Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Fall 2008*

From the Director's Desk

This is the time of the year that we usually learn if we have been successful with one of our primary grant program; USDA - 1890 Institution Teaching and Research Capacity Building Grants Program. I am happy to report that we were successful in having two research proposals funded. The first is entitled "Establishing a Pilot Tannery and Capability for Goat Leather Research at Langston University" and the second is entitled "Boer Goat Selection for Residual Feed Intake." I have included a brief description of each project in this writing.

For the first project, a pilot tannery will be established to develop research capability on the tanning of goat skins. Specific objectives include establishing a pilot tannery and capability for goat leather research at the LU campus; determining the effects of goat breed, diet and age upon skin chemical composition and mechanical properties of resulting leather; and to evaluate environmentally friendly tanning methods on U.S. goat skins. Mechanical properties of leather will also be tested.

For the second project, variability of residual feed intake (RFI) will be examined. RFI is the difference between metabolizable energy intake and metabolizable energy required for maintenance and growth. RFI is independent of ADG and may be improved through selection without increasing mature size. Therefore, objectives of the project are to 1) determine and demonstrate efficacy of use of residual feed intake to achieve genetic progress in improving efficiency of feed utilization without elevating mature size or body fatness compared with selection based on growth rate and 2) characterize relationships between residual feed intake and animal activities, feeding and social behaviors, and energy expenditure, and assess potential means of prediction of residual feed intake at an early age. Bucks classed as HIGH RFI - HIGH ADG; HIGH RFI - LOW ADG; LOW RFI - HIGH ADG; and LOW RFI - LOW ADG will be bred to Boer females and progeny will be performance tested. Moreover, bucks will be used for measures that may be related to RFI and serve as predictors at an early age.

From a separate funding agency, the proposal entitled "Effect of Nutritional lane on Maintenance Energy requirements of Goats" was approved by the U.S. - Egypt Joint Science and Technology Fund of the USDA Foreign Agriculture Service.

In other news, Drs. **Terry Gipson**, **Arthur Goetsch**, **Roger Merkel**, **Ryszard Puchala**, **Zaisen Wang**, **Steve Zeng**, and I attended the 9th International Conference on Goats in Querétaro, Mexico. You can read more about the conference on page 6.

Recently, Drs. **Marvin Burns**, **Terry Gipson**, **Steve Hart**, and I traveled to Bentonville, AR to meet with WalMart personnel. WalMart is investigating the possibility of expanding its distribution of

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goat meat in its Super Center and Sam's Club stores. We presented a Meat Goat Industry Outlook and discussed trends in domestic animal inventory and harvest. We also discussed the importation of goat meat into the United States and consumer preferences. We were impressed with the knowledge that the WalMart representatives already had about goat meat. They were familiar with the Boer goat and knew exactly which of their stores carried goat meat. We were pleased that we had this opportunity to share our expertise with WalMart. We hope that it will lead to better things for the meat goat industry.

On the extension side, Dr. **Steve Zeng**, Associate Professor/Dairy Product Specialist, was invited to conduct a Cheese Demo Live at the Oklahoma State Fair. This Cheese Demo Live was a first ever in the history of the fair and rightfully fitted in as a creative event in the Creative Arts and Handcrafts Building. Dr. **Zeng** demonstrated basic cheese making principles, skills, and techniques to diversified audiences. He used Nubian goat milk from Foremost Registered Goats in Edmond and made several batches of Colby cheese, our very own American type. A huge turnout was present and was certainly much greater than anticipated. During the show, cow cheeses (seven varieties from Christian's Cheese in Kingfisher) and goat cheeses (several varieties from Pure Prairie Creamery in Ada and from the Langston University Pilot Creamery) were sampled by hundreds of show-attendees and fair-spectators. This show raised the public's awareness of cheese in general and goat milk cheese in particular. For many it was their first time to see and actually taste goat cheeses. This Cheese Demo Live was a big success and it will be presented again next year.

Dr. Steve Zeng at the Oklahoma State Fair demonstrating cheese making.

Research Spotlight: Reducing Greenhouse Gases

Methane emission: tannins from differing levels of lespedeza.

Methane emitted by ruminants represents a loss of energy to the animal and is a greenhouse gas. Twenty-four yearling Boer × Spanish wethers (7/8 Boer; initial body weight of 75 ± 2.2 lbs) were used to determine effects on methane (CH_4) emission of dietary levels of a condensed tannin (CT)-containing forage, Kobe lespedeza (*Lespedeza striata*; K), and a forage very low in CT, sorghum-sudangrass (*Sorghum bicolor*; G). Treatments were dietary K levels (dry matter (DM) basis) of 1.00, 0.67, 0.33, and 0 (100, 67, 33, and 0 K, respectively). Forages were harvested daily. The CT concentration was 0.03 and 15.1% of DM in G and K, respectively. DM intake was similar among treatments and digestibility increased linearly with decreasing K. CH_4 emission changed quadratically with decreasing K (10.9, 13.8, 17.6, and 26.2 liters/day for 100, 67, 33, and 0 K, respectively). *In vitro* CH_4 emission by incubation of ruminal fluid for 3 weeks with a medium for methanogenic (methane-producing) bacteria and other conditions promoting activity by methanogens also was affected quadratically by K level (7.0, 8.1, 9.2, and 16.1 cc for 100, 67, 33, and 0 K, respectively). The CT-containing forage K decreased CH_4 emission by goats regardless of its feeding level, although the effect per unit of K increased with decreasing K. These findings suggest that relatively low dietary levels of CT could be employed to lessen CH_4 emission by directly affecting activity of methanogenic bacteria without a marked detrimental effect on other conditions such as total tract protein digestion.

Animut, G., R. Puchala, A.L. Goetsch, A.K. Patra, T. Sahlu, V.H. Varel and J. Wells . 2008. Methane emission by goats consuming diets with different levels of condensed tannins from lespedeza. Animal Feed Science and Technology, 144:212-227.

Methane emission: tannins from various sources.

Twenty-four yearling Boer × Spanish wethers (7/8 Boer; initial body weight of 83 ± 2.0 lbs) were used to assess effects of different condensed tannin (CT) sources on methane (CH_4) emission. Diets were Kobe lespedeza (*Lespedeza striata*; K), K plus quebracho providing CT at 5% of dry matter (DM) intake (KQ), Sericea lespedeza (*Lespedeza cuneata*; S), and a 1:1 mixture of K and S (KS). Forages were harvested daily. In phase A, forage diets were fed alone, and in phase B, .05 lb/day of polyethylene glycol (PEG) was given mixed with .10 lb/day of ground maize grain. PEG binds CT in the rumen. Adaptation periods were 28 and 7 days in phases A and B, respectively. The level of CT was 14 and 15 % of DM for S and K, respectively. DM intake was similar among treatments in both phases. N digestibility was affected by treatment in phase A but not in phase B. Energy digestibility was similar among treatments in phase A but differed among treatments in phase B. When data of both phases were pooled, supplementation with PEG in phase B markedly increased CH_4 emission (9.0 liters/day versus 19.1 liters/day). In accordance, there was a substantial difference between phases in *in vitro* CH_4 emission by ruminal fluid incubated for 3 weeks in a methanogenic (methane-producing) medium and with other conditions promoting activity by methanogens (11.5 and 22.9 cc in phases A and B, respectively). In summary, CT from different sources had a disparate influence on N digestion, but similar effects on ruminal microbial CH_4 emission by goats, possibly by altering activity of ruminal methanogenic bacteria though change in actions of other bacteria and/or protozoa may also be involved.

Animut, G., R. Puchala, A.L. Goetsch, A.K. Patra, T. Sahlu, V.H. Varel and J. Wells. 2008. Methane emission by goats consuming different sources of condensed tannins. Animal Feed Science and Technology, 144:228-241.

2008 Buck Performance Test Results

The twelfth annual meat buck performance test started May 3, 2008 with 35 bucks enrolled from 8 different breeders. Geographical and breed distribution are given in the tables below.

State	No. Bucks
KS	4
MO	3
NE	3
OK	3
TX	22
Total	35

Bucks were given a physical examination by Dr. Lionel Dawson, dewormed with Cydectin (moxidectin), deloused with Atroban De-Lice, given a preemptive injection of Nuflor for upper respiratory infections, and boosters or initial vaccinations for enterotoxemia and caseous lymphandinitis. Four weeks after check-in, all bucks were given a booster vaccination for enterotoxemia and caseous lymphandinitis.

Average age in days and entry weight are detailed in the table below.

Trait	Total
Average of Entry Weight (lbs)	45.4
Average of Entry Age (days)	92

Adjustment Period

The Feed Intake Recording Equipment (FIRE) system was used for all animals. The FIRE system is a completely automated electronic feeding system, which was developed for swine but we have adapted it for goats. Animals wear an electronic eartag, which is read by an antenna in the feeder. The FIRE system automatically records feed intake. 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 FIRE system.

The area immediately around FIRE feeders and waterers is concrete, however, the large majority of the inside portion of the pen is earth and 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 permitted, the bucks had access to the outside pens as well as the inside portion of the pens.

This year we were fortunate to hire a second year veterinary student from Oklahoma State University, Ms. Madeline Deatherage, to care for the bucks. Madeline did a wonderful job caring for the bucks.

Ration

Nutritionists at Langston University formulated the following ration. 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 ration remains unchanged from. The ration was fed free-choice during the adjustment period and during the 12-week test.

The crude protein content of the ration is 16% with 2.5% fat, 20.4% fiber and 60.6% TDN. Calcium phosphorus and sodium levels are .74%, .37% and 1.07%, respectively. Zinc concentration is 33.04 ppm, copper is 17.15 ppm and selenium is .21 ppm.

ABGA Approved Performance Test

In the year 2000, the Oklahoma performance test was designated by the American Boer Goat Association Board of Directors as an ABGA Approved Performance Test. Qualified fullblood or purebred Boer bucks are eligible to earn points towards entry into the "Ennobled Herd Book". Candidate bucks must pass a pre-performance test inspection conducted by one (1) or more ABGA approved breeders. Ten (10) points will be awarded to a Boer buck that shows an average daily weight gain (ADG) in the top five percent (5%) of the animals on test. Five (5) points will be awarded to a Boer buck that shows an average daily weight gain (ADG) in the next fifteen percent (15%) of the animals on test. All bucks must gain at least three tenths (.3) pounds per day to be awarded any points.

International Boer Goat Association, Inc. Sanctioned Test

In 2003, the Oklahoma buck performance test was sanctioned by the International Boer Goat Association, Inc.

Complete results of the 2008 Buck Performance Test can be found at http://www2.luresext.edu/goats/extension/demonstrations.htm.

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Gain

The official performance test started on May 21 after the adjustment period was finished. Weights at the beginning of the test averaged 51 lbs with a range of 32 to 84 lbs. Weights at the end of the test averaged 97 lbs with a range of 65 to 139 lbs. Weight gain for the test averaged 47 lbs with a range of 29 to 63 lbs.

Average Daily Gain (ADG)

For the test, the bucks gained on averaged 0.55 lbs/day with a range of 0.35 lbs/day to 0.75 lbs/day.

Feed Efficiency (Feed Conversion Ratio)

For the test, the bucks consumed an average of 296 lbs of feed with a range of 180 to 449 lbs.

For the test, the bucks averaged a feed efficiency of 6.48 (feed efficiency is defined as the number of lbs of feed needed for one lbs of gain), with a range of 3.75 to 10.56.

Muscling

The average loin eye area as determined by ultrasonography was 1.79 square inches with a range of 1.05 to 2.48 square inches and the average left rear leg circumference was 14.1 inches with a range of 11.0 to 17.0 inches.

Index

For 2008, the index was calculated using the following parameters:

- 30% on efficiency (units of feed per units of gain)
- 30% on average daily gain
- 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 ($BW^{0.75}$)
- 20% circumference around the widest part of the hind left 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 indices above 100% and those below average have index scores below 100%.

Congratulations

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

- Ms. Jessica Stephens of Elm Creek, NE
  for having the Top-Indexing buck

Also, deserving congratulations are:

- Mr. Sam Stephens of Elm Creek, NE
  for having the #1 Fastest-Gaining buck
- Ms. Jessica Stephens of Elm Creek, NE
  for having the #2 Fastest-Gaining buck
- Mr. Orlin Scrivener of Cabool, MO
  for having the #3 Fastest-Gaining buck
- Mr. Sam Stephens of Elm Creek, NE
  for having the #4 (tie) Fastest-Gaining buck
- Mr. Martin Peters of Barksdale, TX
  for having the #4 (tie) Fastest-Gaining buck
- Mr. Marvin Shurley of Sonora, TX
  for having the Most-Feed-Efficient buck
- Mr. Marvin Shurley of Sonora, TX
  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, Ms. Madeline Deatherage for her management and oversight of the day-to-day activities, Mr. Jerry Hayes and Mr. Erick Loetz 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 Stillwater Milling of Stillwater, OK for custom mixing the feed.

Buck #36 is was the top-indexing, second-most fastest growing, and second-most feed efficient buck in the 2008 buck performance test.

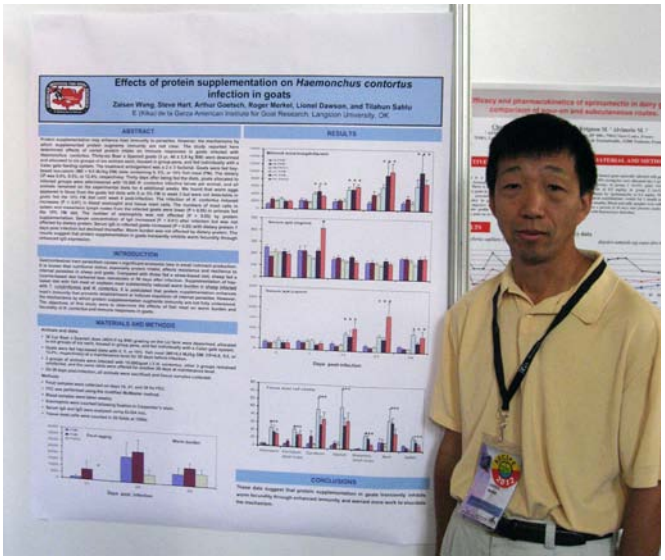
9th International Conference on Goats - Querétaro, Mexico

The 9th International Conference on Goats, was held from the August 31st to September 5th, 2008 in the city of Querétaro, Mexico. Drs. Terry Gipson, Arthur Goetsch, Roger Merkel, Ryszard Puchala, Tilahun Sahlu, Zaisen Wang, and Steve Zeng attended the conference.

The venue of the conference was the lovely city of Querétaro, which was selected for its proximity to Mexico City, about 140 miles north of Mexico City. In fact, the Langston delegation flew into Mexico City and took a wonderful bus ride to Querétaro on Federal Highway 57, which was lined by expansive corn fields and quaint villages. Querétaro also is conveniently located near other important goat producing states of Mexico.

The main goal of the 9th International Conference was to disseminate knowledge to benefit sustainable goat production. Therefore, the first two days and the fourth day of the conference were full days with numerous oral and poster scientific presentations. The Langston delegation was canvassed as to which presentation, other than a Langston presentation, was the most interesting. They responded as follows:

Dr. Steve Zeng and Ms. Lisa Shepard, American Dairy Goat Association (ADGA) Performance Programs Coordinator.



Dr. Zaisen Wang with his poster entitled "Effects of protein supplementation on Haemonchus contortus infection in goats".

- *The problem of grazing planning in a non-equilibrated environment: from the analytical procedure toward the systems approach* presented by Dr. Mata was Dr. Zeng's choice;
- *Future of organic goat production* presented by Dr. Lu was Dr. Wang's choice;
- *Recent advances in exploiting goat's milk: quality, safety and production aspects* presented by Dr. Silanikove was Dr. Sahlu's choice;
- *Concluding synthesis and future strategies for sustainable goat production* presented by Dr. Devendra was Dr. Puchala's choice;
- *Can goat be a vehicle in a pathway out of poverty?* presented by Ms. Bajracharya was Dr. Merkel's choice;
- *Goat milk production under organic farming standards* presented by Dr. Rahmann was Dr. Goetsch's choice, and;
- *Preliminary detection of QTL associated with resistance to gastrointestinal nematode in the*

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Creole goat presented by Dr. Alexandre was Dr. Gipson's choice.

On the third day of the conference, participants could choose between one of two tours; university research farm or commercial goat farms. Several in the Langston delegation chose the latter. Three commercial goat farms were visited. The first farm had 240 goats with 180 does in lactation. They had Alpine, Black Alpine, Saanen and Toggenburg breeds. They converted the milk into cheese in a family cheese plant on site. The second farm had 320 Saanen goats and was increasing the herd size. They had a commercial cheese plant on site that also processed goat milk from other surrounding farms. The third farm had 1,000 Saanen goats and would soon be relocating to a newly constructed facility near the commercial cheese plant at the second farm.

Newly-constructed milking parlor of a commercial dairy goat farm in Mexico.

Large commercial herd with twin parallel parlors.

Saanen does eating citrus waste.

Presentations of the Langston University delegation	
Title	***Authors***
Suitability of an on-line certification program for goat producers	Merkel, Gipson, and Sahlu
Effect of time of day, ambient temperature, and relative humidity on feeding behavior of growing meat goats	Gipson, Dawson, Hart, and Sahlu
Considerations for on-farm research and demonstration of useful feeding/nutrition practices for small ruminants in Ethiopia	Goetsch and Abebe
Gender differences in an on-line certification program for goat producers	Merkel, Gipson, and Sahlu
Ruminal methane emissions by goats consuming dry hay of condensed tannin containing lespedeza with or without polyethylene glycol, alfalfa, or sorghum-sudangrass	Puchala, Animut, Goetsch, Patra, Sahlu, Varel, and Wells
Effects of protein supplementation on *Haemonchus contortus* infection in goats	Wang, Hart, Goetsch, Merkel, Dawson, and Sahlu
Effects of trans-10, cis-12 conjugated linoleic acid dietary supplementation on quality and texture profile of semi-hard goat milk cheese	Chen, Ren, Bah, and Zeng
Comparison of electronic versus direct microscopic somatic cell counting of goat milk	Zeng, Garry, Vasquez, and Bah

Noteworthy News

►In August, Dr. **Steve Zeng** traveled to Washington, DC to attend the Project Directors Conference sponsored by USDA-CSREES. Dr. **Zeng** presented the experimental protocol of his current research grant "Impact of subclinical mastitis in dairy goats on quality and yield of goat milk and cheese" funded by USDA.

►In August, Dr. **Steve Hart** presented Basic Goat Management at the Future Farms 2008: Planning for Change conference in Oklahoma City, OK, and which was hosted by the Kerr Center for Sustainable Agriculture.

►In August, Dr. **Terry Gipson** traveled to Columbiana, AL to present on Dairy Goat Genetics at the Second Annual Small Ruminant Conference.

►In August, Dr. **Steve Hart** traveled to Edmonton, Canada to present on Fencing and on Internal Parasites at the annual conference of the Alberta Goat Breeders Association.

►In August, Dr. **Steve Hart** presented on Basic Goat Management to the Oklahoma Department of Corrections in Lexington, OK.

►In August, Dr. **Steve Zeng** traveled to Beijing, China as a Featured Speaker to conduct a series of seminars on functional dairy foods, dairy herd improvement laboratory, and cheese development.

►In September, Dr. **Steve Hart** traveled to Waco, TX to present a FAMACHA workshop for World Hunger Relief, Inc.

►In September, Dr. **Steve Hart** was the superintendent for the Boer Goat Shows at the State Fair of Oklahoma in Oklahoma City, OK.

►In September, Dr. **Steve Hart** traveled to Jefferson City, MO to present on Nutrition for Meat Goat Production at the SARE-PDP conference, which was hosted by Lincoln University.

►In September, Dr. **Steve Hart** traveled to Porum, OK to present on Internal Parasites at the Kerr Center Forage Field Day.

►In October, Dr. **Steve Hart** Traveled to Lexington, NE to present on Meat Goat Industry Outlook at the annual meeting of the Nebraska Meat Goat Association.

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