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Mississippi Beef Cattle Improvement Association

Mississippi Beef Cattle Improvement Association—Productivity and Quality

Upcoming events:

- January 11—Beef Quality Assurance Training, Marshall County, Holly Springs, MS
- January 29—Statewide Cattlemen's Exchange meeting, Charolais performance and commercial marketing programs, distance education, 6:30 p.m.
- January 31 to February 3—Cattle Industry Annual Convention and Trade Show, Nashville, TN
- February 9—Mississippi Beef Cattle Improvement Association annual membership meeting, Regency Inn, Jackson, MS, 1:00 p.m.
- February 9-10—Mississippi Cattlemen's Association Annual Convention, Regency Inn, Jackson, MS
- March 1—Hinds Community College Bull Test Sale, Raymond, MS
- March—MSU Artificial Insemination School, MSU campus, TBA
- May 8—South MS Gain on Forage Bull Test Sale, Tylertown, MS
- June 6-9—Beef Improvement Federation Annual Convention, Fort Collins, CO

Inside this issue:

Mississippi BCIA Annual Membership Meeting Next Month

Mark your calendars for two days of educational programs as part of the Mississippi Cattlemen's Association annual convention and trade show on February 9-10, 2007 at the Regency Inn in Jackson, MS. Producer education programs kick off on Friday, February 9 at 1:00 p.m. with the Mississippi BCIA session.

The MBCIA session on Friday features Dr. Bob Weaber, State Extension Beef Genetics Specialist with the University of Missouri. Dr. Weaber will share information with Mississippi BCIA on "Optimal EPD ranges for beef cattle genetic selection." He will also speak on an additional beef cattle genetics topic on Saturday morning. The MBCIA annual membership meeting follows Dr. Weaber's initial presentation and will include an update on the MBCIA Fall Bull Sale, other MBCIA activities, and the MBCIA board of directors election.

The Pfizer Cattlemen's College on both Friday and Saturday during the convention will feature Dr. Weaber speaking on beef genetics, Dr. Darrell Rankins (Auburn University) speaking on cattle nutrition programs, Dr. Dan Scruggs (Pfizer Animal Health) speaking on herd health, and Dr. John Anderson (Mississippi State University) speaking on beef cattle markets.

For more information on the events scheduled as part of the Mississippi Cattlemen's Association annual convention and trade show, contact the Mississippi Cattlemen's Association at (601) 354-8951.

MBCIA Annual Membership Meeting

Friday, February 9, 2007, 1:00 p.m.
Regency Inn, Jackson, MS

Cattlemen's Exchange Breed Association Sessions Continue

The Cattlemen's Exchange groups throughout Mississippi recently interacted with Mr. Jack Ward, Chief Operations Officer and Breed Improvement Director for the American Hereford Association, and Dr. Dan Moser, Extension Beef Cattle Geneticist with Kansas State University. They discussed the Hereford Verified program, advantages of using Hereford genetics, what the AHA is doing for producers, and what is planned for the future.

On January 29, representatives from the American International Charolais Association (AICA) will visit with the Mississippi Cattlemen's Exchange groups over the MSU Extension Service interactive video system. Dr. Robert Williams, breed improvement and foreign marketing director with AICA, will address Charolais performance programs and commercial marketing programs. A newly established AICA sponsored calf tagging program will be introduced to beef cattle producers. As with the Hereford program, there will be plenty of opportunities to ask questions about these and other topics.

If you are interested in joining the meeting, contact your local Extension office or Lance Newman, Extension Area Animal Science/ Forages Agent, at 662 234 4451. A DVD version of the program will be available after the meeting for interested producers unable to attend. Look for future meetings of this type featuring additional beef breeds.

Grass Tetany Prevention and Management

Grass tetany season is upon us

Unfortunately for several cattle producers in the state, grass tetany season has arrived early and within a vengeance. Reports of cows down from grass tetany have been coming in to the Extension offices. The following article by J. A. Parish, R. H. Watson, and B. J. White describes grass tetany prevention and management practices for Mississippi.

What is grass tetany?

Grass tetany, also known as grass staggers or hypomagnesemia, is one of the more common metabolic disorders in beef cattle in Mississippi. Grass tetany results when magnesium (Mg) and calcium (Ca) levels in forages are too low to meet the requirements of cattle and cattle do not receive adequate Mg and Ca supplementation. Grass tetany can result from low magnesium intake, high potassium and low sodium intakes (which affect magnesium absorbtions, or low blood calcium.

Grass tetany is typically associated with low levels of Mg or Ca in cattle grazing annual ryegrass, small grains (e.g., oats, rye, wheat), and cool-season perennial grasses (e.g., tall fescue) in late winter and early spring. During this time of the year, there is often a flush of new forage growth. Forages grown on soils deficient in Mg, wet soils, or soils low in phosphorus but high in potassium and nitrogen (N) may contain very low levels of magnesium and calcium. This is also the time of the year when many herds are calving or approaching calving. Grass tetany most commonly affects cattle in late gestation (a period of rapid fetal growth) or early lactation, particularly the highest-producing animals in the herd. Magnesium and calcium requirements of lactating cattle are far greater than those of dry (non-lactating) cattle. This predisposes cattle to grass tetany during lactation.

Grass tetany is described as a "metabolic" disorder instead of a nutritional disorder because grass tetany is not necessarily associated with a dietary deficiency (i.e., low Mg levels in the diet), but instead, occurs when there is not enough Mg circulating in the blood and cerebro-spinal fluid for the animal to function normally. Frequently, there are factors that can reduce absorption of Mg into the blood stream, despite seemingly adequate Mg levels in the feed or forage. For example, high concentrations of aluminum in forage are often associated with grass tetany, and research indicates that dietary aluminum can interfere with Mg retention in cattle. In addition, Mg absorption is inhibited by high concentrations of potassium (K) and N, with K being the dietary factor recognized as having the greatest and most consistent effect on depressing Mg absorption in cattle.

Grass tetany – What to look for and which animals are at risk

Early signs of disease may be subtle and include restlessness, separation from herd, and anorexia. Clinical signs of grass tetany include nervousness, muscle twitching and strong contractions, poor coordination, recumbency (lying down and inability to stand), drooling, and teeth grinding. The disease typically progresses very rapidly leading to seizures (convulsions) and death if untreated.

An accurate diagnosis is important to allow formation of best treatment and prevention plan for the herd. Measuring the blood Mg level is necessary for a definitive diagnosis, but most times clinical signs, the type of animal affected and treatment response lead to a reliable, tentative diagnosis. If an animal is found deceased and low magnesium was suspected samples may be collected to measure Mg levels in the vitreous humor (fluid within the eye) to confirm the diagnosis and allow preventative measures to be implemented for the herd.

The condition is most commonly seen in cows and heifers in the first sixty days post-calving, although isolated cases have been noted in calves and steers. The greater susceptibility of beef females that have just calved is one of the reasons many cases of grass tetany occur in the spring. There has not been much research on the Mg requirements of beef cattle; however, the limited studies conducted to date indicate that there are significant increases in the re-

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Grass Tetany (Cont.)

quirements for Mg after calving. This research showed that the daily Mg requirement for cows between 1 and 35 days after calving is approximately 21 grams/day. This requirement falls to about 18 grams/day when the calves are over 150 days old. In order for a cow to achieve these intake levels on pasture, the Mg levels in the forage or hay needs to be about 0.18% of the dry weight. Comparatively, pregnant cows need between 8 and 9 grams of Mg per day, or a 0.12% Mg level in the forage. This highlights the importance of obtaining forage tests to determine the quality and mineral content in the diet. Forage test results can indicate when action might be needed to prevent any metabolic disorders or livestock production losses.

Requirements for Mg can differ among breeds of cattle. These differences in the efficiency of Mg absorption among different cattle breeds may be the result of genetic variation in absorptive mechanisms, feeding behavior, gastrointestinal tract motility (gut movement), gastrointestinal tract fill, or some combination of these factors. Brahman influence cattle have an advantage in Mg absorption and tend to be less susceptible to grass tetany than other breeds.

The role of forages in grass tetany

As the name implies, cases of grass tetany are frequently seen in cattle grazing lush spring grass. There is a large degree of variation in Mg content between different forage species and even within a species. The first cases of grass tetany were observed during the 1950's and 60's in cattle grazing cereal crops (wheat, oats, and rye), and native grass pastures. Currently, grass tetany is generally associated with introduced cool-season grasses, such as annual ryegrass and tall fescue.

While the cool-season grasses generally have adequate levels of Mg to meet the needs of cattle, they are much lower in Mg than many other common forage species. Consequently, there does not have to be much reduction in Mg levels to create a dietary deficiency, particularly in a cow that has just calved. The Mg, Ca, and K levels in legumes and other non-grass species are much higher than in the cool-season grasses, especially annual ryegrass. Therefore, more attention needs to be paid to cattle grazing pure stands of annual ryegrass or cereal crops.

The relative level of other minerals in the forage, such as Ca and K, also needs to be considered. Relatively high levels of Ca and K in the diet can interfere with the absorption of Mg by cattle. Therefore, forages with a high Ca and/or K level, relative to the Mg level, are more likely to cause grass tetany. The cool-season grasses fall into this category posing the greatest risk. For example, on a percentage basis, annual ryegrass has almost a 1:10 Mg:K ratio, whereas legumes, such as alfalfa, are closer to a 1:5 ratio. Therefore, a forage plant may seemingly have adequate levels of Mg, but the utilization of this Mg can be reduced by the presence of relatively high Ca and K levels in the same plant. Forage testing can also help identify these imbalances in pasture or hay.

The maturity and growth rate of the plant also have an effect on Mg concentrations in forage. Mineral levels are generally higher as the plant matures and dry matter levels increase. Therefore, the youngest growth often has the highest risk for grass tetany. Magnesium levels are also affected by how much stress the plant has been under. When plants are under stress, such as during the cold winter period, they do not take up and use as much K, which can lead to a build up of K around the root zone. This K buildup eventually interferes with the uptake of Mg when the plant comes out of dormancy and begins spring growth. Spring is characterized by a lot of fresh growth and plants that have just come out of a winter dormancy, which is a major reason that grass tetany is more common during this time. These factors tend to be more prominent on the heavier clay soils where low soil temperature and water-logging can further impair Mg uptake.

"…The condition is most commonly seen in cows and heifers in the first 60 days post-calving…"

Lush cool-season pasture during calving season is an ideal scenario for grass tetany

Grass Tetany (Cont.)

Proper magnesium mineral supplementation is critical for grass tetany prevention

Effects of fertilization and soil fertility on grass tetany

Nitrogen, phosphorus (P), and K are all essential for forage plant growth, and are common elements in most commercial fertilizers. High levels of all these minerals in plants have been found to interfere with Mg absorption by ruminant livestock. An important goal of fertilization is not to create imbalances of minerals in the soil, which ultimately may lead to imbalances in the plant. Applying high rates of N, P, and K in the late winter/early spring, to pastures where the Mg levels are relatively low, may increase the likelihood that spring-calving cows will be affected by grass tetany. The cool-season annual grasses, such as annual ryegrass and the cereal crops, are all very good at taking up and accumulating a lot of N and K, so applying excessive amounts to these species may increase the risk of grass tetany.

The uptake of Mg, and other minerals, can be impaired when soil pH is outside the optimum range (6.0 to 7.0). If soils are outside this range, then it is possible that the plant uptake of minerals, such as Mg, is being impaired, even if there are adequate amounts present in the soil. Most soils in Mississippi will have a pH that is below 6.0 if they have not been receiving regular lime applications. An exception to this is the Black Belt soils of Northeast Mississippi where the pH is generally above 7. In each case, mineral uptake by the plant may be affected.

Prevention and treatments for grass tetany
While careful pasture fertilization strategies can reduce the risk of grass tetany, the most reliable method of grass tetany prevention is supplemental feeding of Mg and Ca during the grass tetany season. Both mineral elements can be included in a mineral mix as part of a free-choice mineral supplementation program. Start feeding a high Mg mineral one month prior to grass tetany season. A good target for Mg levels during grass tetany season is 14% Mg for a mineral with a projected intake of four ounces per head per day.

"…Palatability of Mg mineral supplement can be low, so it is important to monitor mineral consumption…"

Palatability of Mg supplements can be low, so it is important to monitor mineral consumption to make sure that cattle consume adequate quantities. The addition of molasses or protein meals such as soybean meal or cottonseed meal to mineral supplements can increase supplement palatability, but the protein meal supplementation may exacerbate the grass tetany condition. Moving mineral feeders closer to areas where cattle congregate can also be an effective method for increasing mineral consumption if necessary.

If calving pastures are large, multiple mineral feeders should be available to the herd. Some cows will remain separated from the herd after calving, so mineral feeder placement in remote areas of pastures may be prudent. Feeders should be checked regularly to ensure that mineral does not run out or become caked. If management changes do not bring mineral intake to required levels, mineral formulation changes should be considered.

It is important to note that while Mg deficiency can result in grass tetany, excessive Mg supplementation can cause production problems as well. Clinical signs of Mg toxicity include severe diarrhea, weight loss, drowsiness, and damage to rumen tissues. Under most production circumstances, however, overconsumption of Mg is unlikely to cause beef cattle death losses and Mg deficiency is a more likely scenario.

Consult a veterinarian for grass tetany treatments for the herd. Early treatment of grass tetany is important. Collapsed cattle that have been down more than 12 to 24 hours will seldom recover. Blood Mg levels can be increased within 15 minutes by intravenously administering 500 ml of calcium borogluconate solution with 5% magnesium hypophosphate. The solution must be administered slowly, and heart and respiratory rates should be monitored closely during administration.

After treating with the intravenous solution, orally administer one tube of CMPK gel (a source of calcium, phosphorus, magnesium, and potassium) or intraperitoneally adminis-

Grass Tetany (Cont.)

ter another 500 ml bottle of calcium borogluconate solution with 5% magnesium hypophosphate for slow absorption to decrease the possibility of relapse. If the animal is treated using subcutaneous (under the skin) administration, the desired effect may not occur for three to four hours. It is important to utilize proper formulations of injectable products to avoid negative side affects. A 20% magnesium sulfate (epsom salt) solution is recommended for subcutaneous administration, because tissue sloughing may occur with a higher dosage.

Forage management to reduce the risk of grass tetany

There are several fertilization and pasture management practices that can help reduce the risk of grass tetany. Altering pasture composition is one effective method. Adding legumes to annual ryegrass, small grain, and tall fescue pastures not only increases the quality, but improves the levels of important minerals such as Mg. A pasture legume content of between 20% and 30% could increase in Mg levels in the forage as much as 40% without any significant increase in Ca or K levels. This legume content can also reduce the requirement for N applications, thereby reducing the risk of grass tetany caused by a spike in N uptake by the cool-season grasses. Other forage species, such as chicory and plantain, have similar ability to increase Mg levels in pastures. Several forage breeding efforts have attempted to produce forages with increased Mg and Ca levels relative to K levels, but they have met with limited success for addressing grass tetany problems.

Appropriate fertilization is essential for maintaining the correct balance of nutrients in the soil, plant, and ultimately the grazing animal. The only way to achieve the correct nutrient levels is to regularly soil test pastures and hay fields (every 2-3 years for grazed pasture and every year for hay fields). The Mississippi State Soil Testing Lab provides soil tests for $6.00/sample (see MSU-ES Information Sheet 376, Soil Testing for the Farmer for details about soil testing). The test report gives recommendations for lime, N, P, and K fertilization requirements for each crop, and gives the extractable levels of P, K, Ca, Mg, and several other important minerals. It is important to pay close attention to these levels to identify and fix any imbalances. The soil test will indicate the levels of each mineral in a soil sample on a scale from very low to very high. If an imbalance is identified, they can generally be fixed with an inexpensive mineral added to fertilizer.

The uptake of the minerals by the plant is reliant on keeping soil pH in the optimum range. Regular lime applications on acidic soils (according to soil test recommendations) are vital for forage production, and helping ensure that mineral imbalances do not occur in the forage.

When applying fertilizers that contain N and K, it is better to apply two or more smaller applications one month apart than one large application. For example, a 50 lbs. N/acre application in mid-February, and another in mid-March is favorable to a single 100 lb N/acre application in February. This helps prevent a mineral imbalance in the plant, allows more efficient use of fertilizer inputs by the plant, and reduces nutrient loss to the environment. It is also advisable to use an N fertilizer that does not contain K where K levels in the soil may already be adequate or high.

The practices listed above can help prevent many of the factors that may increase the incidence of grass tetany in cattle. Grass tetany preventative measures are easy to implement and can help avoid unnecessary production losses. It is still always important to closely check cattle on a regular basis, particularly the more susceptible animals like cows that have just calved, and consult a veterinarian as soon as potential problems arise. For more information on prevention and treatments for grass tetany, soil and forage testing, and animal mineral requirements, contact a local county office of the Mississippi State University Extension Service.

"…Closely check cattle on a regular basis, particularly the more susceptible animals like cows that have just calved…"

Watch cattle for restlessness, separation from herd, nervousness, muscle twitching, poor coordination, inability to stand, drooling, and teeth grinding

Mississippi Beef Cattle Improvement Association—Productivity and Quality

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Send questions or comments about this newsletter to Jane Parish, Extension Beef Specialist, Mississippi State University Extension Service

Visit MBCIA online at http://msucares.com/livestock/beef/mbcia/

MBCIA Membership Application

Name:_____

Address:_____

City:_____

County:_____ State:_____ Zip:_____

Phone:_____ Email:_____

(Check one) Seedstock:____ Commercial:____

Cattle breed(s):_____

Completed applications and $5 annual dues payable to Mississippi BCIA should be mailed to:

Mississippi Beef Cattle Improvement Association
c/o Jane Parish, Extension Beef Specialist
Box 9815, Mississippi State, MS 39762

BCIA Genetic Profit Tips—January 2007

Effective sire selection is critical to profitability. The first step in selecting a herd sire is to assess the strengths and weaknesses of the cow herd and decide how cattle will be marketed. This will help in prioritizing sire selection criteria and choosing herd sires and AI bulls with *acceptable combinations of traits* that will *complement the cow herd* and produce calves that will *match market targets*.

Start by determining the purpose of the sire in the breeding herd. Will he be bred to mature cows only or will heifers be exposed to him? Will the bull be used to sire replacement heifers or will he be a terminal sire? Sire selection scenarios for three different production situations appear to the right.

Production Scenario	Sire Selection Considerations
Producer #1	***Growth and carcass sire***
Herd size: 120 cows Breeding mature cows only Will not retain heifers as replacements Sires used to complement the cows in terminal cross Focus on uniform calf crop Emphasis on rapid growth & carcass traits Hired labor on hand High level of management	Superior weaning and yearling weights (rapid growth) Heavy muscling, sound structure, similar color Moderately high birth or calving ease EPDs acceptable (only breeding to mature cows, labor available) Sensible frame size for acceptable carcass weights Milk not important (no daughters retained) Complement the cows and match the market Consider carcass Expected Progeny Differences (EPDs) or live animal ultrasound measures
Producer #2	***Maternal "all-purpose" sire***
Herd size: 50 cows Seedstock producer Will retain heifers as replacements Desires "all-purpose" sire Hired labor on hand	Optimal birth weight, milk, growth and mature size Close attention to economically relevant traits, EPDs Large scrotal size and EPD (negative correlation with daughters' time to first estrus) Structurally sound (feet and legs, eyes) Adaptability, Longevity, Maternal traits (udder quality) Muscularity, Carcass traits important as seedstock
Producer #3	***Calving ease sire or "heifer bull"***
Herd size: 25 cows Breeding many first-calf heifers Will retain heifers as replacements No hired labor Producer works full-time off farm Limited working facilities	Most calving difficulty and associated losses occur in first-calf heifers Low birth weight EPD or desirable calving ease EPD Reasonable muscling, acceptable growth EPDs Manageable disposition, sound structure Carcass and maternal considerations dependent on replacement and marketing plans

By evaluating production resources, cow herd needs and marketing opportunities, practical and hopefully profitable sire selection decisions can be made. Avoid genetic antagonisms that come with single-trait selection (e.g., birth weight/calving ease vs. retail product yield; retail product yield vs. marbling). In other words, look at the big picture and try to strike a balance among different selection criteria. The rewards of carefully planned sire selection decisions will be realized when it comes time to market calves.