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Choosing the Right Cutting Height for Alfalfa Stands

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Alfalfa growth morphology is different from grass morphology, which features protected growing points and a fibrous root system. Like most leguminous plants, alfalfa develops a deep taproot that serves as carbohydrate reserve for regrowth after defoliation. Regrowth is initiated from buds that are lined around the crown and from axillary buds that are located further up on tillers. Unlike grasses, forage legumes can be cut relatively low in height but, in turn, not very frequently to preserve root carbohydrate necessary for regrowth. Specific cutting heights can be achieved with modern equipment, and it is a good idea to review some principles of harvesting alfalfa.

Regrowth of alfalfa tillers early in the growing season comes mostly from crown buds. Growth from the axillary buds is also generated, but this growth is less vigorous than that coming from the crown buds. Since axillary buds are located higher up in the canopy, there are questions related to cutting heights and effects on yield and quality. Research has indicated that leaves emerging from axillary buds contribute less to overall yield than tillers stemming from crown buds. In addition, these leaves contribute much less to photosynthesis and may even shade lower portions of the stem. It is, therefore, recommended to cut at 1-2 inches throughout most of the growing season to achieve a good compromise of yield and quality. However, a short cutting height is not always the recommended practice. If alfalfa stands emerge weakened from the winter months, cutting height has to be somewhat increased to account for the necessity of stand recovery.

During the course of the growing season, stress factors should be kept to a minimum to achieve high yields and quality. It is mandatory to keep soil fertility and weeds in check as much as possible. Abiotic stresses which may occur during the growing season, such as drought or lack of sunlight, also have to be considered for making crop management decisions. Good overall forage management will ensure stands remain healthy over the years. This includes monitoring of soil fertility (macro- and micro-nutrients), lime requirements, insect control and weed control where necessary. Stand longevity will likely not be compromised through short cutting heights if these general management guidelines are taken into account. It has been shown that cutting height affects milk yield for example, but the increase in forage quality resulting from a higher cutting height does not offset enough to justify lower yields. Therefore, a low cutting height is still recommended. This will also help in reducing weed incidence, which would otherwise compromise dry matter production and forage quality.

Cutting regimens in fall before the first frost occurs require a different approach. As a reminder, alfalfa stands need to accumulate carbohydrates in their taproot to have enough reserves for the winter months and first regrowth the following spring. Killing frosts may occur sometime in the middle of October in northern Arkansas. Alfalfa stands should not be harvested within 4-6 weeks leading up to that date, because root reserves would be depleted due to the ensuing, albeit reduced, regrowth. Harvests during the year should be scheduled so that the final fall harvest can take place no later than September 1. After the killing frost occurs, stands can be harvested, but a stubble height of 4-6 inches should be maintained for protection during longer periods of snow, albeit those rarely happen in Arkansas. While the harvested material at that point may be hard to cure for hay, silage or baleage are good options to make use of post-freezing cuts.

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Mineral Supplementation for Beef Cattle

Dr. Tom R. Troxel, Professor

Cattle require the proper balance of water, energy, protein, vitamins and minerals to achieve optimal production. In some cases, all the necessary vitamins and minerals are present in the forage. However, it is not unusual for forage-based diets to be deficient in one or more minerals and vitamin A.

Cattle usually require some form of mineral supplementation during all times of the year. The required minerals are divided into major (macro) and trace (micro) minerals. Major minerals are reported as a percentage of the diet. The major minerals include sodium, chlorine, potassium, calcium, phosphorus, magnesium and sulfur. Trace minerals are required at much lower levels than the major minerals but are just as essential. Trace minerals are commonly reported as parts per million (ppm). Required trace minerals include zinc, copper, selenium, manganese, iron, nickel, cobalt, molybdenum and iodine.

Salt (sodium chloride). Supplemental salt is almost always required by the beef herd. The only exception is when water is very high in salt or with forages that are grown on very salty soils.

Phosphorus. Phosphorus is often deficient in forages for lactating cows with superior milking ability. Phosphorus is one of the structural components of the skeletal system, and levels build up when cows are grazing lush forages that contain phosphorus at levels above requirements. Some of the phosphorus in bone can be mobilized during early lactation to overcome shortfalls in intake, but prolonged dietary deficiency has been reported to result in depressed reproductive efficiency and milk production.

Calcium. Calcium is usually not deficient in grass forages fed to beef cattle in Arkansas. In addition, legumes such as alfalfa and clover are high in calcium. Like phosphorus, calcium is a structural part of bone, so temporary shortfalls in the diet can be overcome by the animal mobilizing some of the calcium in bone.

Magnesium. Forages contain adequate magnesium during most of the year, but levels can be very low during times of rapid growth in the spring and fall, especially in well-fertilized pastures. There can also be high levels of potassium in forage at this time, which can interfere with the absorption of magnesium. The low level of magnesium in forage often corresponds to calving seasons and the onset of lactation, which is when cow requirements are highest. These factors and very low body magnesium stores can lead to acute magnesium deficiency, a malady known as grass tetany. Supplementation with magnesium oxide is recommended for 30 days prior to calving and during the first three months of lactation. Provide a mineral with enough magnesium (at least 10 percent in a 4-ounce/head/day mineral) with less attention paid to phosphorus during periods that promote magnesium deficiency.

Potassium. Potassium is usually excessive in most forages in Arkansas, with the exception of weathered stockpiled forages. Potassium is primarily present as an electrolyte in body fluids, so there is little storage.

Sulfur. Sulfur is a component of several amino acids that are the building blocks of protein. Sulfur, other than that fed in the form of protein, is usually needed only when diets contain substantial amounts of nonprotein nitrogen (NPN).

Trace Mineral. Because of the low level in forages and lower bioavailability, trace mineral supplements are usually formulated to meet at least 100 percent of beef cattle requirements.

Zinc. Zinc is deficient in many Arkansas forages. Forty percent of hays tested at the U of A were deficient in zinc. Zinc is a part of many important enzyme systems in the body, and its deficiency leads to depressed feed intake and growth rate, an abnormal hair coat and skin lesions. Zinc is important in male reproduction. An adequate zinc status is also needed for normal immune response. Storage of zinc is minimal, and deficiencies occur rapidly following introduction of animals to a diet severely deficient in zinc. Zinc methionine, an organic form of zinc, has improved performance in feedlot cattle and in cattle grazing forages already containing adequate levels of zinc. Zinc methionine can help overcome foot problems in cattle. Veterinarians and nutritionists recommend feeding zinc methionine as an aid in controlling, and even treating, foot rot in beef cattle. High levels of iron in the diet interfere with the absorption of zinc and increase the dietary requirement.

Copper. Copper, like zinc, is deficient in many areas of Arkansas (52 percent of hays tested were low in copper). It also comprises an essential part of many different enzymes in the body. Copper is important for adequate growth, reproduction and immunity. Some breeds have been shown to be more prone to copper deficiencies. Unlike zinc, copper is stored tenaciously in the liver, and levels build up rapidly when animals are fed high levels of copper. Copper is extremely toxic to sheep, so many supplements sold to cattle producers contain little copper, primarily to prevent liability of the supplement manufacturer in case the product is fed to sheep. Cattle producers should avoid using a low copper mineral unless complementary grazing programs with sheep are being used. **Copper oxide should be avoided as a copper source because of its poor bioavailability, which will affect the level of copper required in supplements.** High levels of molybdenum, sulfur, iron or zinc in the diet interfere with normal copper absorption and metabolism.

Selenium. Selenium levels are marginal to deficient throughout Arkansas. Sixty-two percent of hays tested for selenium were deficient. Severe selenium deficiency results in white muscle disease in calves, which is characterized by stiffness and heart failure. The activity of selenium is related to vitamin E, and supplementation with either will help prevent white muscle disease. However, since vitamin E levels are normally not a problem, selenium deficiency is usually the underlying problem. Marginal selenium deficiency can result in retained placenta, impaired fertility, silent heats and unthrifty weak calves with poor immune response (resulting in high preweaning death losses). Selenium can be provided in mineral mixes or in an injectable form.

Manganese. Manganese levels in forages vary considerably, depending on the soils on which they are produced. Manganese is a part of several important enzyme systems. A deficiency may result in impaired reproductive performance in both cows and bulls and in the birth of deformed calves.

Cobalt. Cobalt is needed only for the ruminal synthesis of vitamin B12. Cobalt requirements are higher when cattle are fed high-grain diets, because more B12 is required to metabolize the end products of rumen fermentation. Cobalt may be very deficient in some soils, so including it in trace mineral supplements is a sound practice.

Iron. Iron is a part of hemoglobin, which transports oxygen to body tissues. Since most forages contain high levels of iron and because substantial amounts of soil are consumed during grazing, iron is almost never deficient in cattle fed forage-based diets. A more common problem with iron is that it may be excessively high in forages or in drinking water, which can interfere with the absorption of copper and zinc.

Iodine. Iodine makes up part of the thyroid hormones. A deficiency results in a condition known as goiter, which is actually an enlarged thyroid gland. Iodine is normally included in trace mineral supplements.

The following are recommendations for a mineral supplementation.

Recommendations on Mineral and Vitamin Supplement Composition for Beef Cows	Intermediate Quality	Low Quality (Non-Fertilized)	Lush Pasture (for Grass Tetany Prevention)
Mineral	12:6:4	12:14:4 or 12:6:2	12:4:10 Hi Mag
Minimum Forage Phosphorus, % dry matter	0.22	0.18	0.20
Dry or Lactating Cows	Lactating	Lactating	Early Lactation
Intake (oz/cow/day)	4	4	4
Calcium, %	12	12	12
Phosphorus, %[2]	4-6	6-8	4
Potassium, %[2]	-	-	-
Magnesium, %	2	2	10
Salt, %[3]	10-25	10-25	10-25
Sulfur, %[2]	0-3	0-3	0-3
Iron, ppm[4]	-	-	-
Manganese, ppm	2000	2000	2000
Zinc, ppm	4000	4000	4000
Copper, ppm	1250	1250	1250
Iodine, ppm	50	50	50
Selenium, ppm	20	20	20
Cobalt, ppm	15	15	15
Vitamins A, D, E[5]			

[1]Most commercial trace mineralized salts contain inadequate levels of trace minerals for Arkansas conditions and are therefore not recommended. This may serve as a guide for custom blends.

[2]When needed, include in protein supplement to obtain adequate intake.

[3]Provide additional salt in supplement if consumption is excessive. If greater consumption is needed, add 5 to 15 percent molasses, grain or cottonseed meal.

[4]Add none above that contained in other mineral compounds used.

[5]Generally, vitamins should be provided when green forage is not available. Reasonable rates of vitamins for a 2 oz/cow/day mineral supplement consumption would be as follows (IU/lb supplement): A - 200,000 to 400,000; D3 - 15,000 to 40,000; E - 100 to 200. For 1 oz/cow/day, double the levels, and for 4 oz/cow/day intake of mineral supplement, reduce the levels by 50 percent.

Assuring Bull Performance for the Spring Breeding Season

Bryan Kutz, Instructor

Breeding season is just around the corner for producers whose cows calved in the spring, and it is never too late to start planning. Improvement of next year's calf crop is dependent upon the breeding decisions you are about to make. Males account for approximately 90 percent of the gene pool, contributing more to the genetic makeup of a herd in one breeding season than a cow contributes in her lifetime. Selecting genetically superior sires is the fastest approach to herd improvement and ultimately bottom line profitability.

For those of you who already a have a bull in place, remember that breeding success depends on the reproductive health of both the cow and the bull. However, because a bull is expected to service various numbers of cows, the potential fertility of the bull is much more important than determining the fertility of any individual cow. It is consequently essential to evaluate bulls every year before breeding starts because the fertility of a bull can vary from year to year. The breeding soundness exam should be performed 30 to 60 days before the start of breeding season. It is important to allow sufficient time to replace questionable bulls. This time allotment will also allow for enough time for stressed animals to recover and be tested again before the beginning of the breeding season.

Not every bull will fit your production scenario. Resources and goals are different for each cow-calf operation. Nonetheless, sire selection should target an acceptable combination of traits that complement the strengths and weaknesses of the cow herd and match markets.

Ask questions that pertain to your particular production situation. What are your target markets? Are you selling all calves at weaning? If so, what color does that market value the most? Are you planning to background your calves and send them through the feedlot? Are you going to retain replacement heifers? Are you breeding both heifers and cows? What are your available labor and forage resources?

Answers to these questions will aid you in determining the selection efforts you may want to apply towards economically important traits such as growth, carcass traits and possible maternal performance. Feet and leg soundness, libido, disposition, scrotal size, sheath, frame size, composition, breed type and horn presence or absence are also important traits for consideration. While one may apply more pressure on one or two traits, remember to strike a balance among various traits and avoid extremes. Base the type of sire selected on the purpose of your breeding plan.

Sire selection should target an acceptable combination of traits that complement the strengths and weaknesses of the cow herd and match markets.

Along with adept visual appraisal of an animal, the use of genetic selection with expected progeny differences (EPD) can be an extremely valuable tool. EPD's provide predictions of the expected performance of the calves sired by a bull compared to the expected performance of calves sired by another bull. EPD's are the best predictors of the genetic performance of an individual animal, and they are available for a growing number of economically relevant traits. Breeds are different and make available a wide variety of EPD's; however, most breeds have basic EPD's, such as birth weight, weaning weight, yearling weight and milk. A large number of breeds have implemented the use of selection indices. These are based on multiple traits weighted for economic importance, heritability and genetic associations among traits. A selection index may provide a balanced selection approach when selecting for more than one trait at a time.

Beef cattle selection should be based on many factors. The knowledge gathered from your production needs and concerns is invaluable in your sire selection endeavor. The more information used in this process, the fewer surprises you will have for generations to come. It is important to use both performance information and visual appraisal in choosing a sire that suits you and your production goals. They should complement each other.

A balanced approach to sire selection focusing on multiple economically important traits can go a long way towards herd genetic improvement. Nonetheless, without a proper breeding soundness exam (BSE), these decisions may not matter. Remember that a bull is only as good as his semen. A cow is responsible for half the genetic material in only one calf each year, while the bull is responsible for half the genetic material in 20 to 50 calves. The bull's ability to locate cows in estrus and breed them is clearly vital to any successful breeding program.

Fly Control Options for Beef Cattle

Dr. Jason Cater, Assistant Professor/Extension Veterinarian

External parasites, especially horn flies, can have a serious economic impact on beef herds in Arkansas and all across the South. These pests usually become a concern for producers in mid-summer through late fall. It is generally agreed that economic losses occur when fly numbers exceed 150 flies per animal. Therefore, it is necessary to control horn flies in cattle to maximize economic returns and enhance animal welfare.

A fly control demonstration was performed with the cow herd at the University of Arkansas at Monticello beginning in August of 2014. Here we evaluated two aggressively marketed fly control products which included XP-820 fly tags manufactured by Y-Tex corporation and Aim-L Vetcaps marketed by Agrilabs. The XP-820 fly tag is a slow-release product containing abamectin, which had not been previously used in the United States. This tag is labeled to control horn flies, including strains resistant to synthetic pyrethroids, and several tick species. The Aim-L Vetcaps are softgel capsules that contain10 ml of lambda-cyhalothrin with piperonyl butoxide. They provide horn fly and lice control for cattle over 600 lbs. The Vetcaps are applied with a Vetgun, a remote delivery system that is designed to save time and reduce handling stress by allowing the product to be applied to cattle in the pasture.

The demonstration began on August 7, 2014. This herd consists of approximately 90 Brahman-influenced females and was divided into three equal groups with fly counts being recorded prior to treatment. One group of 30 cows served as our control group that was untreated. The second group of cows were brought to the corral and had one XP-820 fly tag applied. The third group was treated in the pasture with the Aim-L Vetcaps using the Vetgun. The time required for treatment and the cost per head were recorded for both treatment groups. Fly counts were performed weekly to evaluate the efficacy of the two products.

On August 7, 2014, prior to any fly control treatment, fly counts averaged greater than 200 horn flies per animal for all three treatment groups. For this demonstration, all fly totals exceeding 200 per animal are listed as 200 plus. The time required to gather the 30 head of cattle from the pasture, move them to the corral, apply the XP-820 tags and return them to the pasture was 55 minutes. Keep in mind that the university has above average working facilities and workers readily available for assistance. The time required to administer the Vetcaps to the second treatment group was 24 minutes. Some practice is required to develop a high degree of accuracy with the Vetgun. Additionally, a rainfall event within 24 hours of Vetcap application can negatively affect absorption and duration

of the product. Approximately three hours post treatment, two-tenths of an inch of rain was recorded on the university farm.

One week post application, fly numbers had dropped significantly for the XP-820 group to approximately 20 flies per head. The Vetcaps group had also declined to approximately 120 flies per animal. Two weeks post application, the XP-820 group was even lower at approximately 10 flies per animal; however, the Vetcaps group had returned to around 200 per animal. On August 21, 2014, fly numbers were back to pretreatment levels for the Vetcaps group, and the decision was made to readminister the Vetcaps since a rainfall event occurred only three hours after the first treatment. One week after the second application with Vetcaps, fly numbers in this group were down to approximately 20 per animal while the fly tag group remained at approximately 10 flies per head. On September 4, 2014, the Vetcaps group had risen slightly to approximately 50 per animal, and the fly tag group had increased to 20 flies per animal. By September 11, 2014, the Vetcaps group fly counts had returned to pretreatment levels of almost 200 flies per animal, while the fly tag group was still less than 50.

In summary, horn fly control is essential for maximum productivity and profitability in beef cattle operations. In this demonstration, the Vetcaps fly control product did provide effective horn fly control but only for approximately two weeks post treatment. While it does require less time for application and possibly less handling stress, the cost of the Vetcaps and Vetgun, along with the need for multiple applications per fly season, leads us to the conclusion that the XP-820 fly tag is the most beneficial and economical of these two products. The XP-820 tags suppressed horn fly numbers below 50 flies per animal for seven weeks and below the threshold of 150 flies per animal for a total of eight weeks. Talk to your herd health veterinarian and start planning now for the horn fly control strategy that best fits your operation.