Goat & Sheep News

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Rain Brings Relief, New Problems to Livestock Producers

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We have been happy to see the rains that have lately soaked our pastures throughout the Southeast and Midwest, breaking a long dry period. However, livestock producers need to be on the lookout for increased incidence of hoof problems and internal parasites.

Livestock hooves soften if animals are pastured on wet ground or housed in damp pens for an extended period of time. Softer hooves are more susceptible to cuts, tears or abrasions that create an opening for organisms that cause hoof rot to enter. Producers should avoid placing animals on hard or gravel surfaces until their hooves have had an opportunity to dry out and harden to reduce the likelihood of cuts, tears or abrasions.

Organisms that cause hoof rot thrive in moist environments. Producers should be on the lookout for lame animals. Lame animals should have their hooves examined. Foul-smelling odors, heat and inflammation at the coronary band, where the hoof adjoins the pastern, and pain are commonly noted signs of the disease. Producers should trim the hoof to remove damaged or dead tissue, then treat the affected hoof with one of the following:

- antibacterial spray (20% cetrimide and 1.3% oxytetracycline in water and alcohol)
- foot bath (10% zinc sulfate, 10% copper sulfate, or 5% formaldehyde solutions)
- foot soak (1 hour in a solution of 10% zinc sulfate and 0.2% v/v of laundry detergent containing nonionic surfactants or the surfactant sodium lauryl sulfate)

A vaccine against hoof rot is available for use in sheep but is not approved for use in goats.

Wet weather also creates conditions that are favorable for internal parasites to infect animals on pasture. Liver flukes, which can cause death in sheep (usually via black disease that destroys liver tissue) and significant economic losses in dairy and beef cattle, are more common in wet weather. Likewise, barber pole worm (*Haemonchus plaeci*), large stomach worm, wire worm, medium or brown stomach worm and small stomach worm are aided by wet weather. After long

periods of drought, such as we have seen across the Southeast and Texas, eggs that have remained dormant will be freed by recent rains, and the wet environment of the pasture will foster larval development. This means larger numbers of infectious larvae than usual will be present to infect livestock.

Scours, anemia and unthriftiness are common signs of heavy internal parasite infestation. In sheep, goats and calves, "bottle jaw," swelling under the jaw caused by fluid escaping from the blood vessels, is a serious indicator of *Haemonchus* infestation. Unfortunately, many of the dewormers used against *Haemonchus* are becoming ineffective. Producers should work closely with their veterinarian to develop a plan to reduce the impact of internal parasites over the next few weeks. 

FAMACHA for Parasite Control

Steven M. Jones, Associate Professor Animal Science

There are several sources for information on parasite control and FAMACHA©. The best single source is *http://www.SCSRPC.org*.

The most common worm is the barber pole worm (*Haemonchus contortus*), which feeds on blood in the abomasum (true stomach). If there are too many, they cause anemia, poor performance and ultimately death of the animal. The barber pole worm is responsible for the death of 85% of the animals that die of worms and is therefore a very important worm. The red stripe of the barber pole worm is his gut full of your goat's blood, and the white stripe is the worm's uterus full of eggs – essentially a blood-sucking, egg-laying machine. The barber pole worm is about an inch long and as big around as a paper clip wire, so it is easy to see him in the stomach of a freshly dead goat. Most are attached sucking blood (looks like a hairy stomach), but a few will be swimming around. Since it is a tropical worm, it is a greater problem during the summer.

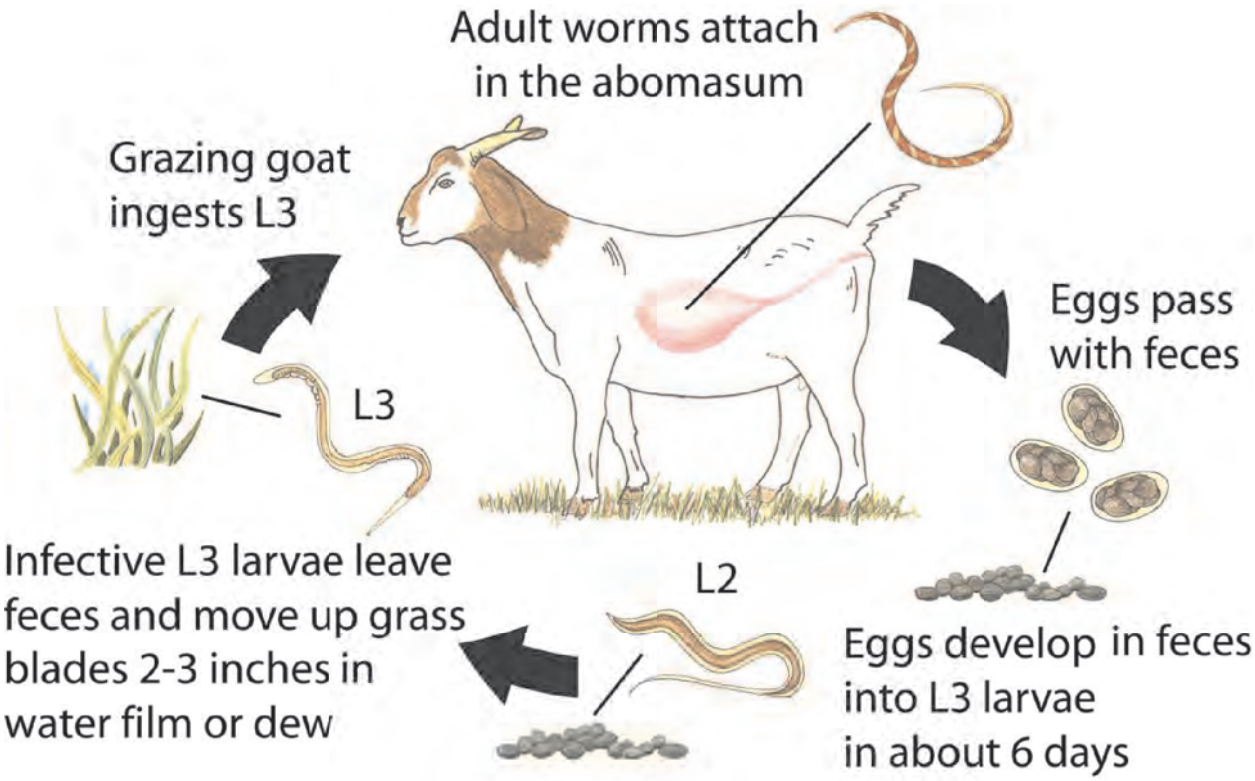
There are two other worms of secondary importance. One is the black scour worm (*Trichostrongylus colubriformis*), which feeds on mucous in the small intestine and causes diarrhea, reduced appetite and poor performance. The other worm is the brown stomach worm (*Teledorsagia circumcincta*, formerly *Ostertagia*), which feeds on the secretory cells of the abomasum and causes loss of blood plasma, diarrhea, reduced appetite and poor performance. Neither of these two worms cause anemia – you only see diarrhea and a poor doing animal. These worms are very small, the size of an eyelash. They are difficult to see, but you can see them wiggling if you put a little digesta on a white card. These worms are temperate species and cause more problems in the spring and fall than in the summer.

It is very important to understand the life cycle of the worm so we know some management steps we can take to reduce the infection of goats. Worm eggs are in the feces and will hatch when it is over 50º F, but hatch best at 85° F. This is why worms are less of a problem in the winter. It takes 1-6 days for the eggs to hatch, but they have to go through several developmental stages before they can infect animals. They hatch to the first stage larvae, abbreviated l-1. The l-1 eats bacteria in the feces, grows and molts (sheds skin like a snake) and becomes a l-2. Both the l-1 and l-2 can be killed by drying out when the weather is dry. When we have a dry July and August, we have much fewer worm problems.

The l-2 eats bacteria in the fecal pellet and grows and molts to a l-3, but this is an incomplete molt. The old skin slides up and he grows a new skin underneath, which is a good news/bad news proposition. He is more resistant to drying out since he has two layers of skin, but when he partially sheds his skin, it covers his mouth so that he can no longer eat and must live off his stored fat. This means that he must get into your goat before he runs out of fat. How long can he live? Since he is cold-blooded, his metabolism goes slow when he is cool and he may live 120-240 days. However, when the weather is hot, like 95º F, his metabolism really speeds up and he may only live 35-40 days before he runs out of fat. It takes about 6-14 days for an egg to develop to a l-3, the infective stage of the larvae, depending on how warm temperatures are.

The larvae has to escape the fecal pellet and get on grass so the goat can eat him. Since the outside of the fecal pellet dries into a hard shell and he can't penetrate it, he needs some rain or heavy dews to soften or break the crust so that he can escape. It takes about 2" of rain in a month's time to crack a pellet open. If he runs out of fat before there is enough rain or dew to release him, he dies. Once the pellet is softened or cracked open, the larvae is like a canoe, going wherever the water takes him, hopefully up a leaf of grass so that your goat will eat it along with the third stage infective larvae. The larvae is unable to swim or crawl.

If the larvae is lucky enough to get into your goat, he immediately moults to a l-4. The l-4 has a decision to make. He can decide to grow into a l-5 and go to



Life Cycle of Haemonchus contortus, the barber pole worm

adulthood and lay eggs, or he can decide to enter a state of suspended animation called hypobiosis or arrested form. He nestles down in the stomach gland, and the immune system does not know he is there.

The barber pole worm causes anemia. Therefore, the degree of anemia tells us how much difficulty the worms are causing the animal. The brown stomach worm and black scour worm do not cause anemia, and we have to depend on diarrhea and loss of body condition to detect them. We measure anemia with the FAMACHA© card by rolling the lower eyelid down and comparing the color of the inside of the eyelid, where it was touching the eyeball, to the color chips on the card. A healthy pink color will match chips #1 or #2, whereas a very pale color, white as a sheet, will match #5. If the color match is in between two chips, score it the higher number (more pale) color. Do not hold the eye open for more than a few seconds because the color will change. Check the other eye if necessary. Remember that pink eye can affect the color of the eye. One should also remember that there are other causes of anemia such as coccidi-osis, lice and liver flukes, and if animals do not respond to deworming, these may need to be investigated as well as determining if the dewormer is working.

Treat all animals with a FAMACHA© score of 4 or 5 with an effective dewormer, and check again two weeks later if it is during the summer worm season. At deworming, many producers give the animal a blood-building supplement, such as Red Cell, to support production of replacement red blood cells. If >10% of the animals have FAMACHA© scores of 4 or 5, then consider deworming animals that score 3, especially ewes around lambing/kidding or nursing kids, young animals, does nursing kids and thin, poorly conditioned animals. Try to rotate animals to another pasture. Be sure to check animals that lag behind

the herd. If an animal gets "bottle jaw," deworm it regardless of its FAMACHA© score. Score animals using the card, not from memory, and replace the card every 12 months because the colors fade. Record animal numbers as they are dewormed. If you add up the number of times animals are dewormed across the summer, those requiring the most deworming are also those producing the most eggs and causing pasture contamination for others. Their offspring are also likely to be like them, so those animals that were dewormed the most are good candidates for culling.

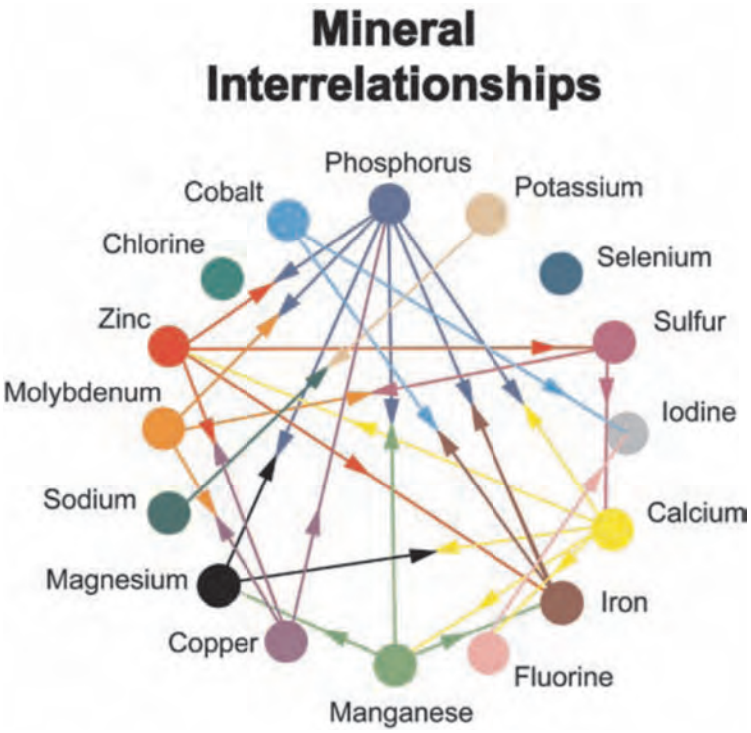
FAMACHA© is not a parasite control program but is a tool in a parasite control program. Your parasite management program should include monitoring of fecal egg counts periodically as well as FAMACHA© eye scores. When you have a parasite problem, determine why and change the parts of management that you can. Only use a dewormer when necessary to reduce the rate of development of dewormer resistance. Cull wormy animals because they cause worm problems for everyone else, and worm problems are often passed onto their offspring. Deworm new animals coming on to your place with at least two classes of dewormer, and check a week later to make sure their feces are free of eggs to prevent importing resistant worms. Notice animals with pale color around the eyes when you check animals and deworm them promptly. Good nutrition (not only protein and energy but also vitamins and minerals) is necessary to fuel the immune system in its fight against worms.

Mineral Supplementation Requires Some Planning

Steven M. Jones, Associate Professor Animal Science

I have had numerous requests in recent weeks on mineral requirements for sheep and goats. I recognize that we have some limitations in Arkansas on the variety of mineral products specific for sheep and/or goats. Be aware that the mineral requirements differ greatly between the species. Most importantly is copper; goats require copper at a level that would be toxic to sheep.

The inorganic nutrients are called minerals. Minerals are further subdivided into macrominerals, those required at 0.1% or more in the diet (macro means large), and microminerals, those required at the part per million (ppm) level (micro means small). A ppm is the weight of a paperclip in a thousand pounds of feed. A hundred ppm is equal to 1.6 ounces in a thousand pounds of feed. Macrominerals include calcium, phosphorus, sodium, potassium, chloride, sulfur and magnesium. Microminerals include iron, copper, cobalt, manganese, zinc, iodine, selenium, molybdenum and others. Minerals function in many ways in the body. Some such as calcium and phosphorus are major structural components of bones and teeth, as well as having other functions. Other



minerals facilitate nerve functioning or fulfill a role as electrolytes. The mineral requirements for goats are not as well known as those for other livestock species and have often been extrapolated from sheep or cattle requirements due to a lack of studies in goats. As such, mineral recommendations for goats often have a wide range because of lack of accurate goat-specific information.

Macrominerals

The macrominerals are listed below, followed by the abbreviation, normal dietary range, function, deficiency symptoms and major dietary sources.

Calcium (Ca) 0.3%-0.8%

The major biological function of calcium is for bones. Bones contain 99% of the calcium in the goat's body. Calcium is also necessary for muscle contraction, nerve conduction and blood clotting. The main deficiency symptoms are seen in the skeletal system. Bones can become soft and weak and may be deformed, resulting in lameness. This condition is called rickets or osteomalacia. Vitamin D deficiency causes similar symptoms due to the role of vitamin D in the absorption and metabolism of calcium. Milk is relatively high in calcium, and lactating goats need adequate levels of calcium for milk production. Does can get hypocalcemia (milk fever) while lactating. This is due to a metabolic disorder, which results in a shortage of calcium in the blood due to calcium being used for milk production. Urinary calculi is a condition brought about, in part, by an imbalance in the calcium-to-phosphorus ratio in the diet. Generally, about twice as much calcium as phosphorus should be in the diet of ruminant animals. An excess of calcium can cause abnormal bone growth. Major common dietary sources of calcium include forages, limestone and dicalcium phosphate.

Phosphorus (P) 0.25%-0.4%

Approximately, 80% of the body's phosphorus is found in bones, with the remainder in the blood and other tissues. In addition to skeletal structural functions, phosphorus is essential in energy metabolism, acid-base balance and is a constituent of enzymes and genetic material. The major symptoms of phosphorus deficiency include reduced growth, listlessness, unkempt appearance, depressed fertility and decreased serum phosphorus. Phosphorus is the most commonly encountered mineral deficiency and also the most expensive macromineral. Sources of phosphorus include protein supplements, cereal byproducts, mineral supplements and dicalcium phosphate.

Sodium (Na) 0.2%
Potassium (K) 0.8%-2.0%
Chloride (Cl) 0.2%

All three of these minerals function as electrolytes in the body. Electrolytes are mineral ions, carrying a positive or negative charge that the body uses for osmotic balance, pH balance and water movement. They are also essential in transmission of nerve impulses. These minerals are highly water soluble and are easily lost with diarrhea. Electrolyte solutions used to treat animals with diarrhea contain all three of these minerals. A deficiency of potassium could occur when animals are on high-concentrate diets, with symptoms including poor appetite, urinary calculi, body stiffness progressing from front to rear and pica (depraved appetite as described above). A deficiency of chloride depresses growth. A deficiency of sodium causes reduced growth and feed efficiency. Salt provides both sodium and chloride. Most forages have adequate levels of potassium.

Sulfur (S) 0.2%-0.32%

The major biological function of sulfur is as a component of sulfur-containing amino acids. Therefore, sulfur is important in protein synthesis, milk and hair production, enzymes, hormones, hemoglobin and connective tissue and is a component of the vitamins biotin and thiamine. The major deficiency symptoms include poor animal performance, hair loss, excessive salivation, tearing of eyes and weakness. A major source of sulfur is protein, which contains sulfur as a component of some of the amino acids. Therefore, sulfur is important in diets where nonprotein nitrogen (e.g., urea) is used to substitute for some protein. Sulfur-containing mineral blocks are often used for control of external parasites in goats. Excessive sulfur in high-concentrate diets can contribute to polioencephalomalacia, as discussed for the water soluble vitamin thiamine.

Magnesium (Mg) 0.18%-0.4%

Magnesium is found in bones (60% to 70% of that in the body), liver, muscle and blood. It is required for normal skeletal development, nervous and muscular system functions, as well as for enzyme systems. It is also closely associated with metabolism of calcium and phosphorus. In ruminants, a major magnesium deficiency disease is grass tetany, often seen in animals grazing fast-growing, lush cool-season pastures. Affected animals have low blood magnesium levels, exhibit a loss of appetite, are excitable, stagger, have convulsions and may die. High fertilization rates, cool temperatures and high levels of plant potassium and/or

rumen ammonia may contribute to the disease. A major supplemental source of magnesium is magnesium oxide, which is often supplemented on winter wheat pasture and mixed with a protein source to encourage consumption.

Micro or trace elements

The first level after the mineral name is what is thought to be the minimum requirement in the diet, while the second is the value above which the element can become toxic. Most supplemental trace minerals are provided by trace mineralized salt or mineral mixes designed to provide 10% to 50% of the daily minimal requirement. This is adequate if the animal's diet is marginal in a mineral but is inadequate if that mineral is severely deficient. Unless a documented deficiency exists, it is best not to provide 100% of a trace mineral, because an excess of one mineral may depress the absorption of another, creating a deficiency. Excess supplementation of some minerals can cause toxicity problems, especially with copper.

Iron (Fe) 35-500 ppm

The major function of iron is as a component of hemoglobin, required for oxygen transport. It is also a component of certain enzymes. The major iron deficiency symptom is anemia. Anemia can also be caused by blood loss due to several factors, including injury, internal parasites (barber pole worm or liver fluke) and a bad case of external parasites such as lice. Iron is stored in the liver, spleen and bone marrow. Milk is very low in iron; therefore, kids raised for a long time on milk alone will develop anemia. Soil contamination on forages can provide significant levels of dietary iron. Iron sulfate, which is red, is a common means of adding iron to the diet. Forages in some areas have excessively high levels of iron that suppress utilization of other trace minerals.

Copper (Cu) 10-50 ppm

Copper is essential in formation of red blood cells, hair pigmentation, connective tissue and enzymes. It is also important in normal immune system function and nerve conduction. Deficiency symptoms include anemia, "bleached" looking (lighter color) and rough hair coat, diarrhea and weight loss. Young goats may experience progressive incoordination and paralysis, especially in the rear legs. High dietary molybdenum can depress absorption of copper and cause a copper deficiency. There should be at least four times as much copper as molybdenum in the diet. Sheep (both hair and wool types) are sensitive to copper toxicity (maximum of 12-15 ppm), whereas goats require copper levels similar to beef cattle. Angora goats may be more sensitive to copper toxicity than meat and dairy goats. The liver stores copper, which can protect against toxicity in the short term. However, when liver capacity is exceeded, animals can die rapidly from a hemolytic crisis caused by stress.

Cobalt (Co) 0.11-25 ppm

The only well-accepted biological function of cobalt is as a component of vitamin B_{12}. Rumen microbes utilize cobalt for growth and produce vitamin B_{12}. Cobalt deficiency symptoms include loss of appetite, anemia, decreased production and weakness. Most natural feedstuffs contain adequate levels of cobalt. There are cobalt-deficient areas in the United States.

Zinc (Zn) 40-500 ppm

Zinc is found in all animal tissue and is required by the immune system and for normal skin growth. Zinc is also essential for male reproduction. Deficiency symptoms include dermatitis (thick, dry patches of skin), hair loss, skin lesions, swollen feet and poor hair growth. The bran and germ of cereals contain high levels of zinc.

Manganese (Mn) 40-1000 ppm

Manganese is important for bone formation, reproduction and enzyme functioning. Deficiency symptoms include a reluctance to walk, deformity of forelegs, delayed onset of estrus, poor conception rate and low birth weight. It is unusual to have a manganese deficiency.

Selenium (Se) 0.1-20 ppm

Selenium functions with vitamin E as an antioxidant, protecting cell membranes from oxidation. Selenium also affects reproduction, and metabolism of copper, cadmium, mercury, sulfur and vitamin E. Deficiency symptoms include poor growth rate, kids being unable to suckle, white muscle disease (cardiac and skeletal muscles have white spots), sudden death by heart attack, progressive paralysis and retained afterbirth. Selenium is deficient in many areas because of low soil levels. Most of our soils in Arkansas are selenium deficient. It is more effective to provide selenium supplementation through feed than by injection. Injection of BoSe is often given to kids at birth, but an excess of BoSe can be quite toxic.

Molybdenum (Mo) 0.1-5 ppm

Molybdenum deficiencies are very rare. Toxicity occurs above 3 ppm due to reduced copper absorption,

resulting in a copper deficiency. The copper level must be four times the molybdenum level to overcome this effect. High dietary levels of molybdenum are usually related to soil content. Molybdenum (as ammonium tetrathiomolybdate) is often used to treat copper toxicity in animals.

Iodine (I) 0.5-50 ppm

The only proven biological function of iodine is as a component of thyroid hormones that regulate energy metabolism and reproductive function. The major iodine deficiency symptom is goiter – a swelled or enlarged thyroid gland in the neck. This should not be confused with the thymus gland in the neck on young animals (the thymus gland is especially pronounced in Nubian and some Boer kids but shrinks after several months and is mistakenly called milk goiter). Also, iodine deficiency causes reduced growth and milk yield, pregnancy toxemia and reproductive problems such as late-term abortion, hairless fetus, retained placenta and weak kids. Most of the southern U.S. has adequate iodine in the soil, and most minerals and trace mineralized salts contain iodine.

Mineral Nutrition Considerations

Plants are a major source of minerals for the goat, supplying all minerals that goats require except iodine. However, plant requirements for minerals, such as cobalt and selenium, may be much lower than the level required for animals. Some soils are inherently deficient in some minerals, such as iodine and selenium, due to soil geology. Plants grown on soils deficient in a mineral are likely to be deficient in that mineral. However, some plants have an ability to concentrate the minerals available in the soil. Maps of mineral deficient areas of the U.S. are available. However, consulting local extension agents is a better method of determining soil mineral deficiencies or toxicities that could affect mineral levels in local forages.

Various factors other than soil mineral level can interact to influence the mineral content of forages. Soil pH is one factor that affects mineral uptake by plants. Under acidic soil conditions, many trace minerals are less available for plant uptake. Environmental temperature at certain times of the year may also affect mineral uptake. Interactions among minerals after soil fertilization can also affect their availability for incorporation into plant material. Different plant species will also have varying contents. Browse and forb plant species may have higher mineral concentrations than do some grasses. As goats eat a variety of plants, they are less likely to have mineral deficiencies than other species of animals that eat predominantly one plant species.

Mineral supplements should not be overfed. Mineral supplements are formulated for goats to consume a sufficient quantity. Many minerals interact with one another, and excess consumption of one mineral may decrease absorption and/or utilization of another. For example, it is well known that excess iron depresses absorption of zinc, copper, manganese and selenium.

Formulation of mineral supplements requires considerable expertise, since the addition of high levels of one mineral may depress the utilization of another, causing a deficiency. Also, some trace minerals can be toxic in excess. Calculation of supplemental levels for feed formulas requires a certain amount of technical expertise and specialized scales for weighing, along with sophisticated mixing equipment. Most common farm mixing methods are inadequate, resulting in "pockets" of dangerously high mineral levels in a batch of feed.

Choosing a Mineral Supplement

The most important consideration in choosing a mineral supplement is the level of calcium and phosphorus. Some mineral mixes are designated 12 - 8, which means they contain 12% calcium and 8% phosphorus. The levels of these two minerals should be the same that is being fed to cattle in your area (contact your county agent or extension livestock specialist). Phosphorus is expensive, so a 12 - 12 mineral will cost more than one that is 12 - 8. However, most forages are low in phosphorus, making it the most common mineral deficiency.

The mineral supplement should also contain trace minerals that are deficient in the area. Levels of trace minerals used in local cattle supplements can provide a guide for goats. Most mineral supplements are formulated to provide less than half the trace mineral requirements due to toxicity concerns. A mineral supplement should be provided in the loose form to maximize consumption. The salt level in the mineral drives intake; therefore, no other sources of salt should be available. A mineral feeder should be used to protect the mineral from rain and to keep the supplement clean. Replenish minerals frequently to keep them fresh.

Reference: *Dr. Steve Hart, Langston University; Proceedings of the 26th Annual Goat Field Day, Langston University, April 30, 2011.*

Calendar of Events

June 7, 14 and 20 – Faulkner County Small Ruminant Short Course; $25 registration for educational materials (an additional $12 for FAMACHA eye chart). FAMACHA Training on June 21. Contact: 501-329-8344.

July 17 – North Arkansas Meat Goat Association meeting, 2 p.m., Farm Bureau Building, 110 Industrial Park Road, Harrison, Arkansas. *http://www.arkansasmeatgoat.com*.

June 25-26 – Third Annual Arkansas Classic ABGA Show, Arkadelphia, Arkansas. Contact: Ronald Morris, 870 279-4882.

July 23 – The Arkansas Meat Goat Association will host a meeting on Saturday, July 23, at 11 a.m. to be held at Western Sizzlin in Benton, Arkansas.

July 29 through August 7 – Ozark Empire Fair, 3001 North Grant, Springfield, Missouri. Show times and judges to be announced. *http://www.ozarkempirefair.com*.

August 6 – Northeast Arkansas Showdown, Greene County Fairgrounds, Highway 49B, Paragould, Arkansas. Three ABGA shows, entry fee $20 per show or $50 for all three shows by July 30, late entry $25, pen fee $5. Judge for show 1 is Mark Berry, other judges to be announced. Contact: Lesia Simpson, (870) 634-6028, *lisia@littlelisiasboers.com, http:www.arkansasboergoats.com*.

August 11-21 – Missouri State Fair, Missouri State Fairgrounds, 2503 West 16th Street, Sedalia, Missouri. Show times and judges to be announced. *http://www.mostatefair.com*.

September 10-11 – Southwest Missouri Boer Goat Classic, Vernon County Fairgrounds, 500 North Centennial Blvd., Nevada, Missouri. Shows at 10 a.m. and 3 p.m. on Saturday and 9 a.m. on Sunday. Entry fee $10 by August 31. Judges to be announced. Contact: Marla Sneed, (417) 448-9615, *showgoats@sofnet.com*.

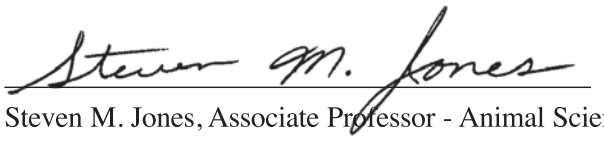
September 22-23 – Northwest Arkansas District Fair, Northwest Arkansas District Fairgrounds, 1400 Fairgrounds Road, Harrison, Arkansas 72601. Junior Market Meat Goats and Junior Boer Goats. Contact: Robert McMahen, (870) 557-1759, *robert@northarkboers.com, http://www.northarkboers.com*.

September 24-25 – North Arkansas Meat Goat Association Fall Classic, Northwest Arkansas District Fairgrounds, 1400 Fairgrounds Road, Harrison, Arkansas 72601. Two ABGA-Sanctioned Open Shows on Saturday and one on Sunday. Early entry fee $15, early entry deadline, September 17; late entry fee $20. Check-in time 3 to 7 p.m. September 23. ABGA judges to be announced. Contact: Robert McMahen, (870) 557-1759, *robert@northarkboers.com,* - *http://www.northarkboers.com*.

October 14-22 – Arkansas State Fair, 2600 Howard Street, Little Rock, Arkansas 72206. Two ABGA-Sanctioned Open Boer Goat Shows, one Junior Boer Goat Show and one Junior Market Meat Goat Show. Show times and judges to be announced. Contact persons: Scott and Jennifer Hawthorn, (870) 246-6353, *jendh34@yahoo.com, http://www.arkansasstatefair.com*.

October 16 – North Arkansas Meat Goat Association meeting, 2 p.m., Farm Bureau Building, 110 Industrial Park Road, Harrison, Arkansas. *http://www.arkansasmeatgoat.com*.

November 5 – Northeast Arkansas Boer Blowout, Greene County Fairgrounds, Highway 49B, Paragould, Arkansas. Three ABGA shows, entry fee $20 per show or $50 for all three shows by October 30, late entry $25, pen fee $5. Judge for show 1: Mark Berry, show 2: Anita Messer and show 3: Larry Epting. Contact: Lesia Simpson, (870) 634-6028, *lisia@littlelisiasboers.com, http:www.arkansasboergoats.com*.



Steven M. Jones, Associate Professor - Animal Science