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Multispecies Grazing

Steven M. Jones, Associate Professor - Animal Science
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As production costs increase and economical available land resources decrease for animal agriculture, there may be a need for diversification of species and a change in management strategies. Multispecies grazing is not a new concept and is practiced throughout the world. Multispecies grazing may have a future, and the future may be now. Many farms in Arkansas are already involved as they have added meat goats and/or sheep to an existing traditional beef cattle operation. The question is, Has a farm evaluation been made, goals outlined and a management plan been made to capture all potential benefits and/or avoid failures due to a poor management plan?

Benefits of Multispecies Grazing

Mixed-species grazing has several advantages. Cattle prefer grass over other types of plants and are less selective when grazing than sheep or goats. Sheep and goats, on the other hand, are much more likely to eat weeds. Sheep prefer forbs (broad-leaved plants) to grass, and goats have a preference for browsing on brush and shrubs then broad-leaved weeds. Therefore, grazing cattle, sheep and goats together on a

diverse pasture should result in all types of plants being eaten, thus controlling weeds and brush, while yielding more pounds of gain per acre compared to single-species grazing.¹

The addition of goats to cattle pastures has been shown to benefit the cattle by reducing browse plants and broad-leaved weeds. This permits more grass growth. Goats will control blackberry brambles, multiflora rose, honeysuckle and many other troublesome plants.² It is thought that you can add one goat per cow to a pasture without any reduction in cattle performance, and with time, the weedy species will be controlled so that total carrying capacity is improved. This is a cheap way of renovating pastures, and you can sell the extra goats and kids for a profit as well. The same principle holds for sheep. Although they are less likely to clean up woody plants, sheep are quite effective at controlling other weeds, with proper stocking pressure.

Multispecies grazing may also benefit pastures that are less diverse by encouraging more even grazing. Cattle will tend to graze taller grasses that sheep may reject. It has been shown that sheep graze near cattle manure

deposits, which cattle avoid.³ This too results in more even use of the pasture. Carrying capacity and pasture productivity are improved, and animal gains are also increased.^{4,5,6} Diversification of species results in diversification of income sources.⁷ Also, some researchers have found that adding cattle to a sheep flock may help reduce predation losses, after a period of bonding.⁸

Parasites are a major concern with sheep and goats under any system. Worm eggs are deposited on the pasture in the manure; the eggs hatch and larvae are consumed by grazing animals. If left untreated, concentrations of parasites will increase with time as this cycle is repeated. Higher concentrations of animals on a pasture may tend to magnify the infestation. Parasites are species-specific; that is, cattle parasites affect cattle but not sheep, while sheep parasites affect sheep but not cattle. The cattle act as “vacuum cleaners,” ingesting the sheep worm larvae and preventing them from affecting the sheep. This is most helpful when sheep and cattle follow each other in a grazing system. However, goats and sheep do share parasites, and grazing them together does not improve parasite control. Because parasite eggs are deposited in the manure and larvae only travel a short distance up grass blades, animals grazing taller forages (well above ground level) will not consume worm eggs or larvae. Therefore, goats that are given ample browse will be much less likely to become infested with parasites. If goats are forced to graze at ground level, however, the goats may acquire a serious parasite load.

Potential Problems

Problems may arise in the practice of mixed-species grazing. One problem is aggression by one species to the other. Another problem is supplemental feeding, including the feeding of trace minerals. The mineral supplement that is adequate for sheep may not be so for cattle, and a mineral supplement that is best for cattle may be toxic to sheep, as sheep do not tolerate much copper. This difficulty, and the one of aggressive animals, may be overcome by simply rotating the animals. If the sheep are grazed for a few days then moved to a fresh pasture and the next species put on the first pasture, you may get the benefits to your pasture and avoid these problems.

Fencing is another issue to consider. Electric fencing is generally considered to be the most

economical and convenient. Another idea, if cattle fence is already in place, is to string offset wires inside the fence. This should be set in about 8 inches and be 12 to 14 inches above ground. Also, it is a good idea to train sheep or goats to electric fence.

Predators are a major problem for sheep and goats. Electric fencing helps to discourage predators, but it may also be necessary to employ a guardian animal. Some producers prefer livestock guardian dogs, such as the Great Pyrenees or the Anatolian dogs, while others are strong proponents of llamas or donkeys.

Each has its advantages and disadvantages.

In conclusion, while multispecies grazing requires more thought and management and more investment in facilities, it can have big payoffs for your pasture and your wallet. If you decide to

add one or more species to your operation, be sure to investigate your market options and your fencing options, and then start slowly. Select healthy stock, and be observant.

References

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Would You Give a Faded Dollar for a Shiny Nickel?

John Jennings, Professor - Extension Forages

With all the access to information nowadays, you have to be careful what sources you choose to believe. So if I offered to sell you a brand new shiny nickel for an old faded dollar, what would be your response? Logic would suggest that would be a terrible deal for you, but some companies hope you would be curious enough to ask “what kind of nickel is it?” Then they can give a pitch of how much better it is than your old ragged dollar and why you should buy it. I am referring to many of the “miracle in a jug” fertilizers being promoted around the state. Several of these products are sold with miraculous claims of increased forage production, but no data or yield comparisons are shown. Farmers are being asked to believe that these liquid fertilizer-type products can be applied to forages at very low rates to produce bumper hay and pasture crop yields. That result would border on miraculous if it actually worked.

Research and years of forage testing show that on a fertilizer equivalent basis one ton of grass forage contains approximately 40 to 50 pounds of nitrogen, 10 to 15 pounds of P₂O₅ and 40 to 45 pounds of K₂O. Many of these nontraditional products supply less than one pound per acre of these major nutrients when applied at recommended rates. Some promotions side-step this fact with claims that their product unlocks nutrients in soil that were bound up by years of synthetic fertilizer use and that these products are natural and safer for the soil. Some even state that manmade chemical fertilizer, being unnatural, kills

earthworms, harms the soil and destroys soil health, although no data or any credible evidence is offered to support any of these claims.

You can fact-check the rates quite easily. Most liquid fertilizer materials weigh approximately 10 pounds per gallon. Some weights vary a few ounces, but 10 pounds per gallon is close enough to make good estimates. Let’s assume that Product A has an analysis of 8% nitrogen, 16% P₂O₅ and 8% K₂O. To calculate the nutrients contained in one gallon, simply multiply 10 pounds per gallon by the nutrient percent. So 10 pounds × 8% = 0.8 pound nitrogen. The recommended application rate for several such products is one quart per acre, so in reality, the application rate would be 0.2 pound of nitrogen per acre. Not enough to cause a yield response for sure.

We compared some nontraditional fertilizer-type products with traditional commercial fertilizer in 2008 for effect on bermudagrass forage yield. No yield response was measured for the nontraditional products when applied alone or in combination with N fertilizer (Table 1). The bottom line is that producers should be wary of products being marketed with miraculous-sounding testimonials that include no research-based yield data to support the claims. If a new product comes along with research-based data that actually shows improved forage yield at a lower cost, then it would be a winning case for producers. But, miracles don’t apply to fertilizer for forages. 

Table 1. Evaluation of Nontraditional Fertilizers for Bermudagrass Yield (2008)

Treatment	July*	October	Total Yield
Dry Matter Yield (lbs/a)**			
Ammonium Nitrate	3229 A	4244 A	7474 A
Urea	2872 AB	3722 AB	6595 AB
Liquid Urea	2877 AB	3546 B	6423 AB
Urea + Monty’s Plant Food	2919 AB	3412 B	6332 B
Urea + Fish Emulsion	2619 B	3670 AB	6289 B
Urea + Sea 90 Mineral	2913 AB	3300 B	6212 B
Monty’s Plant Food	928 C	1526 C	2455 C
Fish Emulsion	965 C	1307 C	2273 C
Sea 90 Mineral	847 C	1178 C	2025 C
Untreated Check	745 C	1127 C	1873 C

* July treatments were applied 6/27/08 and plots were harvested 7/28/08; October treatments were applied 8/7/08 and plots were harvested 10/17/08.

** Treatments followed by the same letter are not significantly different at the 0.05 level.

Copper in Small Ruminants

Steven M. Jones, Professor - Animal Science

I have had several inquiries 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 mineral requirements differ greatly among the species. My main concern is copper. Goats requirements are higher for copper, and goats can tolerate levels that would be toxic to sheep.

Copper (Cu) is essential in the 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.

Copper is a metallic mineral that is an essential nutrient required in very minute amounts for all species of farm animals. Although it is an essential nutrient, copper can also be poisonous if ingested in amounts that **exceed** the animal's requirement. There is a tremendous variation in the amount of copper needed by different species of farm animals. Similarly, there is tremendous variation in the susceptibility to copper poisoning among the farm animal species. What makes this problem confusing is that extra copper may need to be added to the diets of certain livestock species (pigs, poultry) to optimize health and performance, while the same feed can be lethal to other livestock species.

Sheep (both hair and wool types) are sensitive to copper toxicity, whereas goats require copper levels similar to beef cattle. Angora goats may be more sensitive to copper toxicity than meat and dairy goats. There are differences in copper requirements for several sheep breeds. This could be true for meat goats, but no data are available. The liver stores copper, which can protect against toxicity in the short term. Copper toxicity can be of two types: chronic or acute. The acute form of copper toxicity occurs

quickly, shortly after ingestion of high amounts of copper. The chronic form occurs when sheep are fed diets that are marginally higher in copper content relative to level of copper antagonists in the diet over a period of time. This could be over a period of weeks or months, depending on actual copper intake by the sheep. What happens is that sheep bind absorbed copper very tightly in the liver. Copper buildup in the liver occurs because sheep do not excrete copper from the body as efficiently as other animal species. When the liver becomes saturated with copper, tissue damage occurs in the liver and large amounts of copper are released into the bloodstream. This causes the death of red blood cells and subsequent tissue damage. Often, the first very noticeable sign of copper toxicity is dead sheep. This may follow some stressful event for the sheep.

Prevention of copper poisoning is simple. Owners of sheep and goats must remain aware that premixed complete feeds, salts and nutritional supplements designed for other species may contain concentrations of copper that are dangerous to sheep and goats.

Sheep are by far the most susceptible farm animal species to copper poisoning, with goats being less susceptible than sheep and cattle being less susceptible than either sheep or goats. Pigs are the least susceptible to copper poisoning. Their rations often contain added copper (125 to 250 ppm) in amounts that, if consumed by sheep, can cause acute copper poisoning. Many cases of poisoning occur when sheep or goats ingest small amounts of copper over a prolonged time period. Copper that is ingested is stored in the animal's liver, and repeated ingestion of small amounts of copper above the animal's requirement may cause accumulation of what eventually becomes a toxic amount of copper for the animal. Sheep are very susceptible to copper poisoning as dietary Cu levels approach or exceed 20 ppm. Acceptable (minimum) levels of Cu for both sheep and goats is 10 to 12 ppm.

Sources of copper that can cause copper poisoning in sheep and goats include trace mineral-supplemented salt that is formulated for cattle or horses; vitamin and mineral supplements intended for horses, cattle, swine or poultry; and complete feeds for swine, horses, poultry or cattle.

Prevention of copper poisoning is simple. Owners of sheep and goats must remain aware that premixed complete feeds, salts and nutritional supplements designed for other species may contain concentrations of copper that are dangerous to sheep and goats. 

Calendar of Events

June 7: Parasite Workshop and FAMACHA Training, Langston University. Contact Dr. Steve Hart at 405-466-6138.

July 20: North Arkansas Meat Goat Association meeting at 2:00 p.m. in the Farm Bureau Building, 110 Industrial Park Road, Harrison, Arkansas, <http://www.arkansasmeatgoat.com>.

July 24 through August 2: Ozark Empire Fair, Ozark Empire Fairgrounds, 3001 North Grant, Springfield, Missouri. Details to be announced. Contact person: Brittany Gillig, (417) 833-2660, brittany@ozarkempirefair.com, <http://www.ozarkempirefair.com>.

August 2: Northwest Arkansas District Fairgrounds, 1400 Fairgrounds Road, Harrison, Arkansas 72601. Junior Market Meat Goat and Market Lamb shows, <http://www.arkansasmeatgoat.com/summershows.html>.

August 12: Missouri State Fair, Missouri State Fairgrounds, 2503 West 16th Street, Sedalia, Missouri 65301. Entry fee \$8.00 due by July 1. Late entry fee \$16.00 due by August 1. No pen fee. Arrival date August 10. ABGA judge is Josh Taylor. Contact person: Edna Vollmer, (660) 530-5616, <http://www.mostatefair.com>.

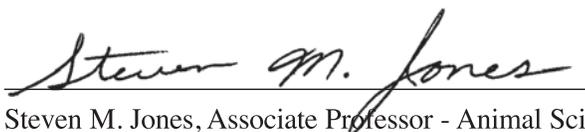
September 6: Demonstration Clinic: Artificial Insemination for Goats, Langston University.

September 19 through 21: Northwest Arkansas District Fair, Northwest Arkansas District Fairgrounds, 1400 Fairgrounds Road, Harrison, Arkansas 72601. Junior Market Meat Goats and Junior Boer Goats, three ABGA open shows. Contact person: Robert McMahan, (870) 577-1759, robert@northarkboers.com, <http://www.arkansasmeatgoat.com/fallshows.html>.

October 10 through 19: Arkansas State Fair, 2600 Howard Street, Little Rock, Arkansas, 72206. Details to be announced. Contact persons: Scott and Jennifer Hawthorn, (870) 246-6353, jendh34@yahoo.com, <http://www.arkansasstatefair.com>.

October 11: Demonstration Clinic: Artificial Insemination for Goats, Langston University.

October 18: North Arkansas Meat Goat Association Meeting and Pasture Walk. Location to be announced.



Steven M. Jones, Associate Professor - Animal Science