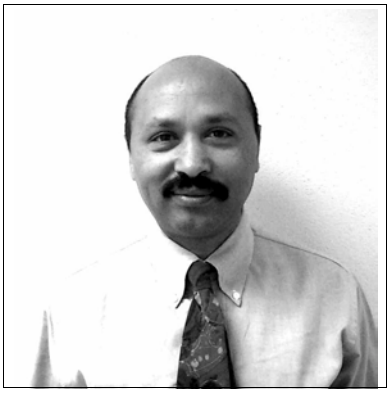
Goat Newsletter

Cooperative Extension Program
Langston University

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

From the Director's Desk



Dr. Tilahun Sahlu

For this research update I'll revert back to listing some of the many studies underway, along with mentioning some of the people involved.

The grazing phase of the co-grazing stocking rate study recently ended, with animals now in a subsequent growth phase at the South Barn being fed a concentrate-based diet. Data from the experiment available at this time are very interesting, with effects of stocking rate on gain per animal and pasture as well as grazing time. Mr. **Getachew Animut** and Dr. **Ryszard Puchala** added a number of insightful techniques to this project, such as use of heart rate to indirectly estimate the grazing activity energy cost and use of an electronic switch monitoring system to study grazing behavior in detail.

In regards to heart rate, Dr. **Berhan Tamir**, joining us in July from Alemaya University in Ethiopia quickly initiated a novel experiment with our respiration calorimetry system with able assistance from Dr. Puchala. Energy expenditure (i.e., heat production) was first measured while resting and then while goats walked at different speeds on a treadmill. Subsequent phases entailed consuming forage while resting or walking at different speeds. The study was conducted to determine if differences in heart rate, such as in confinement versus at different times while on pasture, would influence the ratio of energy expenditure to heart rate, and also to ascertain the relative importance of movement versus physiological conditions associated with forage ingestion to the increase in energy expenditure that occurs when ruminants graze. Such studies will hopefully lead to future studies predicting the grazing activity energy cost based on conditions that are simple and practical for producers to assess.

Dr. **Ignacio Tovar-Luna** is nearing completion of a number of respiration calorimetry experiments to determine energy requirements of different types of goats in various stages of production. Dr. **Roger Merkel** is starting the second year of a project dealing with supplementation of meat goat does in different body conditions shortly before and during the early part of the breeding season to enhance reproductive performance, and Dr. **Arthur Goetsch** and Mr. **Glenn Detweiler** have just initiated an experiment to determine the appropriate number of growing meat goats per pen fitted with an automated feed intake recording system.

On the extension side, we have been very busy also. This August, we completed our seventh annual meat buck performance test. The meat buck performance test, which is sponsored jointly by Langston University and the

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Dr. Terry A. Gipson

Oklahoma Meat Goat Association, provides a tool to objectively select genetically superior bucks. You can read more about the seventh annual meat buck performance test on page 3 of this newsletter.

Our vegetation management workshops for the second year of the Sustainable Agriculture Research and Education project on using goats for vegetation control and management is winding down. Attendance at the field days has been good, and we hope that participants learned something about one of the many uses of goats and had a nice time. Drs. **Steve Hart** and **Jamus Joseph**, performing most of the work on this project, were assisted for 3 months this year by **Anne Manach**, a student from the Institut National Agronomique Paris-Grignon in France conducting an internship at Langston University. This project has been conducted in collaboration with six Native American Nations. In July, the workshop was held near Gracemont and highlighted the use of goats and sheep to control brush on a site owned by the Caddo Nation. In August, three workshops were held. One was held near Antlers and highlighted the brush reduction in beef cattle pastures by the incorporation on a beef cattle operation of a cooperator from the Choctaw Nation. The second workshop examined two different stocking rates of goats to control unwanted vegetation on a site at the Miccosukee Mission of Seminole Nation. The last workshop in August also highlighted stocking rate on a site owned by the Osage Nation in Grey Horse Village. In October, two workshops were held. One workshop discussed the results of goats versus chemical versus mechanical control of unwanted vegetation, which was conducted on a site owned by the Cherokee Nation near Tahlequah. The last workshop again highlighted different stocking rates of goats to control brush on land owned by the Sac and Fox Nation near Stroud.

Dr. **Steve Zeng** has been very busy conducting cheese making workshops in Oklahoma and in the surrounding states. You can read more about his cheese making workshops on page 6 of this newsletter.

Drs. **Lionel Dawson** and **Terry Gipson** have been busy conducting artificial insemination workshops. One workshop was held at Langston University and the other was held in Tahlequah. Both workshop were well-attended and participants learned about artificial insemination by practical, hands-on training. These workshops are an annual event and will be repeated next year.

2003 Buck Performance Test

The seventh annual meat buck performance test started on May 3, 2003 with 52 bucks enrolled from 16 different breeders. Fifty-one of the bucks were fullblood Boers, and one was a Boer-cross buck. Twenty-nine bucks were from Texas, 19 from Oklahoma, 2 from Mississippi and 2 from Nebraska. The test was open to purebred and crossbred bucks born between December 1, 2002 and March 31, 2003.

At registration, bucks were given a thorough physical examination by Extension staff and the attending veterinarian. All bucks were retagged after admission to the performance test so that each buck would be uniquely identified within and across years of the test. All bucks underwent an adjustment period of eighteen days immediately after check-in. During the adjustment period, bucks were acclimated to the test ration and to the Calan feeders. Nine bucks were assigned to each 20' x 20' inside pen equipped with nine Calan feeders. Each pen also had a 20' x 30' outside run. The inside and outside pen space was separated by an overhead door, which can be raised or lowered as the weather dictates. Every other pen was also equipped with a fan to circulate air in the barn complex whenever needed. The grass in the outside pens was mowed often, and grazing was negligible. Each buck wore 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 feed remaining in the Calan feeder from the day before was weighed and removed from the Calan feeder. Fresh feed was then weighted 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 represented the amount consumed. Because only one goat was capable of opening the Calan door and eating, it is possible to calculate the feed intake of the individual bucks. The area immediately around the Calan feeders and waterers is concrete, however, the large majority of the inside pen is earth and was 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.

Gain

The official performance test started on May 21 after the adjustment period was finished. Weight at the beginning of the test averaged 66.3 lbs with a range of 40.7 to 124.4 lbs. Weight at the mid-point averaged 94.5 lbs with a range of 57.3 to 159.7 lbs. Weight at the end of the test averaged 119.5 lbs with a range of 70.5 to 175.1 lbs. Weight gain for the test averaged 52.9 lbs with a range of 11.0 to 77.1 lbs.

Average Daily Gain (ADG)

For the test, the bucks gained on averaged 0.63 lbs/day with a range from 0.13 lbs/day to 0.92 lbs/day.

Feed Efficiency

For the test, the bucks consumed an average of 363.3 lbs of feed with a range of 137.3 lbs to 559.7 lbs. For the test, the bucks averaged a feed efficiency of 7.1 (feed efficiency is defined as the number of lbs of feed needed for one lbs. of gain), with a range of 5.1 to 12.5.

Muscling

The average loin eye area as determined by ultrasonography was 1.76 square inches with a range of 0.96 to 2.66 square inches and the average right rear leg circumference was 16.6 inches with a range of 13.75 to 20.5 inches.

Index

For 2003, the index was calculated using the following parameters:

1. 30% on efficiency (units of feed per units of gain)
2. 30% on average daily gain

3. 20% on area of longissimus muscle (loin) at the first lumbar site as measured by real time ultrasound adjusted by the goat's metabolic body weight
4. 20% circumference around the widest part of the hind right leg as measured with a tailor's tape adjusted by the goat's metabolic body weight

The adjustment to metabolic body weight gives lighter weight goats a fair comparison of muscling to heavier goats.

The deviation from the average of the parameters measured from the goats in the performance test was used in the index calculation. Thus, the average index score for bucks on-test was 100%. Bucks that are above average have indexes above 100% and those below average have index scores below 100%.

The Oklahoma performance test is designated by the American Boer Goat Association Board of Directors as an ABGA Approved Performance Test and is sanctioned by the International Boer Goat Association, Inc.

Congratulations

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

- Mr. Marvin Shurley of Sonora, TX for having the Top-Indexing buck in the 2003 Oklahoma Meat Buck Performance Test

Top indexing buck for the 2003 Buck Performance Test.

Also, deserving congratulations are:

- Mr. Marvin Shurley of Sonora, TX for having the #1 Fastest-Gaining buck
- Mr./Mrs. James and Luann Hansen of Cushing, OK for having the #2 Fastest-Gaining buck
- Mr./Mrs. James and Luann Hansen of Cushing, OK for having the #3 (tie) Fastest-Gaining buck
- Mr./Mrs. Jim and Lynn Farmer of Mullin, TX for having the #3 (tie) Fastest-Gaining buck
- Mr./Mrs. Jim and Lynn Farmer of Mullin, TX for having the #5 (tie) Fastest-Gaining buck
- Mr. Johnnie Holliday of Edmond, OK for having the #5 (tie) Fastest-Gaining buck
- Mr./Mrs. James and Luann Hansen of Cushing, OK for having the Most-Feed-Efficient buck
- Mr./Mrs. Jim and Mary Daniel of Earlsboro, OK for having the Most-Heavily-Muscled buck

Acknowledgments

The Buck Test supervisor wishes to acknowledge Dr. Lionel Dawson of Oklahoma State University for his contributions as the admitting and on-call veterinarian, Mr. Filemon Vasquez for his management and oversight of the day-to-day activities, Mr. Jerry Hayes of Langston University for aid and supervision, Mr. Les Hutchens and his associates at Reproductive Enterprises, Inc. for conducting the ultrasound measurements for the loin eye area and the breeding soundness exams, and Bluebonnet Feeds of Ardmore, OK for custom mixing the feed.

Research Spotlight

Abstracted by A. Goetsch

Diets for Fall-born Kids.

There are several feeding options available to goat producers with fall-born kids. One for kids weaned in the winter is to graze or be fed harvested low-quality forage, such as prairie grass or prairie hay. This might be followed by consumption of relatively high quality forage or browse in the spring or, for others, there could be immediate or delayed placement on high grain diets. Spanish wether and doeling kids (4.5 months of age) were used to determine influences of different quality diets consumed continuously or after a lower quality diet on characteristics of growth. The experiment consisted of two 9-week periods. Diets were low quality forage (L; prairie hay supplemented with soybean meal), high quality forage (H; dehydrated alfalfa pellets), and 70% concentrate (C). Kids on two treatments consumed L in Period 1, with half switched to C and half to H in Period 2. The third treatment entailed consumption of C in both periods, and for the fourth H was consumed throughout the study. The final treatment considered feeding of H in Period 1 followed by C in Period 2. Results of this study indicated that diets high in concentrate may yield average daily gain similar to that for high quality forage but with greater fat deposition in both carcass and noncarcass components. Switching from a high quality forage to a concentrate-based diet resulted in average daily gain similar to that with continuous intake of either diet. Little or no body weight change for kids consuming low quality forage resulted in smaller differences in subsequent fat and protein accretion when changed to high quality forage or a concentrate-based diet. In conclusion, the nature of the diet consumed by young Spanish goats can impact rate and characteristics of tissue accretion.

Wuliji, T., A. L. Goetsch, T. Sahlu, R. Puchala, S. Soto-Navarro, R. C. Merkel, G. Detweiler, and T. Gipson. 2003. Effects of different quality diets consumed continuously or after a lower quality diet on characteristics of growth of young Spanish goats. Small Ruminant Research 50:83-96.

Protein in the Diet.

The quantity and quality of protein reaching the small intestine are influenced by ruminally undegraded intake crude protein (UIP) and microbial protein synthesized in the rumen. Ruminally degraded intake crude protein (DIP) requirements are typically presented on a crude protein basis. Minimal DIP levels supporting high microbial growth and(or) digestion with a non-protein nitrogen source such as urea could vary from those with feedstuffs like soybean meal that provide peptides and amino acids in addition to ammonia. Hence, eight yearling Boer × Spanish wether goats were used to study effects of dietary level of crude protein (CP), the ratio of DIP to total digestible nutrients (TDN), and source of supplemental DIP on site of digestion with a high concentrate diet. Diets were formulated to range from approximately 9 to 15% CP (dry matter basis), with a ratio of DIP:TDN of 0.073 to 0.167. Results of this experiment support suggestions that goats have considerable ability to recycle nitrogen to the rumen. For goats with ample tissue protein stores available for mobilization, this permits high microbial protein production and efficiency of microbial growth with high concentrate diets containing as little as 9-10% CP and with a DIP:TDN ratio of 0.073. In such instances, only small increases in digestibility can be achieved by supplying additional DIP, such as with a dietary CP concentration of 11-14% and a DIP:TDN ratio of 0.104-0.113. When ruminal ammonia availability is not limiting, with a high quality, high concentrate diet, it is unlikely that benefits in microbial growth or digestion will occur with use of a true protein source compared with a source of non-protein nitrogen such as urea.

S. A. Soto-Navarro, A. L. Goetsch, T. Sahlu, R. Puchala, and L. J. Dawson. 2003. Effects of ruminally degraded nitrogen source and level in a high concentrate diet on site of digestion in yearling Boer × Spanish wether goats. Small Ruminant Research 50:117-128.

The Power of Goat Cheeses

by S. Zeng

As the dairy goat industry in the United States is proving to be more economically viable, more and more dairy goat producers are becoming interested in the production of goat cheese. This was particularly true in the summer of 2003 as Dr. Steve Zeng, the Institute's Dairy Products Specialist, traveled in Oklahoma and to the states of Missouri, Vermont conducting seven goat cheesemaking workshops. In addition, a goat cheese seminar was conducted on campus for staff and faculty as part of the Langston University Passport program.

Presently, a lot of the surplus goat milk is used or sold for feeding calves, greyhounds and hogs, and some of the surplus is used for powdered milk processing. Cheesemaking can definitely add value to high quality goat milk and create another source of income for producers. A tremendous interest in goat cheesemaking was illustrated by the large number of participants attending the workshops. In several cases, a maximum number of sixteen (16) participants had to be set in order to maintain the workshops' hands-on format. The participants were primarily goat producers. However, there were also school teachers, middle and high school students, human physicians, chefs, goat cheese lovers, and a few cow producers as well.

The manufacturing of various hard cheeses (Cheddar, Colby and Gouda), soft cheeses (Chevre, Mozzarella cheese, Feta cheese, low fat cream cheese) and yogurt was demonstrated depending on the level and the duration of the workshops. In some workshops, participants were paired up to make their own batch of cheese on site. Basic principles and practical techniques were demonstrated through actual cheesemaking procedures. There were plenty of questions and discussion facilitated the learning process during the events. Information related to cheesemaking books, supplies, and quality controls was disseminated via handouts. In the end, the participants also had some cheeses to take home for continuous ripening and evaluation.

Most of the goat cheesemaking workshops were made possible through a cost-sharing program between Langston University and respective county extension offices.

For future workshops on and off Langston campus, please contact Dr. Steve Zeng at (405)466-3836 or via e-mail at szeng@luresext.edu.

Noteworthy News

Drs. **Arthur Goetsch**, **Ryszard Puchala**, **Terry Gipson**, **Ignatius Nsahlai**, **Steve Zeng**, **Steve Hart**, **Mario Villaquiran**, **Tilahun Sahlu**, Mr. **Getachew Animut**, and Ms. **Anne Manach** traveled to Phoenix, AZ to present scientific abstracts at the 2003 joint American Society of Animal Science and American Dairy Science Association meetings.

Drs. **Terry Gipson**, and **Mario Villaquiran** traveled to Louisiana State University, Fort Valley State University, Virginia State University, North Carolina State University, and the USDA-ARS Appalachian Farming System Research Center in West Virginia in June and to Prairie View A&M University in Texas in July to meet with collaborators in the USDA-IFAFS funded project entitled "Enhanced Goat Production for the Southern United States". Also in July, Dr. **Mario Villaquiran** returned to Fort Collins, Colorado to meet with a principal collaborator in the USDA-IFAFS funded project.

Ms. **Anne Manach**, a student trainee from the Institut National Agronomique Paris-Grignon in France, returned after completing her internship on the vegetation control project.

In August, Dr. **Terry Gipson** judged the Tulsa County youth goat show and in September, Dr. Gipson judged the Pittsburg County, Pawnee County, and Noble County youth goat shows.

In June, Drs. **Steve Hart** and **Lionel Dawson** conducted two workshops on Sustainable Internal Parasite Control for Small Ruminants in Langston and Tahlequah, OK. Workshop participants learned about parasite life cycles, managing around parasites, proper use of dewormers, and received training in fecal egg counting.

In September, Mr. **Eugene Waight**, Director of Livestock Development, Ministry of Agriculture and Fisheries of the government of Belize, visited Langston University.

Mr. **Juvenal Kanani**, Master's student at Texas A&M University-Kingsville, visited Langston for a 10-day training period. Mr. Kanani interacted with several researchers in the goat program and learned several new techniques to enhance his research skills.

In June, Dr. **Roger Merkel** traveled to Denver, CO to meet with collaborators on a project entitled "Combating Micronutrient Malnutrition: Assessment of Constraints to Including Animal Source Foods in Children's Diets in Rural Ethiopia and Kenya".

Ms. **Kathy Rose**, student at Northeast Iowa Community College, conducted a week-long internship at Langston University in September.

Dr. **Steve Hart** served as the superintendent for the meat goat and the Boer goat shows at the State Fair of Oklahoma. Dr Hart also supervised the goat exhibit in the Birthing Center at the Tulsa State Fair.

Dr. **Berhan Tamir** from Alemaya University arrived to work with Langston researchers under the auspices of a grant entitled "Improving Ethiopian Household Food Security and Enhancing the Teaching, Research and Extension Ability of Alemaya University, Alemaya, Ethiopia".

Dr. **Aberra Melesse** from Debub University in Ethiopia arrived to collaborate with Langston University researchers under a grant entitled "Improving Ethiopian Household Food Security and Enhancing the Teaching, Research and Extension Ability of Awassa College of Agriculture, Debub University, Ethiopia"

Noteworthy News cont.

Dr. **Tilahun Sahlu** traveled to Italy in August to attend a Board of Directors meeting of the International Goat Association.

Dr. **Arthur Goetsch** traveled to Israel to meet with participants of the USAID MERC project "Multinational approaches to enhance goat production in the Middle East," as well as working with Israeli collaborating scientists on a proposal for a new research project.

Dr. **Steve Hart** went to Kansas to conduct a workshop on mineral nutrition of goats.

Dr. **Tilahun Sahlu** was awarded a Capacity Building grant to study "Nutrient requirements of goats: composition of tissue gain and loss".

Dr. **Tilahun Sahlu** traveled to Grenada, Spain in October to attend the First Joint Seminar of the FAO-CIHEAM Sheep and Goat Nutrition and Mountain and Mediterranean Pastures Sub-Network.

Dr. **Arthur Goetsch** was awarded an USDA NRICGP Seed Grant to study "Tethering for detailed study of grazing ruminants".

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