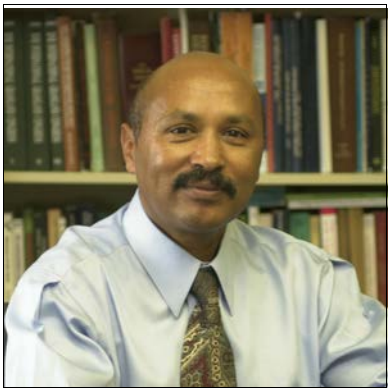
Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Winter 2003*

From the Director's Desk



Dr. Tilahun Sahlu

We have had a wide array of research and extension activities underway since the last newsletter. To start off, Drs. **Terry Gipson** and **Art Goetsch** have been developing a web-based goat nutrient requirement calculation system from results of the nutrient requirement project that was recently conducted. The system should be completed soon, and will be overviewed at the upcoming Southern Ag Workers meeting in Tulsa and International Conference on Goats in South Africa. This work demonstrates the integration of research and extension components of our program. For a more-detailed description of the web-based goat nutrient requirement calculation system, please see page 6.

As noted in other newsletters, we have the unique opportunity to interact with scientists from many different parts of the world in our research program. In this regard, Dr. **Aberra Melesse** of Debub University in Ethiopia joined us in September 2003. He and Drs. **Roger Merkel**, **Berhan Tamir**, and **Art Goetsch** conducted the second year of research on a project addressing potential to enhance reproductive performance of meat goats of different body condition scores by concentrate supplementation right before and in the early part of the breeding period. Drs. **Mike Looper** and **Charlie Rosenkrans** of the USDA ARS Dale Bumpers Small Farms Research Center and University of Arkansas Department of Animal Science, respectively, have collaborated on this project. Furthermore, they are also cooperating on a couple of small experiments studying estrous behavior of goats with an automated heat detection system. And while on the subject of body condition score, Drs. **Mario Villaquiran** and **Terry Gipson** are initiating a study to develop relationships between body condition score and body weight of the different types of goats on our research farm. This is part of the USDA Initiative for Future Agriculture and Food Systems-supported project "Enhanced Goat Production Systems for the Southern United States," which includes a number of collaborating institutions in the southern US. In accordance, similar data will be collected by our collaborators at Virginia State University, North Carolina State University, USDA ARS Appalachian Farming Systems Research Center, Louisiana State University, Fort Valley State University, and Prairie View A&M University.

Before returning to Alemaya University in Ethiopia in late December, Dr. **Berhan Tamir**, along with Drs. **Ryszard Puchala**, **Roger Merkel**, and **Art Goetsch**, conducted an experiment looking at the effect of time allowed for grazing (i.e,.

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Dr. Terry A. Gipson

4, 8, or 24 hours) on forage intake, grazing behavior, and energy metabolism. The animal portion of our first series of respiration calorimetry energy requirement studies has just been completed by Drs. **Ignacio Tovar-Luna**, **Ryszard Puchala**, and **Art Goetsch**, with focus now devoted to laboratory and statistical analyses and data interpretation. Similarly, comparable activities are underway by Mr. **Getachew Animut** and Drs. **Jamus Joseph** and **Steve Hart** for the two years of activities on their 'mixed pasture grazing' and 'vegetation management projects,' respectively. Currently, preparations are underway for experimentation on two new research projects, with participating visiting scientists to arrive in the near future.

On the international scene, Drs. **Art Goetsch**, **Roger Merkel** and I traveled to Egypt and Cyprus to conduct activities under the USAID-sponsored Middle East Regional Cooperation Grant "Multinational Approaches to Enhance Goat Production in the Middle East." While in Egypt, we traveled with Egyptian collaborators to the north Sinai region to visit participating goat farmers and see the results of extension activities. One extension activity carried out was to teach farmers about the ammoniation of crop residues. These were typically corn stover mixed with molasses and treated with urea for ammoniation. Additionally, farmers were taught about making feed blocks using available resources. Composition of the feed blocks included date seeds, olive seed pulp, wheat bran, wheat straw, molasses, flour, limestone, salt, and either soybeans or barley. Other crop residues used as feed included tomato and other vegetable vines, fruit, and grain crop residues. Browse and tree leaves, such as olive tree leaves, are also important components of local livestock feeding systems. Egyptian extensionists also recommend that fruit tree farmers, typically apricot, plow shallow furrows in their fields after fruit production ends. These shallow furrows catch dried leaves that fall and are blown in the wind. The dried leaves are subsequently gathered and fed to livestock. The extremely harsh environment of the Sinai necessitates the use of such measures. The annual meeting of grant collaborators was held in Cyprus. At the meeting, representatives presented reports on the preceding year's progress and plans for the future.

All in all, it's been a very successful research/extension year. I hope that your's has been also.

Research Spotlight

Abstracted by A. L. Goetsch

Supplementation during Pregnancy.

Ruminants often consume forages low in digestibility and protein, particularly in developing countries during the dry season. To achieve desirable levels of animal performance, feedstuffs high in crude protein (CP) can be supplemented. Infrequent supplementation is of interest to livestock producers if performance is not markedly adversely affected. Therefore, objectives of this experiment were to determine effects of frequency of supplementation with soybean meal on performance of Angora does consuming low quality forage in late gestation and early lactation with single- or twin-kid litters. Angora does consuming low quality forage, with single- or twin-kid litters, were used in a 120-day experiment (15 8-day periods). Prairie hay (5.1% crude protein) was consumed ad libitum without soybean meal (SBM), or SBM was offered at an average daily rate of 0.125% body weight (BW) every 1, 4, or 8 days (1X, 4X, and 8X, respectively). Ground corn was supplemented after kidding at 0.5-1.0% BW, and kidding was in periods 7-11, with approximately one-half of the does kidding before day 58. Results of this experiment indicated that Angora does in late gestation and early lactation consuming low quality forage can be supplemented with protein from SBM as infrequently as once every 4 days without adversely affecting BW. Less frequent supplementation, such as once every 8 days, may be as effective as supplementation daily or every 4 days with moderate nutrient requirements of late gestation. However, in early lactation with elevated nutritional demands, supplementation once every 8 days can increase BW loss compared with more frequent supplementation. Does with 2- vs. 1-kid litters mobilized tissue energy reserves to provide nutrients for increased needs for gestation and lactation rather than to lessen mohair fiber growth. This finding, along with lower BW for 8X vs. 1X and 4X, suggests a need for frequent supplementation, such as daily, to maintain BW and stimulate fiber production when nutrient demands of Angoras are high during lactation.

R. Joemat, A. L. Goetsch, U. Wuliji, G. W. Horn, T. Sahlu, R. Puchala, R. C. Merkel, and S. Soto-Navarro. 2003. Effects of frequency of supplementation with soybean meal and litter size on performance of Angora does consuming low quality forage in late gestation and early lactation. Journal of Animal and Feed Sciences 12:707-722.

Tannins for Parasite Control.

This article is a review of published research regarding potential use of tannins in control of gastrointestinal parasites (worms), especially in goats. Gastrointestinal parasites in goats are developing resistance to dewormers and, in the near future, dewormers will lose their effectiveness in controlling worms. Some laboratory studies have shown that tannins in plants may be effective in controlling worms and a few field studies have shown promising results. Sericea lespedeza and oak species are examples of plants containing tannins. There are two mechanisms by which tannins may help to control worms. They may have indirect effects through improving protein absorption by the animal, which can enhance immune response. Protein status is elevated by binding of tannins to protein in the rumen, preventing degradation by rumen microorganisms; acidity in the stomach then causes tannins to release protein for digestion in the postruminal tract. This has been shown to improve protein absorption by 20-40%. Tannins may also have direct effects on the parasites themselves. In some cases, egg production by the worms has been reduced by more than 40%, causing a reduction in pasture contamination. One study showed that one type of worm is killed by tannins, but this species is not the most common worm in the southern US. Also, there is some evidence that tannins reduce hatch and development of worm eggs in the feces.

Min, B. R., and S. P. Hart. Tannins for suppression of internal parasites. 2003. Journal of Animal Science 81(Electronic Supplement 2):E102

International Update - China

by Steve Zeng

Drs. Tilahun Sahlu and Steve Zeng took a trip to China as the second phase of the USDA-China Ministry of Agriculture (MOA) cheese project continued between Langston University and three Chinese universities during November 5-22, 2003. They first visited the Northwest Sci-Tech University of Agriculture and Forestry (NWSTUAF) in Yanglin, Shaanxi Province, with

Dr. Zeng (shaking hands on right) participates in the signing of Memorandum of Understanding for collaboration in cheese research and development.

which Langston has enjoyed ten years of great collaborative science exchange programs in goat research and cheese development. Due to the tremendous success in the last ten years, Langston University and NWSTUAF have renewed the Memorandum of Understanding for further scientific collaboration and graduate education in the future. Then Drs. Sahlu and Zeng were invited to Zhejiang University in Hangzhou, Zhejiang Province as they intended to initiate research projects for graduate students and to start cheese development and production. Zhejiang University as a potential collaborator was discussed with university administrators and dairy food professors. As a commitment from Langston University, we donated some small scale cheesemaking equipment and books for them to get started. At Jiangxi Agricultural University (JAU) in Nanchang, Jiangxi Province, a cheesemaking workshop was conducted as their students and professors were eager to find out how cheeses are made. Due to a tremendous mutual interest in long-term collaborations, Langston University and JAU signed a new Memorandum of Understanding for scientific research and graduate education in the future. At all three universities, Dr. Sahlu presented an overview of Langston University and the current research projects at our goat research institute to a full house audience. Dr. Zeng gave a presentation on the cheese industry in the US, the nutritional benefits of cheese and cheese products, and the potential for cheese development in China.

Drs. Sahlu and Zeng also visited one of the top dairy processing equipment companies in China, Shanghai Dairy Processing Equipment Manufacturing Company. Since China has never had a cheese industry, they have never manufactured cheesemaking equipment. Therefore, discussions were focused on cheesemaking procedures and equipment design with their General Engineer.

This continuation of our Scientific Exchange Program to China provided an opportunity for US participants to make initial contacts with the Chinese dairy leaders in academia and in the dairy industry. We now have a much better understanding of the Chinese dairy industry and the dairy product consumption patterns. This Scientific Exchange Program project has created mutual interests in collaborative research and development of cheese and cheese products in China. Long term collaborations will certainly strengthen our international presence in dairy goat product research and development.

For further information regarding this international project, contact Dr. Steve Zeng at (405)466-3836 or szeng@luresext.edu.

Congressional Staff Tours Goat Facilities

by D. Dean

(Left –Right) Dr. Marvin Burns, Dean, School of Agriculture and Applied Sciences; Michael Jackson, Senator Jim Inhofe's office; Mike Maxwell, Congressman Ernest Istook's office; Dr. George Acquaah, award recipient; President Ernest Holloway, Josh Bradley, Congressman Frank Lucas' office; and Todd Lamb, Senator Don Nickles' office.
Dr. George Acquaah, is presenting his national USDA award- winning biotechnology textbook to Congressional staff.

The Langston University School of Agriculture and Applied Sciences sponsored a successful Congressional Staff Tour of the Animal Science facilities. The fact-finding tour was designed to acquaint Oklahoma Senate and Representative congressional staff with the School of Agriculture's progressive efforts toward aquaculture and goat research efforts throughout the world. Four (4) Congressional staffers represented members from the Senate and Legislative branches. Michael Jackson, Senator James Inhofe's office; Todd Lamb, Senator Don Nickles' office; Josh Bradley, Representative Frank Lucas' Office, Mike Maxwell, Representative Ernest Istook's office. Helping plan and execute the event were experts from the Agriculture Research Service, Farm Service Administration, Bureau of Land Management, and Natural Resources and Conservation Services.

The tour included visits to constructed wetlands, aquaculture facilities, and the goat research facilities. Also discussed were grasslands, homeland security, and biomass and biotechnology research. "The Congressional staff's visit to Langston University gives them a chance to see first hand all the services that Langston University Extension and Outreach programs provide to Oklahoma Agriculture," said Dr. Marvin Burns, Dean, School of Agriculture and Applied Sciences.

Web-based Nutrient Requirement Calculators

by A. L. Goetsch and T. A. Gipson

A research project developed equations for energy and protein requirements for goats, as well as prediction of feed intake. Because the Internet is so widely used and because the user base continues to increase, a web-base approach is a promising method to reach a large audience located throughout the world. This seems especially pertinent to goats, since they are so important in developing regions of the world. Therefore, an extension project developed a website calculation system for "Nutrient Requirements of Goats" (http://www2.luresext.edu/goats/research/nutreqgoats.html).

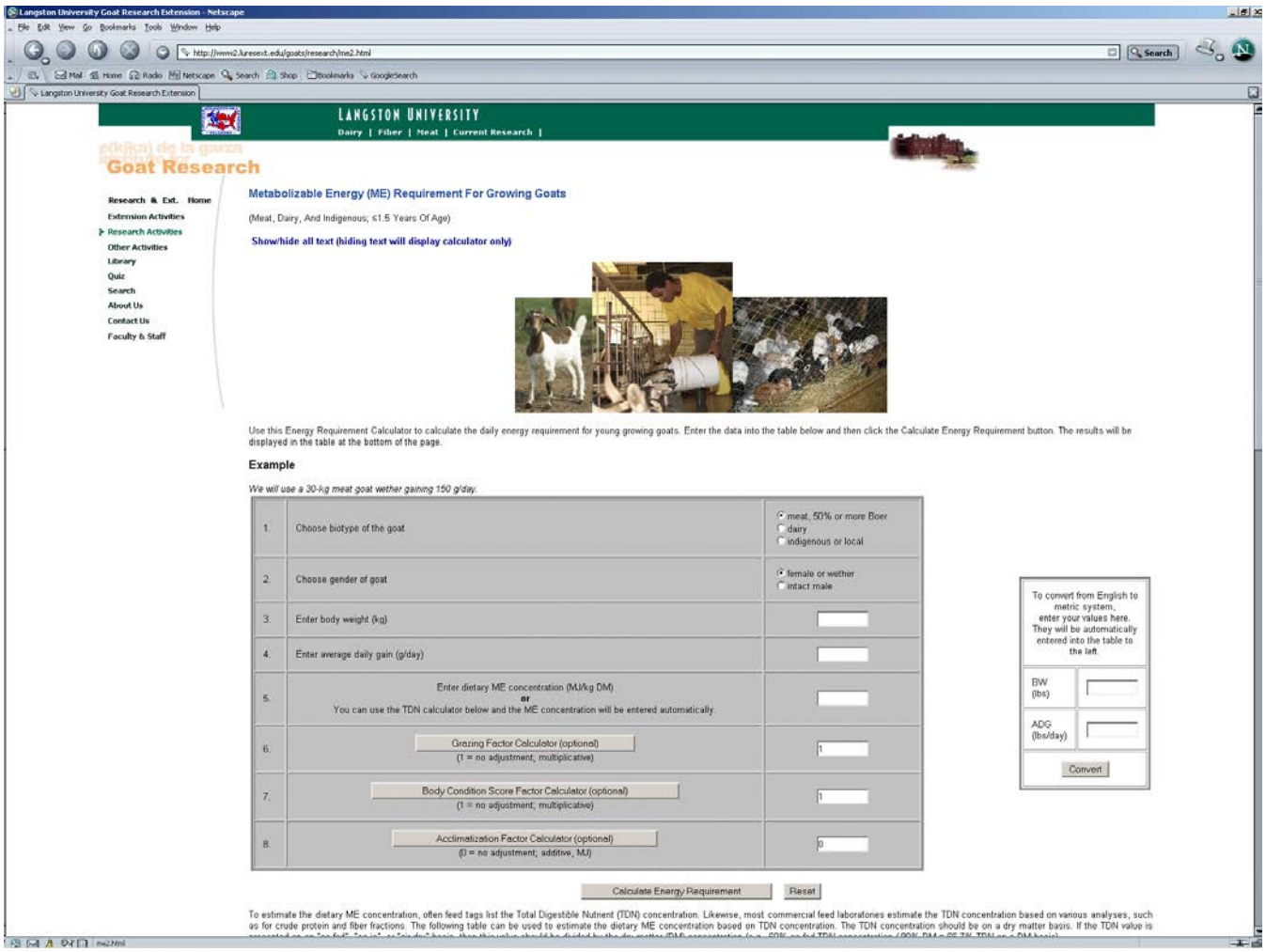
Nutrient requirement calculators represented on the website include:

Energy requirement for:

1. suckling goats.
2. growing goats.
3. mature goats.
4. lactating goats.

Protein:

1. requirement for growing goats.
2. requirement for mature goats.
3. requirement for lactating goats.
4. requirement for rumen degraded CP.
5. determination of metabolizable protein intake.



Metabolizable Energy (ME) Requirement For Growing Goats Calculator

Energy and protein requirements for:
1. Angora goats.
2. late gestation or pregnancy
   (day 95-150; 1, 2, or 3 kids per litter).

Feed intake (confinement) for:
1. lactating goats.
2. Angora goats.
3. mature goats.
4. growing goats.

Energy requirement adjustments for:
1. grazing.
2. acclimatization.
3. previous nutritional plane as assessed by body condition score (BCS).

Diet formulation
1. estimating supplemental concentrate needs.
2. total mixed ration calculator.

Most calculators were based on studies of the project reported in a Special Issue of the journal Small Ruminant Research. For calculators with score inputs (i.e., grazing and body conditions), pictures are available to aid in determining most appropriate entries.

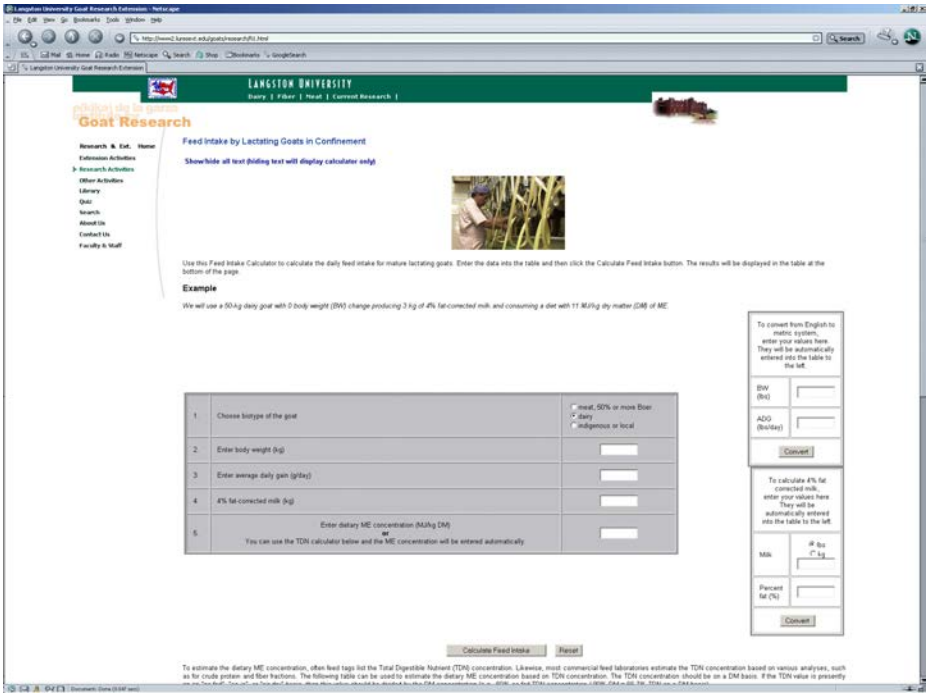
Realistic examples are given, as well as discussion of appropriate and inappropriate usage. However, for the experienced user there is an option to hide text and examples and to view only inputs and outputs.

Also, calculators are equipped with printable version commands to obtain inputs and outputs in hard copy format.

In summary, for nutrient requirement expressions to be of value, they must be readily accessible and reasonably simple. Therefore, a web-based goat nutrient requirement system was developed based on findings of a recent project. It is hoped that this system will enjoy widespread usage and enhance feeding practices for goats.

This project was supported by USDA Grant Number 98-38814-6241.

For further information regarding the nutrient requirement calculators, contact Drs. Art Goetsch or Terry Gipson at (405)466-3836 or goetsch@luresext.edu or tgipson@luresext.edu.



Feed Intake by Lactating Goats in Confinement Calculator

Noteworthy News

In November, Drs. **Terry Gipson**, **Art Goetsch**, **Steve Hart**, and **Mario Villaquiran** traveled to Virginia State University and North Carolina State University to meet with collaborators in the "Enhanced Goat Production Systems for the Southern United States" project.

In October, Drs. **Tilahun Sahlu**, **Roger Merkel**, and **Art Goetsch** traveled to Egypt to visit study sites on the USAID MERC project followed by a meeting in Cyprus of participants from Egypt, Israel, Jordan, and Langston University (see page 2).

In November, Drs. **Steve Zeng** and **Tilahun Sahlu** traveled to China as the second phase of the USDA-China Ministry of Agriculture cheese project (see page 4).

In October, Dr. **Steve Zeng** conducted a cheesemaking workshop for goat producers in Sallisaw, OK.

In December, Dr. **Steve Hart** traveled to Fort Valley State University to participate in an internal parasite project focus group.

In November, Dr. **Roger Merkel** traveled to Ethiopia and Kenya with personnel from Oklahoma State University and University of California Los Angeles to gather information under a collaborative grant "Combating Micronutrient Malnutrition: Assessing Constraints to Including Animal Source Foods in Children's Diets in Rural Ethiopia and Kenya." Also working on the grant is Debub University, Awassa, Ethiopia and University of Nairobi, Kenya.

In December, Dr. **Steve Zeng** was invited to conduct two cheesemaking workshops for in Little Rock, AR.

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