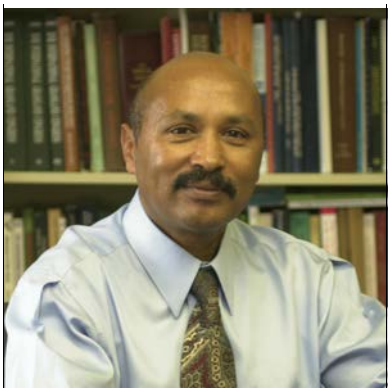
Goat Newsletter

Cooperative Extension Program
Langston University

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

From the Director's Desk



Dr. Tilahun Sahlu

In the summer newsletter, I mentioned that the move to the new building was quite challenging, but that eventually things would return to normal. I am not sure if we are quite to that point yet, but progress is being made. Soon the lab will be fully functional, which is good news given the backlog of samples and analyses that has been developing during the transition period. In addition to lab considerations, it has been difficult at the farm recently in keeping up with the research. The scientists do, however, contribute a great deal to the animal work when necessary. It is good for scientists to have a balance of different types of activities, although too much of any one thing such as farm work can constrain achievements in other areas.

We recently have been fortunate in receiving approval of a number of grant projects. I have mentioned the importance of grants to our research, most notably the USDA 1890 Capacity Building Program, in many previous newsletters, so I won't repeat myself again. Because of these new projects, currently we are making plans for the first experiments, which include the procurement of some needed pieces of equipment and supplies. Since many of these experiments and those of other projects require specific animal ages and(or) growing seasons of forage, much preparation is necessary so that they can be conducted at the appropriate times.

For research underway at the moment, Drs. **Maristela Rovai** and **Terry Gipson** are conducting a collaborative experiment with Dr. Dale Bauman of Cornell University pertaining to the effects of dietary supplementation with the trans-10 cis-12 isomer of conjugated linoleic acid (CLA) on milk and cheese yield and composition in dairy goats. The lactating dairy goat body composition experiment of Drs. **Thomas Ngwa** and **Art Goetsch** is still underway, whereas the animal portion of two other experiments were recently completed (effects of pasture fertilization, supplementation, and presence of tree legume mimosa on performance of Spanish does and their twin kids, by Drs. **Roger Merkel** and **Goetsch** and Mr. **Glenn Detweiler**; effects of dietary levels of Kobe lespedeza and sorghum-sudangrass on methane emission by meat goats, by Drs. **Getachew Animut**, **Ryszard Puchala**, and **Goetsch**). In addition, Dr. **Zaisen Wang** will soon be initiating another experiment investigating physiological mechanisms associated with internal parasite tolerance.

I would like to cite the new research grants that we have received this summer. In June, the Institute was noti-

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Dr. Terry A. Gipson

fied of the approval of funding by the United States - Israel Binational Agricultural Research and Development Fund of the project "Energy Expenditure for Activity in Free-Ranging Ruminants: A Nutritional Frontier." The Newe Ya'ar Research Center is a collaborating institution.

In July, the Institute was notified of the approval of funding by the USDA 1890 Institution Capacity Building Program of two projects: "Characterization of the Energy Requirement for Activity by Grazing Ruminants" and "The Ability of Goats to Withstand Harsh Nutritional Environments."

In August, the Institute was notified of the approval of funding by the United States - Egypt Joint Science and Technology Fund Program of the project "Effects of Acclimatization on Energy Requirements of Goats." The Desert Research Center of Egypt is a collaborating institution.

And in September, the Institute was notified of the approval of funding by the US Agency for International Development (USAID) of the project "Ethiopia Sheep and Goat Productivity Improvement Program," for which the Institute, Prairie View A&M University, and USAID/Ethiopia are collaborators.

As you can see, we will be very busy these next few years research-wise. However our extension activities will not diminish in light of this new research work load.

This August, we completed our ninth annual meat buck performance test. The meat buck performance test, which is sponsored jointly by Langston University and the Oklahoma Meat Goat Association, provides a tool to objectively select genetically superior bucks. You can read more about the ninth annual meat buck performance test on page 6 of this newsletter.

Our annual artificial insemination workshops were held in September at Langston and in October in Tahlequah. A total of 44 participants were instructed in the anatomy and physiology of the female goat, estrus detection and handling and storage of semen. Producers participate in a hands-on insemination exercise.

Earlier this summer, Langston University hosted the Regional SARE Professional Development Project Goat Project Collaborator Meeting. This project is led by Kentucky State University with Langston as a major collaborator. The objective of the two-day meeting was to bring together goat producers, county agents, and extension specialists in an effort to evaluate existing educational materials for meat goat producers and to make recommendations for needed educational materials.

Democratic People's Republic of Korea

by R. Merkel

Dr. Roger Merkel (center, striped shirt) at the Anju Goat Research Facility.

From June 7 through 14, Dr. Roger Merkel of AIGR traveled to the Democratic People's Republic of Korea (DPRK) on a consulting trip sponsored by Global Resource Services, Inc. (GRS). GRS has worked in the DPRK for some time and in 2002 established the Janpoong Goat Dairy in the southern part of the country. Dairy products are in short supply in the DPRK and the GRS-supported dairy has modern equipment to collect and pasteurize milk, package milk into plastic packets for children to consume at schools and other venues, and equipment to process milk into other dairy products such as cheese and yogurt. In November 2004, a GRS delegation of five DPRK scientists spent 8 days at AIGR discussing various aspects of dairy goat production and milk hygiene and milk products. A write-up of that training was printed in the Winter 2004 Goat Newsletter.

Dr. Merkel spent three days at the Janpoong Goat Dairy learning about the feeding and production systems used at the farm. Dr. Merkel also provided some training in internal parasite control and anthelmintic use as well as forage production and forage nutritive value. Currently, milk is processed into cheese and yogurt. The milk processing facility was constructed to abut a hillside where a cave has been built for aging cheeses.

The management at the Janpoong Goat Dairy is also interested in upgrading the genetics of their herd via artificial insemination. Training in AI was provided to the scientists that trained at Langston University last November. Korean goats were inseminated last fall and some crossbred kids have been born at the dairy. In September of 2005, AIGR allowed the use of four Alpine bucks for collection and processing of semen that was then shipped to the Janpoong Dairy.

Dairy goats at the Janpoong Goat Dairy

During his trip, Dr. Merkel also visited the Anju Goat Research Facility in the DPRK. This new facility is conducting some research on dairy goats and goat milk products. They are also interested in expanding their research efforts to include more aspects of reproduction such as artificial insemination and embryo transfer.

In addition to visiting goat research facilities, Dr. Merkel visited sites of two other projects supported by GRS in the DPRK. These were a future tofu production plant and fields of improved soybeans, and a hospital where GRS has provided some surgical equipment. Langston University and the Goat Institute look forward to future potential collaboration with GRS in the DPRK.

Milk processing equipment at the Janpoong Goat Dairy

Research Spotlight

Abstracted by A. Goetsch

Condensed Tannins and Methane Emission.

This study compared methane emission by goats consuming the condensed tannin-containing forage sericea lespedeza (*Lespedeza cuneata*) or a mixture of crabgrass (*Digitaria ischaemum*) and Kentucky 31 tall fescue (Festuca arundinacea). Two groups of 12 Angora does were used. After 1 wk of adaptation to metabolism cages, gas exchange was measured for 24 h in an open-circuit respiration calorimetry system. Forage harvested daily from the previously grazed pastures was consumed ad libitum. Crude protein concentration was 10.3 and 13.0%, IVDMD 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 (1.11 vs. 0.67 kg/d) and digestible DMI (estimated from IVDMD; 0.71 vs. 0.51 kg/d) were greater for sericea lespedeza than for crabgrass/tall fescue. Ruminal ammonia N (3.7 and 9.9 mg/dL) and plasma urea-N concentrations (16.7 and 20.9 mg/dL) were lower for sericea lespedeza than for crabgrass/tall fescue. Despite higher DMI by goats fed sericea lespedeza, daily energy expenditure (409 vs. 431 kJ/kg BW0.75), heart rate (70 vs. 73 beats/min), and the ratio of energy expenditure to heart rate (5.82 vs. 5.94) did not differ between sericea lespedeza and crabgrass/tall fescue, respectively. Methane emission expressed as both quantity per day or relative to DMI 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 tannin 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. J. of Anim. Sci. 83:182-186.

Protein Metabolism.

Six Boer x Spanish goat wethers were used in an experiment with a 2 x 3 factorial arrangement of treatments to investigate effects of dietary CP level (9% and 15% DM) and supplementation with ruminally protected betaine or choline (0.9% DM). Neither betaine nor choline affected blood flow, packed cell volume, hemoglobin concentration or oxygen consumption. Blood flow and oxygen consumption were greater for 15% versus 9% dietary CP. Arterial plasma ammonia N concentration was greater for 9% versus 15% CP. Compared with Control, choline supplementation decreased PDV release and hepatic uptake of ammonia N with the 15% CP diet, whereas betaine decreased PDV release and hepatic uptake of ammonia N with 9% dietary CP. With 9% dietary CP, the concentration of NEFA in arterial, hepatic venous and portal venous plasma ranked choline < Control < betaine; with 15% CP, NEFA concentration also was greater for betaine versus Control, although the magnitude of difference was smaller than with 9% CP. The only treatment effect on NEFA, net fluxes had greater hepatic uptake with 9% CP than with 15%. Plasma TG concentrations also were increased by betaine with 9% dietary CP, whereas choline did not have any influence with either dietary CP level. Concentrations and net fluxes of cholesterol were similar among treatments. In conclusion, these data indicate that potential effects of ruminally protected betaine on performance of ruminants might involve changes in lipid metabolism, with the magnitude of alteration varying with dietary CP level.

V. Banskalieva, R. Puchala., A.L. Goetsch, J. Luo, T. Sahlu. 2005. Effects of ruminally protected betaine and choline on net flux of nutrients across the portal-drained viscera and liver of meat goat wethers consuming diets differing in protein concentration. Small Ruminant Research 57:193-202.

Meat Buck Performance Test

The ninth annual meat buck performance test started May 7, 2005 with 62 bucks enrolled from 19 different breeders. Breed and geographical distribution are given in the table below.

State	Boer	Kiko	Savanna	**Total**
KS	2			**2**
MO	4			**4**
NE	4			**4**
OK	5	6	3	**14**
TX	36	2		**38**
Total	**51**	**8**	**3**	**62**

Entrance weight for the 62 bucks averaged 51.5 lbs with a range of 30.8 to 78.2 lbs. Age at entry averaged 100.0 days with a range of 86 to 157 days.

The performance-testing facility only has 53 Calan feeders but 62 bucks enrolled. To accommodate all animals, the new Feed Intake Recording Equipment (FIRE) system was used. The FIRE system is a completely automated electronic feeding system, which was developed for swine but we have adapted it to goats. Animals wear an electronic eartag, which is read by an antenna in the feeder. The FIRE system automatically records body weight and feed intake. This year, half of the bucks are in the FIRE system and half are in the Calan feeders. For producers who enrolled more than one buck in the Buck Performance Test, the test supervisor randomly assigned half of their bucks to the FIRE system and half to the Calan feeders. The training period was much shorter for the FIRE system than for the Calan feeders. However, the bucks on the Calan feeders mastered the Calan feeders and did quite well. With the combined FIRE system and Calan feeders, the Oklahoma Meat Buck Performance Test now has a capacity of 100 bucks.

Because the FIRE system has not previously been used with goats, Langston University determined the appropriate stocking density per FIRE feeder. As many as 10 young goats can share a FIRE feeder without adverse effects. Langston University also compared the FIRE system with the Calan feeders. We found no differences in average daily gain or feed intake of growing goats on the FIRE system and the well-established Calan feeders.

All bucks underwent an adjustment period of two weeks immediately after check-in. During the adjustment period, bucks were acclimated to the test ration and to the Calan feeders or to the FIRE system. For the Calan feeders, each buck wears a collar with an electronic "key" encased in hard plastic. The key unlocks the door to only one Calan feeder, thus enabling the buck to eat out of his individual feeder. Each morning, the previous day's feed that remained in the Calan feeder was weighed and removed from the Calan feeder. Fresh feed was weighed and placed into the Calan feeder. The difference in weights between the fresh feed place in the Calan feeder one morning and the remaining feed the next morning is the amount consumed. Because only one goat is capable of opening the Calan door and eating, it is possible to calculate the feed intake of the individual bucks. For the FIRE system, feed intake is automatically recorded every time a buck enters into the FIRE system to eat.

The area immediately around the Calan and FIRE feeders and waterers is concrete, however, the large majority of the inside pen is earth and is covered by pine shavings. Pine shavings were periodically added as needed to maintain fresh bedding. Bucks had free access to water provided by float-valve raised waterers. Whenever the weather was permitting, the bucks had access to the outside pens as well as the inside pens.

Nutritionists at Langston University formulated the diet used. In 1999, the amount of salt and ammonium chloride was doubled due to problems with urinary calculi the previous year. Except for the increase in salt and ammonium chloride, the diet was unchanged from that which was used in the first two meat buck performance tests. The diet was fed free-choice during the

adjustment period and during the 12-week test. The crude protein content of the diet is 16% with 2.5% fat, 20.4% fiber and 60.6% TDN. In 2003, competitive bids were sought for the buck-test feed and Bluebonnet Feeds of Ardmore, OK was awarded the contract to supply feed for the buck performance test for 2003, 2004, and 2005.

The official performance test started on May 25 after the adjustment period was finished. Weights at the beginning of the test averaged 63 lbs with a range of 36.3 to 96.9 lbs. Weights at the end of the test averaged 115.3 lbs with a range of 71.6 to 157.5 lbs. Weight gain for the test averaged 52.4 lbs with a range of 29.7 to 80.4 lbs.

The type of feeder (Calan or FIRE) had no significant effect upon gain. Bucks on the Calan system averaged 52.6 lbs gain and bucks on the FIRE system averaged 52.1 lbs gain, which is a difference of 0.5 lbs.

At mid-point, the bucks gained on average 0.62 lbs/day with a range from 0.31 lbs/day to 0.92 lbs/day. For the test, the bucks gained on averaged 0.62 lbs/day with a range of 0.35 lbs/day to 0.96 lbs/day.

The type of feeder (Calan or FIRE) had no significant effect upon average daily gain. Bucks on the Calan system averaged 0.63 lbs/day and bucks on the FIRE system averaged 0.62 lbs/day gain, which is a difference of 0.01 lbs/day.

For the test, the bucks consumed an average of 335.5 lbs of feed with a range of 193.3 to 482.9 lbs.

The type of feeder (Calan or FIRE) had no significant effect upon intake. Bucks on the Calan system averaged 328.9 lbs intake and bucks on the FIRE system averaged 338.1 lbs, which is a difference of 9.2 lbs.

For the test, the bucks averaged a feed efficiency of 6.55 (feed efficiency is defined as the number of lbs of feed needed for one lbs of gain), with a range of 4.53 to 11.34.

The average loin eye area as determined by ultrasonography was 1.71 square inches with a range of 0.95 to 2.36 square inches and the average left rear leg circumference was 18.5 inches with a range of 14.5 to 22.0 inches.

Congratulations

The Oklahoma Meat Goat Association and the Agricultural Research and Extension Program at Langston University congratulate:

- Mr. A.L. Paul of Aubrey, TX
  for having the Top-Indexing buck in the 2005 Oklahoma Meat Buck Performance Test

Also, deserving congratulations are:

- Mr. Orlin Scrivener of Cabool, MO for having the #1 Fastest-Gaining buck
- Mr. A.L. Paul of Aubrey, TX for having the #2 Fastest-Gaining buck
- Mr. Marvin Shurley of Sonora, TX for having the #3 Fastest-Gaining buck
- Mr. Marvin Shurley of Sonora, TX for having the #4 (tie) Fastest-Gaining buck
- Mr. Dan Wagner of Sonora, TX for having the #4 (tie) Fastest-Gaining buck
- Mr. Marvin Shurley of Sonora, TX for having the #4 (tie) Fastest-Gaining buck
- Mr. Martin Peters of Barksdale, TX for having the Most-Feed-Efficient buck
- Mr. Martin Peters of Barksdale, TX for having the Most-Heavily-Muscled buck

For information regarding the buck performance test, contact Dr. Terry Gipson at (405)466-6126 or tgipson@luresext.edu. The final report is available online at http://www2.luresext.edu/goats/extension/demonstrations.htm.

Noteworthy News

In June, Drs. **Sahlu** and **Goetsch** traveled to Ethiopia and Cyprus. Presentations as a part of collaborative projects were given at Alemaya and Debub Universities in Ethiopia. In Cyprus, lead participants from Egypt, Jordan, East Jerusalem for the West Bank, and Israel in the USAID Middle East Regional Cooperation (MERC) project "Multinational Approaches to Enhance Goat Production in the Middle East" met to discuss current and future project activities.

In July, Dr. Yoav Aharoni of the Newe Ya'ar Research Center in Israel, the lead Israeli scientist on the project "Energy Expenditure for Activity in Free-Ranging Ruminants: A Nutritional Frontier," visited the Institute.

In July, Dr. **Steve Hart** gave presentations on goat nutrition at the IBGA annual conference in Lawton, OK and at the AMGA annual meeting in Stillwater, OK.

In July, Drs. **Sahlu**, **Goetsch**, **Gipson**, **Merkel**, **Hart**, **Patra**, **Ngwa**, **Villaquiran**, **Rovai**, **Animut**, **Puchala**, and **Zeng** attended the national meetings of the American Society of Animal Science in Cincinnati, OH to make research presentations and attend scientific sessions.

In July, Dr. **Steve Hart** traveled to Claremore, OK and Sulphur Springs, TX to conduct parasite workshops for goat producers.

In August, Dr. **Terry Gipson** judged the youth dairy goat show in Tulsa county and the market goat show in McCurtain and Kay counties.

In September, Dr. **Steve Zeng** conducted a soapmaking workshop at Langston and a cheesemaking workshop in Idabel.

In September, Dr. **Steve Hart** gave goat presentations at the Women in Agriculture conferences in Pawhuska, OK and Quartz Mountain, OK.

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