and sample. MDA may be able to assist with sample pickup.

Taking corn samples for aflatoxin analysis:
• Collect 12 ears of corn from different areas of the field to get a representative sample.
• Keep cold as described above. (Note: Shelled corn already harvested can also be tested. Collect a 1 quart sample as above and bring to the Extension office)

Taking silage samples for nitrate and prussic acid analysis:
• Collect at least 10 stalks from different areas of the field to get a representative sample.
• Chop silage up into 6" pieces and thoroughly mix samples together. Put in an airtight package then store cold. Ship with cold packs.
• Prussic acid samples must be kept cold, preferably frozen, at all times to prevent volatilization of prussic acid (hydrocyanic acid).

UPCOMING MD/DE FORAGE CONFERENCES PLANNED

The MD/DE Forage Council in cooperation with local agencies is once again pleased to announce the lineup of forage conferences planned for January, 2013.

- **Delmarva Hay & Pasture Mini-Conference,** January 14, 6:00 – 9:00 pm, Delaware State Fairgrounds, Harrington, DE
- **Delmarva Hay & Pasture Conference,** January 15, Delaware State Fairgrounds
- **Southern Maryland Hay & Pasture Conference,** January 16, Izaak Walton League Outdoor Education Center, Waldorf, MD
- **Tri-State (Md., Pa., and W. Va.) Hay & Pasture Conference,** January 17, Location TBA

Dr. Ed Rayburn; Extension Specialist - Forage Agronomist with West Virginia University Extension Service will be our featured speaker for the 2013 Conference. Dr. Rayburn will share the results of a baleage survey study conducted in WV and related best practices for baleage production and no-till sequential cropping of summer and fall annual forage species compared with grassland.

In addition, Jeff Harman; General Manager with Green World Ag, LLC will discuss hay additives and preservatives.

A variety of other topics and speakers will round out the programs at each location. Certified crop advisor and pesticide and nutrient management certification credits will be offered.

Additional registration information will be forthcoming.

2012-2013 Winter Feeding Strategies

Dr. Mark A. McCann
Extension Animal Scientist, VA Tech

Feeding the flock during the upcoming winter of 2013 could be summed up in one word--- **minimize**. The Midwestern drought and its impact on grain and feed costs have increased prices about 50%. Shifts in management need to be considered in an effort to minimize (not eliminate feed needs). I have listed a few of the most important possibilities for consideration--- note many of these are not new but may deserve more consideration in view of the current feed environment.

1) Delay ram turn-in to a date that would insure that lactating ewes can take advantage of the spring flush of growth during lactation and require minimum supplementation. Under grazing conditions, forage can meet a ewe's energy and protein requirement except during lactation. Spring lambing flocks can take advantage of new pasture growth which is very digestible and high in protein. Generally, this will meet the nutrient needs of ewes nursing singles. Ewes nursing twins will respond to low levels (1-1.5lb/d) of energy supplementation.
2) Stockpile tall fescue. Fertilizing limited acreage (40-70 lb N/acre) and accumulating forage growth is a management practice that works. The amount of accumulated growth will be dependent on fall moisture. Strip/limited grazing is the most efficient method to utilize the accumulated growth. The quality of this accumulated growth diminishes only slightly over the course of the winter.
3) Test hay which will be used. There is a large variation in hay quality beyond forage variety and cutting. Fertilization and harvest conditions have a significant impact on hay quality. Visual evaluation and comparison can detect gross differences between hays, but do little to estimate nutrient content. Only through forage testing can the nutrition content be estimated and a feeding program devised. Farmers can distinguish between their top and bottom hays when the hay is harvested. However, the question then becomes "How good is the better hay and how bad the poor hay is?" Efficient, economical and effective supplementation programs depend on an accurate forage test. Economically you do not want to overfeed and from a production perspective you cannot afford to underfeed. Additionally, the hay nutrient analysis can determine if protein or energy maybe the most limiting nutrient. As potential hays are evaluated, the following tables are helpful in comparing hay nutrient content to a stage of production for the ewe and potential feedstuffs that fulfill deficiencies. Table 1 contains the CP (crude protein) and TDN (total digestible nutrient) requirements of a 180lb ewe across different stages of production.

Table 1. TDN and CP Requirements of 180lb ewe

Stage of Production	TDN Lb/d	CP Lb/d	Voluntary DM Intake, Lb/d	Percent TDN*	Percent CP*
Maintenance	1.6	.27	2.9	55.0	9.3
Early Pregnancy	1.8	.31	3.3	55.0	9.4
Late Gestation	2.9	.49	4.4	65.5	11.1
Early Lactation	4.3	.96	6.6	65.5	14.5

Table 2 contains the amount of energy and protein supplementation needed to balance hay of varying qualities for 180lb ewes across stage of production. Corn and soybean are used as standard supplements but other feeds can be substituted. In today's environment of high input costs and slim margins, having the facts on hay quality can improve the accuracy and cost effectiveness of nutrition and management decisions.

Forage Analysis		Early[2] Gestation		Late[3] Gestation		Early[4] Lactation		Late[5] Lactation	
CP % of DM	TDN % of DM	Lbs SBM	Lbs Corn	Lbs SBM	Lbs Corn	Lbs SBM	Lbs Corn	Lbs SBM	Lbs Corn
11.2 & over	56 & over	-	-	-	.75	.5	2.5	.3	1.5
9.5 - 11.1	56 & over	-	-	.15	.75	.8	2.5	.45	1.5
	53 - 56	-	-	.15	.85	.8	2.7	.45	1.65
	50 - 53	-	-	.15	1.0	.8	2.9	.45	1.80
8.2 - 9.5	54 - 56	-	-	.25	.8	1.0	2.5	.55	1.5
	51 - 54	-	.2	.25	1.0	1.0	2.75	.55	1.75
	50 & under	-	.4	.25	1.2	1.0	3.0	.55	2.0
7.3 - 8.2	53 – 55	.1	-	.4	.8	1.1	2.5	.6	1.5
	51 – 53	.1	.2	.4	1.0	1.1	2.75	.6	1.75
	50 & under	.1	.4	.4	1.2	1.1	3.0	.6	2.0
Under 7.3	Under 48	.2 - .3	.5 – 1.0	.4 - .5	1 -1.5	1.2 -1.5	2.5 -3.5	.7 - .8	2.0 -3.0

[1] Recommendations are made on basis of 44 % soybean meal and ground shelled corn. Other supplements can be used to deliver the same amount of energy and protein.
[2] Dry ewes in the first 15 weeks
[3] Last 4 weeks of pregnancy (200% lambing rate expected).
[4] First 6-8 weeks of lactation suckling twins
[5] Last 4- 6 weeks suckling twins.
** Note 1.5lbs of corn gluten feed can replace 1.0 lb corn and .5 lb soybean meal

4) Lastly, the identification of high quality hay can allow decisions to be made regarding storage of the hay if options are available. If limited shelter is available, clearly the best hay needs to be in the dry. Clearly the grain markets have added another set of hurdles which need to be evaluated and addressed. Following the options noted above can have significant impact on this winter's feed bill.

SULFUR DEFICIENCY IN ALFALFA

Jim Camberato[1], Stephen Maloney, Shaun Casteel, and Keith Johnson
Agronomy Department, Purdue University, West Lafayette, IN

Editor's Note: "Sulfur deficiencies are becoming more common place on grain and forage crops in Maryland and Delaware. There are a number of factors contributing to a lack of sulfur availability, most notably the reduction in sulfur deposition from power plants and limited sulfur application in fertilizers. The below article from Purdue University provides some more detail on sulfur deficiencies."

Sulfur (S) deficiency has recently been reported in a number of alfalfa fields in southwestern Wisconsin according to Carrie Laboski at the Univ. of Wisconsin **(see ref. 1)**. Quite a few sulfur deficiencies in alfalfa and corn have been reported since 2005 in northeast Iowa by John Sawyer and Brian Lang **(see ref. 2, 3)**. In Indiana we have documented S deficiency in wheat and corn in recent years and are conducting some research on S deficiency as well **(see ref. 4)**.

Factors Affecting Sulfur Deficiency
Sulfur deficiency of alfalfa and other crops may be becoming more prevalent because less S is deposited from the atmosphere to the soil due to reductions in power plant S emissions **(Fig. 1)**. Higher yields result in greater crop S removal from the field - about 5-7 lb for each ton of alfalfa hay. Additionally, less incidental S applications in fertilizers and pesticides may contribute to more S deficiency. In the case of row crops, increases in no-till, early planting, and heavy residue from high yields have also been implicated in contributing to S deficiency.

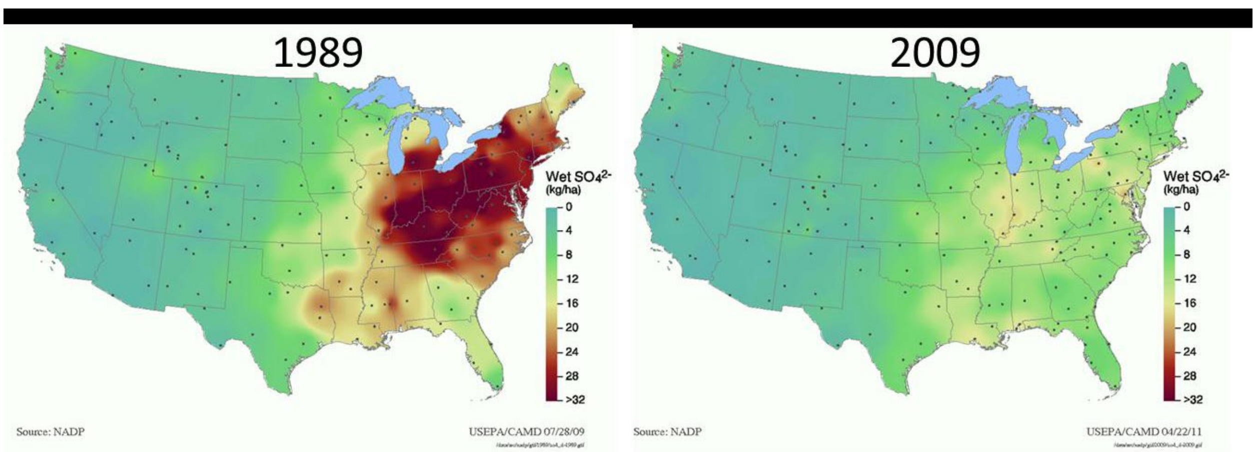

Fig. 1. The amount of sulfate (SO42-) deposited on the land in rainfall has been greatly reduced since 1989. Red colors indicate high deposition and green low deposition. To convert the values given on the maps from SO42- in kg/ha (see legend) to SO4-S in pounds per acre, the more common term used in agriculture, multiply by 0.3. For example 32 kg SO42- /ha equals 9.6 pounds per acre. Data from: http://epa.gov/castnet/javaweb/wetdep.html. (URL accessed April 2012).

[1]For more information, contact J. Camberato (765-496-9338, jcambera@purdue.edu), S. Casteel (765-494-0895, scasteel@purdue.edu), or K. Johnson (765-494-4800, johnsonk@purdue.edu).

Soil Factors Resulting in Sulfur Deficiency
The main source of S in most soils is organic S. Each percent organic matter in the plow layer contains about 100 pounds of sulfur per acre. Organic S must be mineralized to sulfate-S (SO4-S) to be taken up by crop plants, in much the same way that organic N is made available to crop plants. Therefore the lower the organic matter content of the soil the more likely S deficiency is to occur.
Since mineralization is a process carried out by living microorganisms, soil temperature and moisture largely determine when and how much of the organic S is made available to the crop. Cold and excessively wet or dry conditions reduce microbial activity and reduce S availability from soil organic matter and crop residues. Thus, alfalfa is more likely to be S deficient in the early spring before soil temperatures warm substantially.

Sulfate-S is relatively mobile in most soils (similar to nitrate) because it has a double negative charge and is repelled by the negative charge of the soil, unlike nutrients such as potassium, calcium, or magnesium. Although SO4-S can bind to iron and aluminum in the soil, these elements are much more likely to bind phosphate at the exclusion of SO4-S and as a result SO4-S is easily leached from soils, especially sandy soils.

At the field level the occurrence of S deficiency may be highly variable since soil S availability varies considerably with soil organic matter and texture. Sulfur deficiency is often seen in sandier, lower organic matter, and higher elevation areas of a field while lower lying, higher organic matter, and heavier textured areas have sufficient S.

Soil testing methods measure the SO4-S form of S. Unfortunately soil testing is not particularly useful for predicting S deficiency because it does not take into account the organic S component that might become available to the crop. The SO4-S component that is actually measured may also be leached from the soil between the time of sampling and the time of crop need.

Identifying Sulfur Deficiency in Alfalfa

At the individual plant level, S-deficient alfalfa will have a uniformly yellow appearance because S is not readily translocated from older to younger plant parts. Visually S deficiency may not be easy to distinguish from other nutrient deficiencies or leafhopper damage without close inspection, experience, and/or tissue testing.

The best way to identify a S deficiency is by tissue sampling. Collect the upper 6 inches of stem and leaf tissue from 40-50 plants from the area suspected of deficiency and a healthy area of the field for comparison. If samples are contaminated by soil they can be rinsed quickly in cold distilled water, but do not overdo it because some nutrients, especially potassium, may be leached out of the tissue. Wet samples should be air-dried before shipping to the laboratory in paper bags. Tissue S greater than about 0.25% on a dry matter basis indicates sufficiency.

Correcting Sulfur Deficiency in Alfalfa

If S deficiency is identified, an application rate of 20 to 30 pounds of SO4-S per year is recommended to alleviate S deficiency in alfalfa based on the most recent research conducted in Iowa **(see ref. 3)**. Although some carryover of S may occur in silt loam soils with deep rooted alfalfa crops it may be necessary to make applications of S every year on sandy soils, particularly if irrigated and high yielding.

Fertilizer Materials

The composition of several fertilizer sources of S are listed in **Table 1**. Potassium sulfate and sulfate-of-potash-magnesia (sul-po-mag or K-mag) are often good choices because alfalfa removes large amounts of potassium from the soil and potassium fertilization is often required. Either of these sources can be blended with muriate of potash (0-0-60) to provide an economical source of both potassium and S. The inclusion of magnesium in sul-po-mag may be an extra benefit compared to potassium sulfate if soil magnesium levels are low.

Ammonium sulfate and gypsum are also potential sources of S for alfalfa. Although there is no benefit to applying ammonium-nitrogen to the alfalfa, there are not likely to be any negative effects either with the rate that would be used to correct the S deficiency. Naturally-occurring mined gypsum and several by-product sources of gypsum can be applied to provide S as well. Unless pelletized, however, higher than necessary rates of S will be applied with gypsum which is difficult to spread at rates less than 500 to 1000 pounds per acre (85 to 170 pounds of S per acre assuming 17% S). If carryover of S occurs, the S will be utilized in later years. However, in sandy soils, where leaching is a problem, the benefit in future years may be minimal.

Table 1. Sulfur-containing fertilizers and their composition **(see ref. 5)**.

Fertilizer	%N	%P2O5	%K2O	%S	%Mg	%Ca
Ammonium sulfate	**21**	0	0	**24**	0	0
Gypsum	0	0	0	**17**	0	**22**
Potassium magnesium sulfate	0	0	**22**	**23**	**11**	0
Potassium sulfate	0	0	**50**	**18**	0	0

Effects of Sulfur Containing Fertilizers on Soil pH

None of the S-containing fertilizers mentioned above affects soil pH except ammonium sulfate. The conversion of ammonium to nitrate generates acidity which lowers soil pH. No acidity arises from the sulfate in any of the fertilizer materials, including the sulfate in ammonium sulfate. Only elemental S or chemically reduced S (thio-S for example) creates acidity. None of the fertilizers increase soil pH either.

References used in this article:

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(4) Camberato, Jim and Shaun Casteel. 2010. Keep an eye open for sulfur deficiency in wheat. Purdue University Department of Agronomy, Soil Fertility Update. Available at: http://www.agry.purdue.edu/ext/soybean/Arrivals/04-13-10_JC_SC_Sulfur_deficiency.pdf. (URL accessed April 2012).

(5) Zublena, J.P., J.V. Baird, and J.P. Lilly. 1991. Nutrient content of fertilizer and organic materials. http://www.soil.ncsu.edu/publications/Soilfacts/AG-439-18/AG-439-18.pdf. (URL accessed April 2012).

Upcoming Meetings

AFGC Annual Conference
Covington, KY
January 6-9, 2013

Join the American Forage and Grassland Council for the very best in education, exhibits and networking. You will hear relevant presentations about forage production and utilization practices that will help you be more profitable. From the opening program to the closing session, you'll find activities and information designed to help you navigate today's forage and grassland environment. The Forage Spokesperson Competition, Forage Bowl, Emerging Scientist Competition, Photo Contest and more await you in Covington, KY, January 6-8, 2013. For more information call 800-944-2342 or visit www.afgc.org!

Forage Bits is a publication of the Maryland-Delaware Forage Council. It is compiled and edited by Ben Beale, Agricultural Extension Educator-St. Mary's Co. and Richard Taylor, Extension Agronomist, University of Delaware. Please send any comments, questions or submissions to Ben at the St. Mary's Extension Office: PO Box 663, Leonardtown, MD 20650, fax 301 475 4483, phone 301 475 4484 or e-mail at bbeale@umd.edu

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