Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Winter 2005*

From the Director's Desk

Dr. Tilahun Sahlu

This winter has brought many challenges to the Institute, some of which are certainly shared by goat producers in this area of the country. The one probably most significant at this particular point in time is the lack of rainfall, which is negatively affecting our cool-season forages. Nonetheless, we will continue to push forward with our research and extension activities as best we can, but with one eye toward the sky.

Faculty of the Institute have had a lot of travel on projects recently. Though many of us do enjoy a bit of travel and some people might even be envious of this aspect of our work, too much travel makes it difficult to stay on top of things. Besides the actual time away from campus, considerable effort is typically expended in preparing for the activities of the particular trip. And there is sort of a readjustment period upon returning, the severity of which depends on the travel destination, length of the trip, etc.

For present and recent past research activities, there has been preparation of a number of grant proposals, although this is actually a continuous year-round activity and so probably does not need to be stated in every newsletter, making me wonder why I just did.

Regarding specific experiments, Dr. **Zaisen Wang**, with assistance from others such as Drs. **Steve Hart**, **Lionel Dawson**, and **Roger Merkel**, recently completed an internal parasite experiment. Drs. **Amlan Patra**, **Ryszard Puchala**, and **Art Goetsch**, along with Mr. **Glenn Detweiler**, have initiated an experiment dealing with effects of acclimatization on adjustment to environmental conditions on energy requirements. Drs. **Maristela Rovai** and **Terry Gipson** and Messrs. **Erick Loetz** and **Jerry Hayes** have completed breeding of the Alpines for the upcoming extended lactation project. While on the subject of future research, Dr. **Adnan Beker**, originally from Ethiopia, recently completed his Ph.D. requirements at the Animal Science Department of Oklahoma State University and has joined us as a Postdoctoral Research Associate to work on one of the new research projects; his will deal with factors influencing the grazing activity energy cost. Adnan will soon be joined by two other researchers from other countries to work on the additional new projects.

Mr. **Sean Chen** and Dr. **Steve Zeng** have completed two studies as part of the USDA-funded project on goat milk shelf life.

Drs. **Thomas Ngwa** and **Mario Villaquiran** have completed their research stays and have returned to Cameroon and Brazil, respectively. Dr. **Ngwa** worked on the research project "Nutrient Requirements of Goats: Composition of Tissue Gain and

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Loss" and Dr. **Villaquiran** worked on the project entitled "Enhanced Goat Production Systems for the Southern United States".

An important aspect of any of our research, extension or international programs is training. Be it long-term training of scientists involved in our research projects as Visiting Scholars as was mentioned above or producer-oriented training workshops for a single day, the transfer of knowledge from the university is always a priority with us. In this newsletter, you will be able to read about an important producer training project that we recently completed.

This producer training project involved the development of a web-based training and certification program for meat goat producers. Meat goat production is one of the fastest growing livestock enterprises in the United States. Many new meat goat producers do not understand food safety issues that arise from everyday management practices. In addition, a quality assurance program does not exist for goats as it does for other livestock species.

Even though Langston University has one of the nation's foremost goat research center, the university could not have accomplished this project alone. Langston University led a consortium of 1890 universities and producer associations in this project. The consortium identified the subject topics most pertinent and pressing for the instructional modules. The consortium then identified experts on the selected subject topics and pursued these experts as module authors. These authors represent the most qualified persons in their field in academia as well as in the industry.

In this issue of the newsletter, we will highlight two of the instructional modules: the introductory module and the nutrition module.

The introductory module is an overview of meat goat production. After completion of this module, the producer should be able to state reasons for making the decision to raise meat goats. The nutrition module is an introduction to dairy, meat, and fiber goat nutrition. After completion of this module, the producer should be able to state the nutritional needs of the goat and to adjust the nutritional needs at specified times during the goat's production cycle.

These are just two of the instructional modules available for browsing freely or for pursuing the certification process. Other instructional modules cover topics from goat facilities to organic goat production.

We hope that you will find these modules a valuable tool in your effort to improve your production practices.

Web-based Meat Goat Certification

http://www2.luresext.edu/goats/training/qa.html

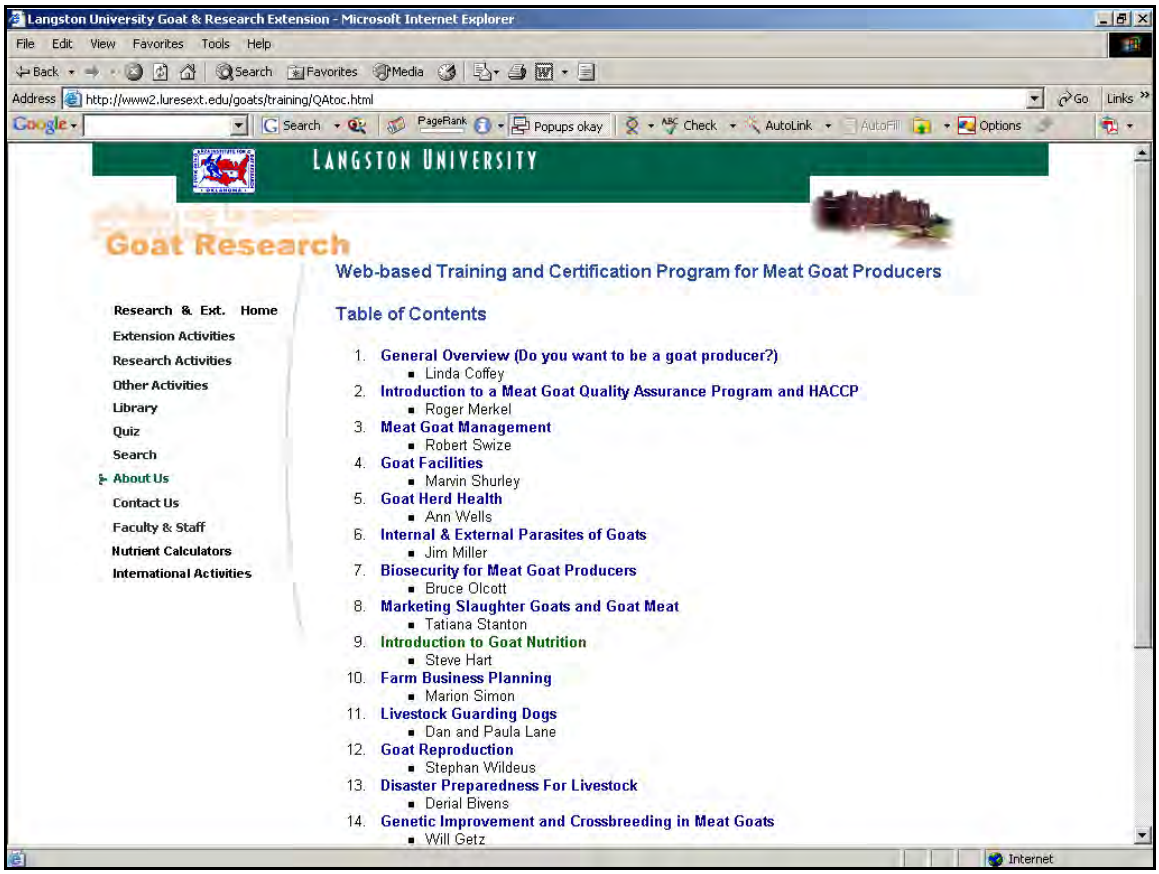
Meat goat production is one of the fastest growing sectors of the livestock industry in the United States. New producers, as well as some established ones, have an expressed need for current, correct information on how to raise goats and produce safe, wholesome products in demand by the public. As the meat goat industry grows and evolves, a quality assurance (QA) program is essential. Such a QA program ensures the production of a wholesome product that satisfies consumers and increases profit for the meat goat industry.

Langston University was awarded funding by the Food Safety and Inspection Service of USDA to develop training and certification for meat goat producers to meet such a need.

In this issue of the newsletter, we will highlight two of the instructional modules: the introductory module and the nutrition module.

Several institutions collaborated with Langston University in this project and they are:

- Alcorn State University
- American Meat Goat Association
- American Boer Goat Association
- Florida A&M University
- Fort Valley State University
- Kentucky State University
- Prairie View A&M University
- Southern University
- Tennessee State University
- Tennessee Meat Goat Association
- Tuskegee University
- University of Arkansas Pine Bluff
- USDA/FSIS
- USBGA
- Virginia State University



Web-based Meat Goat Certification - General Overview module

This introductory module was written by Ms. Linda Coffey of the National Sustainable Agriculture Information Service, also known as ATTRA. ATTRA is created and managed by the National Center for Appropriate Technology (NCAT). Linda joined NCAT in 2000, working primarily for ATTRA on sheep, goat, and multispecies grazing questions. Linda is based in ATTRA's office in Fayetteville, AR.

An excerpt and a screenshot from Linda's introductory module on meat goat production follow. You will notice that this module is also available as a pdf for easy printing and as a podchapter for downloading and listening on your favorite mp3 player. The complete module can be accessed via the meat goat certification web site at http://www2.luresext.edu/goats/training/qa.html.

General Overview (Do you want to be a goat producer?)

Why raise goats? (and not cattle or emus?) What are the advantages?

We've mentioned the two major uses of meat goats: meat and land management. Of course, there are other animals that make meat and can use otherwise wasted plants. So, what is special about goats, in comparison to cattle, for example?

Strong market/ethnic demand=strong prices

As previously stated, there is a strong demand for goat meat. This is in contrast to emus, which did not have a good meat market. Many immigrants would rather eat goat meat than any other kind. This presents an opportunity for American farmers and ranchers, as there is a lot of room for expansion in this industry: we are currently importing goat meat equivalent to over 700,000 goats per year with the majority of the goats coming from Australia.

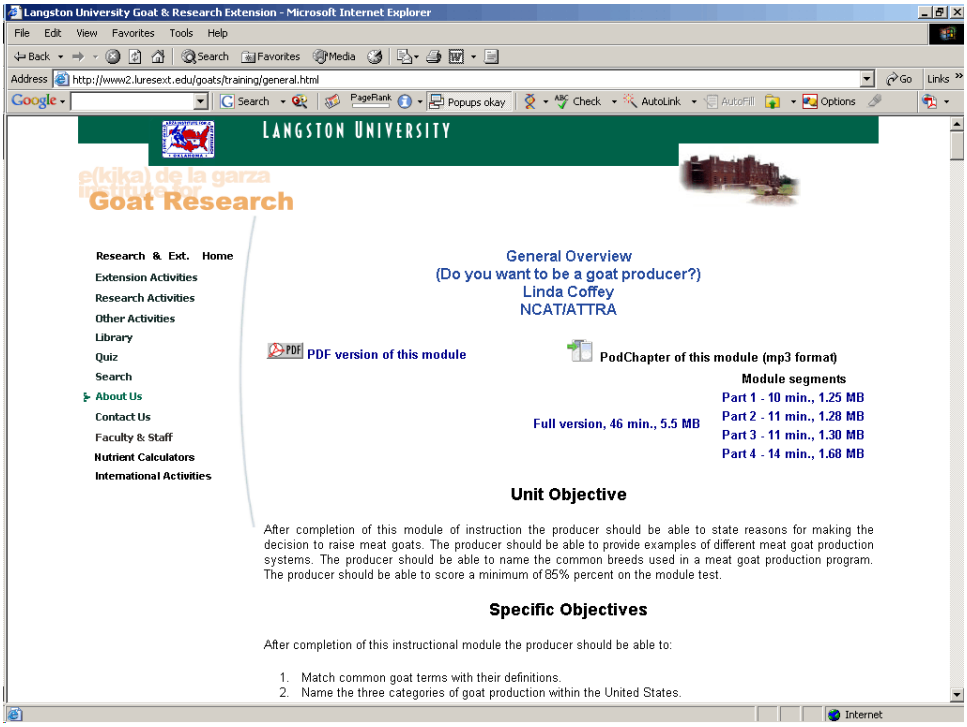
Goats are an attractive enterprise for many who may be intimidated by larger animals. Goats are small and safer to work around than cattle, and because of their size and ease of handling, there is no need for expensive working facilities or head gates, squeeze chutes, and other equipment essential in cattle ranching.

Low cost (to buy and raise)

Goats are one of the cheapest livestock enterprises to start-up, because they do not require much capital to purchase or feed. Also, as stated above, facilities are cheaper than for cattle.

Different grazing preferences = better use of diverse forages

Because goats prefer to browse (eat brush or vines) rather than graze grasses, they are comple-



mentary grazing in combination with cattle or horses. Using more than one species to graze an area is called "multispecies grazing," and in nature it maintains species balance and ecological stability in an area. Modern farming practices have tended to limit the kinds of animals on a specific piece of land, and this encourages less useful plants to dominate an area. For example, on a pasture used by cattle alone, shrubs and vines may increase, because cattle do not graze those plants consistently. Adding goats to the pasture will result in more meat being produced on that land, because the goats and cattle will be turning different forages into meat.

Different grazing habits = sustainable control of weeds and brush

Another benefit of goats grazing plants that cattle won't is that they prevent weeds and brush from taking over an area. The brush that a goat eats is converted into money by way of meat. Because it won't be necessary to use chemicals or other means to control the brushy plants, the goats will also save you money. Besides the financial benefits, goats are a much safer tool to use on weeds. Many people develop sensitivity to chemicals after years of exposure; using goats to accomplish the goal is much better for the environment and those living in the area.

Prolific breeders = rapid building of herd size and/or salable kids

For some livestock enterprises (such as cattle), it takes years to build a herd because of the length of time to reach puberty and low reproductive rate. However, goat herds build much faster because goats can give birth to their first kid at one year of age. Also, while the first-time kidders are likely to have single births, most does will have twins thereafter. Therefore, herd numbers grow rapidly.

Web-based Meat Goat Certification - Nutrition module

This nutrition module was written by Dr. Steve Hart of the E (Kika) de la Garza Institute for Goat Research (GIGR) of Langston University. Steve joined in GIGR in 1991. Currently, Steve's research is investigating goat nutrition and various pastures for meat, dairy and Angora goats. He is also involved in extension goat demonstrations in Oklahoma demonstrating the ability of goats to clear brush and weeds, measuring weight gains and the management of goats on these pastures.

An excerpt and a screenshot from Steve's nutrition module for goat production follow. You will notice that this module is also available as a pdf for easy printing. The complete module can be accessed via the meat goat certification web site at http://www2.luresext.edu/goats/training/qa.html.

Introduction to Goat Nutrition

Nutrients

Nutrients are defined as substances that aid in the support of life. The six classes of nutrients include protein, carbohydrate, fat, vitamins, minerals, and water. Nutrients are often classified as organic (carbon-containing) or inorganic (minerals).

Energy is not considered a nutrient, but can be derived from the breakdown of several nutrients including fat, protein, and both simple and complex carbohydrates. Energy is required to propel the biochemical processes that are necessary to sustain life. A deficiency of energy will cause weight loss, low productivity, and ultimate death of an animal. An oversupply of energy will usually result in excessive fatness, which is also unhealthy.

Water

Water is an essential nutrient for all animals and is sometimes overlooked. While goats require less water than cattle, they do need water and require additional supplies when lactating or coping with hot weather. A 110 lb goat will re-

quire about 1 gallon of water per day in the summer, a little more on the hottest days, and less than 1 gallon per day in the winter. A lactating goat will require an additional 1 quart of water for every 1 pint of milk produced. If a goat is producing 5 pints of milk at peak lactation while raising twins, 2.5 gallons of water are required each day. If goats are eating green material, a substantial part of their water requirement can be met by water contained in the plant material. However, if dry feed such as hay is consumed, water must be supplied to meet the requirement.

Carbohydrates

Carbohydrates usually provide the majority of energy to goats. Carbohydrates can be classified as simple, such as sugars (easily identified by their sweet taste; maybe 1, 2, or 3 sugar molecules linked together), or complex, such as starch (found in grains) or cellulose (i.e., fiber). Grass, forb, and browse plant species generally contain high levels of cellulose, which must be digested by rumen bacteria to provide energy.

Cellulose is often referred to as fiber, although the term fiber also pertains to other substances such as hemicellulose and lignin. Fiber in young plants may be highly digestible and provide a high level of energy, but fiber in older, mature plants is often poorly digested and may only provide half the energy of other carbohydrates. Fiber in the diet may be characterized chemically in several ways, such as crude fiber (CF), acid detergent fiber (ADF), and neutral detergent fiber (NDF). These abbreviations are used in hay analysis and may appear on feed tags. In general, the lower the fiber level, the higher the level of digestible energy. However, a certain minimum fiber level is required for healthy rumen function.

Protein

Protein is composed of building blocks called amino acids that the body uses to produce all of the different proteins required for growth, production, and maintenance. Protein is required in the diet for accumulation of new body mass (growth) and for replacing protein lost by normal wear and tear.

Ruminant animals are usually fed supplemental protein to make up for dietary shortfalls. In the rumen, bacteria degrade much of the consumed protein and use the amino acids to form bacterial protein. Bacteria can also form protein from nonprotein sources such as urea and, if provided with sufficient energy, can form significant quantities of protein. To prevent breakdown and digestion by ruminal bacteria, some protein sources are protected from degradation by coating or other means. Some natural proteins are also resistant to ruminal degradation by bacteria. These types of proteins are referred to as “bypass protein” as they bypass digestion in the rumen. Other common terms for bypass protein are “ruminal escape” and “rumen undegraded.” Bypass protein sources are very important in dairy cow nutrition, but have lesser significance in most meat goat production systems.

Research Spotlight

Abstracted by A. Goetsch

Goats and sheep co-grazing .

Differences among ruminant species in forage selectivity offer potential for efficient utilization of pastures with diverse arrays of plant species. One common management strategy that may influence forage selectivity is stocking rate (SR). Grazing in this experiment was for 16 weeks in 2002 and 2003. Pastures consisted of various grasses, primarily bermudagrass and johnsongrass, and forbs (e.g., ragweed). Sheep (Khatadin) and goats (75% Boer) averaged 46 lb initial body weight (BW), and were 4.5 months of age when grazing began. Stocking rates were four (L), six (M), and eight (H) animals per one acre pasture, with equal numbers of sheep and goats. The nine pastures (three/treatment) were further divided into four paddocks for rotational grazing in 2-week periods per paddock. Post-grazed forage mass decreased as SR increased (1928, 1432, and 1090 lbs/acre for L, M, and H, respectively). In vitro true dry matter digestibility of pre-grazed forage samples was similar among SR, but SR x year interacted for post-grazed samples (year 1: 57.0, 54.4, and 53.5%; year 2: 56.8, 49.0, and 48.3% for L, M, and H, respectively. Year and SR interacted in the percentage of grass in pastures post-grazing (year 1: 64, 69, and 74%; year 2: 50, 66, and 73% for L, M, and H, respectively). The preference for grasses was higher and that for total forbs and lower for sheep than for goats. The preference value for ragweed, measured in year 2, was lower for sheep than for goats and increased linearly with increasing SR. Average daily gain tended to decrease linearly as SR increased (0.13, 0.11, and 0.10 lb/day), and total BW gain per acre per month increased linearly (1.3, 1.7, and 2.1 lb/day for L, M, and H, respectively). The number of steps increased linearly with increasing SR (2279, 2707, and 2788 for L, M, and H, respectively), but was similar for sheep and goats. As SR increased, time spent eating increased (7.4, 8.4, and 9.6 h) and time spent lying (11.0, 10.2, and 8.9 h), ruminating (7.9, 7.7, and 6.8 h), and idle (8.6, 8.0, and 7.6 h for L, M, and H, respectively) decreased. Goats spent less time eating (1.1 h) and more time idle (0.7 h) than did sheep. SR, species, and year interacted in energy expenditure or heat production of wethers (year 1, sheep: 510, 569, and 572 kJ/kg BW0.75; year 2, sheep: 572, 597, and 648 kJ/kg BW0.75; year 1, goat: 524, 524, and 640 kJ/kg BW0.75; year 2, goat: 499, 496, and 551 kJ/kg BW0.75 for L, M, and H, respectively). In conclusion, post-grazing herbage mass greater than 846 lbs/acre at most measurement times suggests that decreasing forage availability with increasing SR may not have been primarily or solely responsible for the effect on average daily gain by limiting dry matter intake. Rather, the effect of SR on available forage mass could have limited the ability of both sheep and goats to compensate for the effect of SR on forage nutritive value. With forage conditions of this study, SR had similar effects on grazing behavior of sheep and goats when co-grazing. Effects of SR on energy expenditure may contribute to impact on average daily gain by small ruminants.

This abstract is the result of combined abstracts from the following two scientific papers:

G. Animut, A. L. Goetsch, G. E. Aiken, R. Puchala, G. Detweiler, C. R. Krehbiel, R. C. Merkel, T. Sahlu, L. J. Dawson, Z. B. Johnson, and T. A. Gipson. 2005. Performance and forage selectivity of sheep and goats co-grazing grass/forb pastures at three stocking rates. Small Ruminant Research 59:191-201.

G. Animut, A. L. Goetsch, G. E. Aiken, R. Puchala, G. Detweiler, C. R. Krehbiel, R. C. Merkel, T. Sahlu, L. J. Dawson, Z. B. Johnson, and T. A. Gipson. 2005. Grazing behavior and energy expenditure by sheep and goats co-grazing grass/forb pastures at three stocking rates. Small Ruminant Research 59:203-215.

Noteworthy News

In October, Drs. **Terry Gipson**, **Art Goetsch**, and **Steve Zeng** traveled to China to work on the international collaboration project entitled “International Collaboration in Goat Research and Production Web-Based Decision Support Aids”.

In October, Dr. **Tilahun Sahlu** traveled to Ethiopia along with cooperators from Prairie View A&M University to initiate a grant project entitled “Ethiopia Sheep and Goat Productivity Improvement Program”.

In October, Drs. **Steve Hart** and **Lionel Dawson** traveled to Kansas City, MO to give presentations at the American Dairy Goat Association annual meeting.

In October, Dr. **Steve Hart** traveled to Booneville, AR to give a presentation on ration balancing for goat production at the USDA-ARS Dale Bumpers Small Farms Research Center field day.

In November, Drs. **Terry Gipson**, **Steve Hart**, **Roger Merkel**, and **Tilahun Sahlu** traveled to Washington DC along with consortium members to present the web modules developed on the project entitled "Development of a Web-based Training and Certification Program for Meat Goat Producers" to USDA. This project was funded by USDA/Food Safety and Inspection Service.

In November, Dr. **Steve Hart** traveled to Claremore, OK to give a presentation on DHI testing for the Green Country Dairy Goat Association.

In November, Dr. **Steve Hart** traveled to NE Oklahoma to give a presentation on ration balancing for the SE Kansas Meat Goat Association.

In December, Drs. **Terry Gipson** and **Art Goetsch** traveled to Mexico to work on the international collaboration project entitled “International Collaboration in Goat Research and Production Web-Based Decision Support Aids”.

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