Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Winter 2006*

From the Director's Desk

A key part of the Institute's program is 'balance.' We have many activities underway that can be thought of as 'research' and 'extension' in nature. It is most appropriate for a balance to be maintained between research and extension. That is, we must conduct research to generate findings of interest and value to clientele and extension activities have to be performed to transfer this knowledge to the end-user. Much more research than extension would obviously limit benefit derived from experimentation. Likewise, more extension resources and capabilities than research would be inefficient through a restricted body of knowledge being generated for dissemination.

There is also balance in the faculty assignments in research and extension. Some people have joint appointments, possessing the needed abilities to handle both types of duties and responsibilities. There is also a balance in the areas of research receiving attention. Some experiments might yield findings of immediate potential benefit to the goat industry. Conversely, field impact of other investigations may not be realized until later, following subsequent research, but feasible rewards could be quite high.

An example of such considerations is research on internal parasite control. Not too long ago we characterized resistance in Oklahoma goat herds of internal parasites to various anthelmintics. This information is useful to goat producers today. However, we are also conducting investigations to determine the physiological mechanisms behind resistance of animals to internal parasites. This line of study may not reap great dividends in the short-term, but on a long-term basis large benefits are conceivable.

While I could go on and on illustrating the need for balance between research and extension, I would like to pause at this time to introduce you to the Meat Goat Production Handbook, which is being compiled and edited by Drs. **Terry Gipson**, **Roger Merkel**, **Steve Hart**, and **Tilahun Sahlu**. Our Langston team has dedicated many long hours in the development and realization of the Meat Goat Production Handbook, which is a companion to the Web-based Training and Certification Program, both of which were funded through an USDA/FSIS grant.

We have included an excerpt from the handbook in pages 4-6 of this newsletter. This excerpt from the Nutrition for Meat Goat Production chapter allows you to see the detailed information available in the handbook. Plus, this nutrition information is valuable at this time in the production cycle, which is during the breeding and kidding seasons.

The 400-plus page Meat Goat Production Handbook is an answer to that paucity of information, especially on the aspect of quality assurance, which will be a key production element as the meat goat

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industry grows and evolves. A quality assurance program ensures the production of a safe, healthy product that satisfies consumers and increases profit for the production industry.

The depth and breadth of this handbook is enormous. Conventional topics such as herd health, nutrition, herd management, and many others are covered comprehensively, yet remain clear and easy-to-read. Additional topics generally not covered in conventional handbooks are also included, topics such as disaster preparedness, legal issues, and organic meat goat production.

Even though Langston University has taken the lead in this project, this handbook is not the product of one person nor of a single university. I would be remiss if I didn't mention our collaborating project institutions/organizations, which include Alcorn State University, American Boer Goat Association, American Meat Goat Association, Florida A&M University, Fort Valley State University, Kentucky State University, Langston University, Prairie View A&M University, Southern University, Tennessee Goat Producers Association, Tennessee State University, Tuskegee University, United States Boer Goat Association, University of Arkansas Pine Bluff, and Virginia State University. Handbook contributing institutions/organizations include Allen Veterinary Clinic, American Boer Goat Association, American Meat Goat Association, BIO-Genics, Ltd., Bountiful Farm, Cornell University, Fort Valley State University, Kentucky State University, Langston University, Law Office of Wheeler and Mueller, Louisiana State University, Louisiana State University AgCenter, NCAT / ATTRA National Sustainable Agriculture Information Service, North Carolina State University, Oklahoma State University, Texas A & M University, United States Boer Goat Association, and Virginia State University.

The cost of the handbook is $50, which includes shipping. There is an order form on page 7 of the newsletter. You can also find additional order forms on our website (http://www2.luresext.edu/goats/handbookorderform.pdf) or you can order the handbook online (http://www2.luresext.edu/goats/MGPH.html). A limited number of handbooks will be available from the first printing; to ensure that you have a copy, please order yours today. We do envision a second printing but not until late 2007.

The ultimate goal of this handbook is to assist goat producers in producing safe, wholesome products for the meat goat industry encompassing all aspects of meat goat production. We hope that this handbook achieves that goal for you.

Research Spotlight

Abstracted by A. Goetsch

Tannins affect Methane Emission.

Methane is produced by ruminants during the ruminal fermentation process and represents a loss of energy to the animal. In addition, methane is a greenhouse gas and contributes to global warming. There has been a small amount of research suggesting that condensed tannins might lessen emission by ruminants of methane. Therefore, the objective of this study was to compare methane emission by goats consuming the condensed tannin-containing forage sericea lespedeza or a mixture of crabgrass and Kentucky 31 tall fescue. Two groups of 12 Angora does that previously grazed a pasture of sericea lespedeza or crabgrass/tall fescue for approximately 4 months were used. Forage harvested daily from the previously grazed pastures was consumed free-choice. Forage crude protein concentration was 10.3 and 13.0%, in vitro dry matter digestibility was 64.5 and 75.3%, and the level of condensed tannins was 17.7 and 0.5% for sericea lespedeza and crabgrass/tall fescue, respectively. Dry matter intake (2.4 vs. 1.5 lbs/day) and digestible dry matter intake (1.6 versus 1.1 lbs/day) were greater for sericea lespedeza than for crabgrass/tall fescue. Ruminal ammonia nitrogen (3.7 and 9.9 mg/dL) and plasma urea-nitrogen concentrations (16.7 and 20.9 mg/dL) were lower for sericea lespedeza than for crabgrass/tall fescue. Concentrations of individual and total volatile fatty acids and the acetate-to-propionate ratio in ruminal fluid did not differ between treatments. Methane emission expressed as both quantity per day or relative to dry matter intake was lower for sericea lespedeza than for crabgrass/tall fescue (7.4 vs. 10.6 g/d and 6.9 vs. 16.2 g/kg DMI). Substantial differences between the forages in condensed tannins concentration and methane emission by Angora goats suggest that condensed tannins decreased methane emission.

R. Puchala, B. R. Min, A. L. Goetsch, and T. Sahlu . 2005. The effect of a condensed tannin-containing forage on methane emission by goats. Journal of Animal Science 83:182-186.

Cheese Quality.

In the United States, Nubian and Alpine goats are two major dairy breeds and most dairy goat herds are in seasonal lactation. In this study, the effects of goat milk obtained from two dairy farms with either Alpine or Nubian breed of goats at various stages of lactation on yield, composition, sensory scores, and fatty acids of soft cheese (Chevré) were evaluated. Results obtained from this study indicated that dairy goat breed did not affect cheese composition, sensory scores, and fatty acid concentrations except oleic acid. However, milk from Nubian goats resulted in a much higher cheese yield, a lower oleic acid concentration, and a lower unsaturated fatty acid concentration than that from Alpine goats. Soft cheese made from late lactation milk had higher fat, protein, total solids, and yield than mid-lactation milk. While the sensory scores of cheese from Alpine milk varied throughout lactation, those of cheese from Nubian milk were virtually same regardless of the stage of lactation. If a dairy goat herd is raised to supply milk for cheesemaking, Nubian goats or a mixed herd with at least some Nubian goats will be of great interest to the cheese makers and in return the milk producers should get a higher premium for their higher cheese-yield milk. In addition, a year-round breeding program could help minimize variations in cheese composition, yield and fatty acid concentration, resulting in a more consistent quality of cheese throughout lactation.

Soryal, K., F.A. Beyene, S. Zeng, B. Bah, and K. Tesfai. 2005. Effect of goat breed and milk composition on yield, sensory quality, and fatty acid concentration of soft cheese during lactation. Small Ruminant Research 58:275-281.

Feeding does throughout their life cycle

by Steve Hart
(excerpted from the Nutrition for Meat Goat Production chapter of the Meat Goat Production Handbook)

The four production periods of does are dry nonpregnant, pregnant, late gestation, and lactating. Does that are open (nonpregnant) or in the early stage of pregnancy (< 95 days) have fairly low nutrient requirements. For open does, the goal is to gain a little weight to be in good condition for breeding. A medium quality pasture, such as in late summer, or a medium quality hay is sufficient to prepare for breeding and the early stage of pregnancy. However, adequate quantities of feed are necessary.

Use the Langston Interactive Nutrient Calculator (LINC) to calculate the nutrient requirements for a 130 lb nonpregnant, mature Boer doe without change in body weight and with intensive pasture grazing. The requirements are 1.50 lbs of TDN, 0.18 lbs of crude protein, 4.03 grams of calcium, and 2.82 grams of phosphorus, with an estimated dry matter intake of 2.31 lbs (based on the composition of fall bermudagrass; 50% TDN and 9% CP). Feeds used are fall bermudagrass and a mineral supplement. A 130 lb doe is expected to consume the mineral at 0.1% of body weight per month = 1.3 lbs/30 days = 0.04 lbs of mineral per day. The estimated 2.27 (2.31-0.04 = 2.27) lbs dry matter intake of fall bermudagrass (3.25 lbs as-fed) provides 1.14 lbs of TDN (76% of requirement) and 0.20 lbs of crude protein (111% of requirement). In this example, it appears questionable as to whether or not body weight of the doe could be maintained with this forage (i.e., 50% TDN). The goat's ability to select higher quality plant parts, as noted above, might enable them to maintain their body weight. In this regard, if they are able to select a diet with a TDN concentration of 60% rather than 50% then the amount of TDN supplied is (2.27 × 0.60 = 1.36 lbs) which is 91% of the required amount, somewhat close to her requirements. Again, it is important to monitor body condition.

Calculate the nutrient requirements for a Boer doeling weighing 70 lbs, gaining 5 lbs per month, and with intensive pasture grazing, using LINC. The requirements are: 1.3 lbs TDN, 0.25 lbs crude protein, 2.98 grams of calcium, and 2.08 grams of phosphorus with a dry matter intake estimate of 2.06 lbs. If we adjust estimated TDN and estimated protein for the forage (questions 7 and 8 in LINC) since the 50% TDN of fall Bermudagrass is different than the 60% assumed, and use 9% CP instead of the 12% assumed, predicted dry matter intake is 2.32 lbs. Using the same feeds, fall bermudagrass and mineral, with a mineral consumption of 0.02 lbs (1% of body weight /month, divided by 30) and using fall bermudagrass for the remainder of her intake (3.3 lbs as fed), both TDN (1.16 lbs intake, 89% of requirement) and crude protein (0.21 lbs intake, 84% of requirement) are inadequate. To achieve the desired growth rate, supplementation may be necessary. By trying sweet feed as a third feedstuff it is determined, through trial and error, that 0.75 lbs of sweet feed along with 2.0 lbs of fall pasture will provide most of the energy requirement but only 0.19 lbs of crude protein (76% of requirement), which is inadequate. By deleting the sweet feed and changing to a 16% dairy ration to supply the needed crude protein, it is finally determined that 0.75 lbs of a 16% crude protein dairy ration, 2.0 lbs pasture, and 0.02 lbs of mineral will provide 1.3 lbs of TDN (100% of requirement) and 0.25 lbs of protein (100% of requirement). The weight gain to achieve adequate breeding size should continue to be monitored with possible feeding adjustments made. The lesson here is that this doeling, because of the need for growth, has higher requirements than a mature doe and needs extra nutrition.

Winter feeding of does

Early to mid-winter is a time when does should be in early pregnancy. The goal of a wintering program is to economically provide the necessary nutrients to maintain a reasonable body condition, lose no weight, and keep them warm. In general, most wintering programs consist of both forage and supplement components. The forage component can consist of hay, stockpiled forage, or a cheap byproduct roughage feed. The supplement usually contains energy, protein, and often vitamins and minerals, although these may be provided separately as a mineral mix. Commonly utilized supplements include whole shelled corn (inexpensive source of energy), range cubes (inexpensive source of energy and protein), sweet feed, protein blocks, molasses blocks or tubs, and liquid feed.

Stockpiled forage is forage that is grown during the summer or fall upon which animals are not allowed to graze, reserving it for the winter months. In drier areas, the forage is well preserved, but in a more humid climate quality declines rapidly, making the practice less satisfactory. Stockpiled forage is a very inexpensive forage source since it does not have to be mechanically harvested (baling forage doubles the cost of forage); animals harvest stockpiled forage by grazing. Animals make much more efficient use of stockpiled forage when strip grazed (using temporary electric fence to limit animal access to an area containing a 1 to 3 day supply of forage) to minimize trampling. Fescue is used in many temperate regions for stockpiling and retains its quality well into late winter even in humid areas. Most recommendations for stockpiling fescue include late summer fertilization, clipping, and deferred grazing. Warm season grasses such as native range and bermudagrass can be stockpiled. The amount of deterioration is dependent on grass species and rain. If local cattlemen are using stockpiled forage it will probably work for certain classes of meat goats. Consult your state forage extension specialist for further information.

Calculate the requirements for wintering a 95 lb mature Kiko doe (use Spanish biotype) in early pregnancy gaining no weight and with intensive pasture grazing, using LINC. The requirements are 1.19 lbs TDN, 0.14 lbs protein, 3.13 grams of calcium, and 2.19 grams of phosphorus, with 1.86 lbs of dry matter intake estimated (based on default dietary TDN and CP levels). Feedstuffs that can be used include stockpiled (winter) bermudagrass and a 16% molasses lick. The estimated intake from the molasses lick label is 4 ounces or 0.25 lbs. Assume the remainder of dry matter intake is from the stockpiled bermuda pasture.

The molasses lick is not in the feed library so must be entered manually as a new feedstuff. Click on "Add/ Delete Ingredient to Feed Library," to bring up a table to be filled out. First, the feedstuff class is selected. This molasses lick is in the "concentrate" class. Then the name "16% molasses lick" is entered, and remaining values are entered. These values can be obtained from the feedstuff tag or label or by calling the manufacturer. If a value is unknown, leave it blank. For this example, enter dry matter of 85%, 16% crude protein, 75% TDN, 2.8% calcium, and 0.45 % phosphorus. Click on "Add Feed Ingredient to Library" and the Select Feed Ingredient page appears. If needed, click on refresh feed library and 16% molasses lick appears under "Your Feed Ingredient Library." If you have a dry hay or feed, 85% dry matter is a good assumption.

To continue formulating the ration, select the 16% molasses lick and winter bermudagrass, then click on "Input these Feed Ingredients to the Ration." Enter 0.25 lbs for the 16% molasses lick under the "Amount, as-fed" column and guess at 1.5 lbs of winter bermudagrass. Through trial and error a total of 2.0 lbs bermudagrass is selected to fulfill intake requirement. The table shows that this diet provides 0.91 lbs of TDN (76% of requirement), 0.12 lbs CP (86% of requirement), 4.74 grams of calcium, and 1.52 grams of phosphorus (deficient). The diet is quite deficient in energy. To provide additional energy, add whole shelled corn. The diet is then reformulated to contain 0.6 lbs whole shelled corn, 1.4 lbs winter bermudagrass, and 0.25 lbs of lick molasses. This provides 1.15 lbs TDN (97% of the energy requirement) and meets the CP needs. Phosphorus is slightly deficient (13%), but if the bermudagrass is better than average the requirement can be satisfied. Mineral supplements vary in their phosphorus levels as phosphorus is an expensive ingredient. If a mineral supplement with a high phosphorus level is selected for feeding, the requirement would be met but likely at a high monetary cost.

Feeding does in late gestation

Energy requirements increase dramatically in late pregnancy. Using LINC, calculate the nutrient requirements for a 130 lb mature Boer doe, 140 days pregnant (10 days

from kidding), gaining no weight, other than that due to pregnancy, and carrying twins. Under question 3, after clicking on the box for greater than 95 days pregnant, a form drops down for pregnancy number (twins), breed (predicts birth weight, can enter yours if known), and days of pregnancy (140). The requirements are 2.45 lbs TDN, 0.45 lbs crude protein, 3.97 lbs intake, 6.03 grams calcium, and 4.22 grams phosphorus.

A ration can be balanced using bermudagrass hay and 20% range cubes to meet the requirements by feeding 1.5 lbs of range cubes and 3.0 lbs of bermudagrass hay. This illustrates the high level of nutrition that is needed, especially in the last 3 weeks of pregnancy. High quality hay as well as supplementation is usually required. The range cubes contain a mineral supplement so no additional mineral mixture is needed.

Doelings require more supplementation than mature does, as the doelings are still growing. The nutrient requirements for a 95 lb growing Boer doeling with a predicted intake of 3.37 lbs, gaining 1 lb per month in addition to pregnancy weight gain and 140 days pregnant with a single kid are 1.77 lbs TDN, 0.36 lbs CP, 5.23 grams calcium, and 3.66 grams of phosphorus. If the same ingredients are used as those for the mature doe, how much of each will be required? The doeling could be fed 3.8 lbs of bermudagrass hay alone to meet the nutrient requirements for pregnancy with a single kid. However, if the doeling is carrying twins and is 140 days pregnant, her requirements are 2.27 lbs TDN and 0.47 lbs CP. This doeling will require 1.0 lbs of range cubes and consume 3.3 lbs of hay. If an abundance of high quality pasture is not available, the doeling will need some type of supplementation. If the forage (or hay) of adequate quality is available, only 1 to 1.5% of body weight of whole shelled corn may be needed as an energy supplement. This is important in that feed intake may be reduced in the last 4 to 6 weeks of gestation by the growing kids that reduce available abdominal space.

Feeding the lactating doe

The lactating doe has very high nutrient requirements. Calculate the requirements for a 4 year old 110 lb Boer-cross doe nursing twins in week 4 of lactation. When lactating is selected under question #2 on LINC, a form drops down. Select litter size (twins), week of lactation (4), and age at kidding (4). The program then predicts production of 4.5 lbs of milk per day with 3.6% fat and 3.3% crude protein. Nutrient requirements are 2.8 lbs of TDN, 0.41 lbs of protein, 7.61 g of calcium, and 5.33 grams of phosphorus, with 4.14 lbs of dry matter

intake predicted (based on default dietary TDN and CP concentrations). During lactation, the doe can consume nearly enough nutrients if an abundant supply of high quality pasture is available, such as in spring or early summer. However, does will likely lose some bodyweight due to the high demands of peak lactation (weeks 3 to 8 of lactation) and an inability to consume an adequate quantity of feed. Kidding should take place when there is an adequate supply of high quality pasture. If there is not adequate pasture, supplemental feed will be required. Inadequate nutrition will decrease body condition, reduce milk production, reduce kid weaning weight, and increase kid mortality.

If feeding bermudagrass hay and a 16% dairy ration, 2.6 lbs of hay and 2.0 lbs of the ration are required to fulfill requirements. However, the doe will still lose 2.0 lbs of bodyweight per month. When feeding high levels of grain such as the amount in this example, the animal should go through an adjustment period of two to three weeks during which time the grain portion of the diet is gradually increased to prevent digestion and other problems from occurring. Feeding a dairy ration and hay to a doe during late gestation and the lactating period will cost approximately $30 per animal. Utilizing available pasture as a feed source is a much cheaper alternative.

Kids are usually weaned at about 12 weeks of age. Milk production of the doe begins to decrease after the 6th week of lactation and is quite low by the 12th week. Nutrient requirements decline as stage of lactation advances, enabling the doe to maintain body condition or even increase it on pasture alone. Kids may be creep fed while nursing to increase growth rate of the kids and reduce nutrient demands on the doe for milk production.

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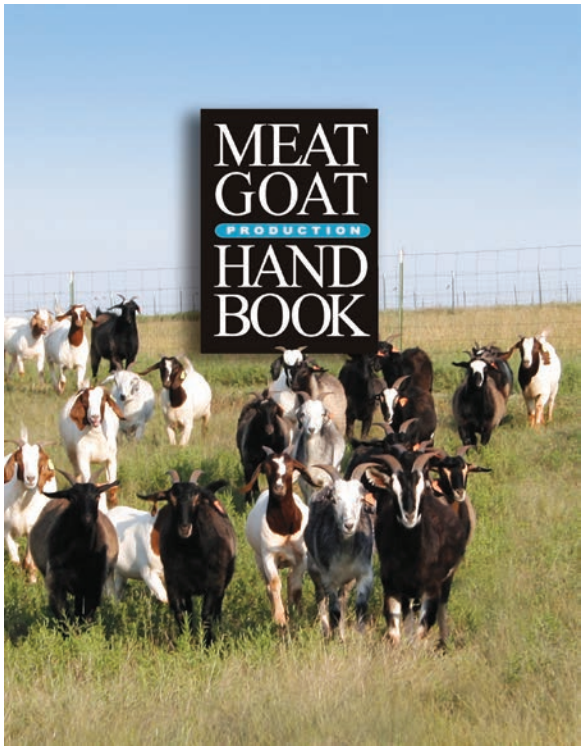

Meat Goat Production Handbook

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Noteworthy News

In October, Dr. **Steve Hart** conducted a internal parasite workshop in Mangum, OK.

In November, Dr. **Tilahun Sahlu** traveled to Houston, TX to attend the NASLGC meeting.

In December, Drs. **Art Goetsch** and **Roger Merkel** traveled to Ethiopia to work on the Ethiopian Sheep and Goat Productivity Improvement Program project.

In December, Dr. **Steve Hart** conducted a workshop on controlling brush using goats in Poteau, OK.

The Meat Goat Production Handbook is now available.

Order yours today.

See page 7 for order details.

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