Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Fall 2013*

From the Director's Desk

This summer has been one of visits and visitors. We were very pleased to receive Dr. **Sonny Ramaswamy**, Director of USDA's National Institute of Food and Agriculture. Dr. Ramaswamy was recently appointed NIFA Director and wanted to meet administrators and scientists at the various land-grant institutions, especially at the 1890 universities. We were delighted to give Dr. Ramaswamy overviews of our research and extension activities, and to give Dr. Ramaswamy a quick tour of the research laboratories and farm. We wish Dr. Ramaswamy many years at the helm of NIFA and we hope to see him back at Langston University soon.

Last year, we welcomed for the first-time ever two student interns from the University of Puerto Rico – Mayagüez. UPRM is a collaborator on a project to develop a Meat Goat Production Basics handbook in Spanish. This summer, we welcomed three student interns from UPRM through this project. Ms. **Marie Negron**, Ms. **Eva Pacheco**, and Ms. **Alexandra Reyes** underwent a practical learning experience lead by Dr. **Erick Loetz**, our research farm manager, and then conducted research experiments on mortality composting directed by Dr. **Roger Merkel**.

In late July, Ms. **Marie-Eve Brassard**, Ph.D. student from the University of Laval in Quebec, joined us for a four-month scientific-study internship. Ms. Brassard is working with Dr. **Ryszard Puchala** on comparing and determining advantages and disadvantages of different methods of estimating the grazing activity energy cost of goats.

In early October, Mr. **Asrat Tera Dolebo**, Director of Livestock Research of the Southern Agricultural Research Institute in Ethiopia, also joined us for a four-month sabbatical. Mr. Dolebo is working with Dr. **Arthur Goetsch** on characterizing negative associative effects in meat goats of different ages of a concentrate supplement as affected by quality of basal forage diet.

Both of these research topics are very interesting and timely, and as they unfold, I will keep you informed.

We also received Dr. **Alex Kahi** and Mr. **Wilson Karimi** of Egerton University in Kenya. Dr. Kahi is the Dean of the College of Agriculture at Egerton University and our principal collaborator on the India–Africa–US Trilateral Partnership for Food Security supported by the US Agency for International Development and administered by the USDA Foreign Agriculture Service (FAS). In this project the American Institute for Goat Research is assisting in capacity-building activities at Egerton University, as well as, Bunda College of Agriculture in Malawi. Three of our scientists traveled to Egerton University this summer to accomplish some of the objectives of the project. Dr. **Steve**

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Zeng conducted an extensive and comprehensive cheese making workshop. Dr. Zeng along with Egerton faculty and students made many varieties of cheeses. Participants enjoyed the workshop and were excited about being able to put their new-gained knowledge into practice.

Dr. **Arthur Goetsch** also traveled to Egerton. During the first part of the trip, he gave a workshop for graduate students, faculty, and staff of the Faculty of Agriculture of Egerton. The workshop was entitled "Methods of Applied Livestock Research: Treatments, Design, Implementation, Interpretation, and Publication." This activity is associated with two projects. One is entitled "Handbook for Livestock Research on Smallholder Farms in Developing Countries," which is supported by the USDA FAS through its Scientific Cooperation Research Program. The second project is the India–Africa–US Trilateral Partnership for Food Security. In addition, Dr. Goetsch viewed facilities being modified for housing of dairy goats being imported from South Africa and provided some suggestions. After Egerton, Dr. Goetsch participated in a week-long "Agricultural Connections Workshop" in Nairobi and Naivasha, which he was invited to attend. This workshop was supported by the Bioscience for east and central Africa (BeaC) program and the Bill & Melinda Gates Foundation (BMGF). The objective of this workshop was to establish linkages and relationships among researchers around the world to collaborate in future projects of the Program for Emerging Agricultural Research Leaders, also funded by the BMGF.

At approximately the same time that Drs. Zeng and Goetsch were visiting Egerton, Dr. **Terry Gipson** traveled to Egerton to assist with the importation of five males and five females each of Alpine, Saanen, and Toggenburg breeds from South Africa. Animals were quarantined in a South Africa Veterinary Services certified quarantine facility and tested for diseases that the Kenyan Ministry of Agriculture deemed necessary for importation. Upon their arrival in Kenya, the animals were immediately transported to Egerton and quarantined for thirty days. During their stay in in-country quarantine, animals were vaccinated for infectious diseases that are widely distributed in Kenya that may not be prevalent in South Africa so that they may build immunity before they were released into the Egerton research herd. These newly imported animals will serve as the nucleus of Egerton's fledging dairy goat research herd.

I haven't even mentioned all the domestic travel that our researchers have done in AR, MO, and OK in conjunction with the on-farm component of the research project entitled "Sustainable Small Ruminant Production through Selection for Resistance to Internal Parasites." So you can see that it has been a busy summer and fall travel-wise.

Research Spotlight

Stocking Rate and Grazing Performance.

Effects of forage conditions with different stocking rates on performance and grazing behavior of goats could vary with animal physiological state, as influencing nutrient demand and usage. Boer goat does nursing two kids (D; 1 month after kidding), growing wethers (G; 4 month initial age), and yearling wethers (Y; 14 month initial age) grazed 1 acre grass/forb pastures, with one animal per type in each pasture (four per stocking rate; SR) for a low SR and two for the high SR. The experiment started in late spring and was 114 days in length with 4 period of ~30 days each. Forage mass was 1.1 tons/acre for all periods for the low SR and 1.2, 0.9, 0.7, and 0.6 tons/acre for the high SR in P1, P2, P3, and P4, respectively. Chemical composition of forage samples did not differ between animal types, with average dietary levels of 11% CP and 53% NDF. Digestibility was the greatest for growing wethers (63.5%, 67.2%, and 62.0% for D, G, and Y, respectively) and greater for the low than high SR (66.1% vs. 62.3%). Intake of ME was 110, 93, and 75 kcal/lb of body weight (BW) for D, G, and Y, respectively and greater for the low than high SR in P1 (131, 86, 74, and 48 for high SR and 181, 83, 74, and 56 kcal/lb of BW for low SR in P1, P2, P3, and P4, respectively). There was an interaction between animal type and period in time spent grazing (7.5, 5.3, 7.4, 8.6, 8.6, 5.6, 10.0, 9.1, 4.8, 5.9, 8.4, and 9.5 hours for D-P1, D-P2, D-P3, D-P4, G-P1, G-P2, G-P3, G-P4, Y-P1, Y-P2, Y-P3, and Y-P4, respectively). Rate of ME intake was greater for D vs. G and Y (207, 92, and 142 kcal/minute for D, G, and Y, respectively) and differed among periods (241, 190, 104, and 54 kcal/minute in P1, P2, P3, and P4, respectively). In conclusion, with this forage of moderate nutritive value, levels of forage mass above 0.6 tons/acre would not be of benefit to performance of meat goats regardless of physiological state with different nutrient requirements.

Askar, A.R., T.A. Gipson, R. Puchala, K. Tesfai, G.D. Detweiler, A. Asmare, A. Keli, T. Sahlu, A.L. Goetsch. 2013. Effects of stocking rate and physiological state of meat goats grazing grass/forb pastures on forage intake, selection, and digestion, grazing behavior, and performance. Livestock Science 154:82-92.

Control of Livestock Greenhouse Gas.

Twenty-four yearling Boer (87.5%) × Spanish wethers (72 ± 0.8 lb body weight) were used in a 32-day experiment to assess effects of frequency of feeding condensed tannin (CT)-containing Sericea lespedeza (SL) on ruminal methane emission. Fresh SL (15.3% CT) was fed at 1.3 times the metabolizable energy requirement for maintenance every day (1SL), other day (2SL), fourth day (4SL), and eighth day (8SL), with alfalfa offered at the same level on other days. Dry matter intake was not affected by frequency of SL feeding. Daily ruminal methane emissions increased at a decreasing rate as frequency of SL feeding decreased (6.3, 7.4, 10.5, 12.0 grams/day for 1SL, 2SL, 4SL, and 8SL, respectively), but emissions on days when SL was fed were not affected by SL feeding frequency (6.3, 6.4, 6.7, 7.0 grams/day, respectively). There were carryover effects of feeding SL on ruminal methane emissions. For example, with 8SL ruminal methane emission did not reach a maximum until day 5–6, or 4–5 days after SL was first fed. Energy in ruminally emitted methane relative to digestible energy intake increased as frequency of SL feeding decreased (4.9, 4.8, 6.6, 8.1% for 1SL, 2SL, 4SL, and 8SL, respectively). The number of protozoa in the short interval sample was not affected by frequency of feeding SL (5.2, 5.3, 5.7, 6.5 × 10^5/cc), whereas the number in the long interval sample increased at a decreasing rate as frequency of SL feeding decreased (6.5, 10.4, 18.4, 20.5 × 10^5/cc for 1SL, 2SL, 4SL, and 8SL, respectively). In vitro methane emissions (indicative of methanogen presence and activity in ruminal fluid) were lower for short than for long samples (19.0 and 24.2 cc, respectively) and increased as frequency of SL feeding decreased (19.3, 19.3, 23.0, 24.8 cc for 1SL, 2SL, 4SL, and 8SL, respectively). In conclusion, the influence of CT containing SL on ruminal methane emission was immediate and short-lived, and the effect appeared attributable to activity of methanogenic bacteria and possibly ciliate protozoa.

Puchala, R., G. Animut, A.K. Patra, G.D. Detweiler, J.E. Wells, V.H. Varel, T. Sahlu, A.L. Goetsch. 2012. Methane emissions by goats consuming Sericea lespedeza at different feeding frequencies. Animal Feed Science and Technology 175:76-84.

Kenyan Postcards

Egerton University participants in Dr. Zeng's cheese making workshop learn about product handling.

Construction on the new barn to house the imported dairy goats.

Dr. Kahi presents a seminar at Langston University.

Cheese making participants enjoy the fruits of their labor.

Imported males from South Africa unloaded at the new dairy goat facility at Egerton University.

Unloading a Toggenburg doeling at the Nairobi International Airport.

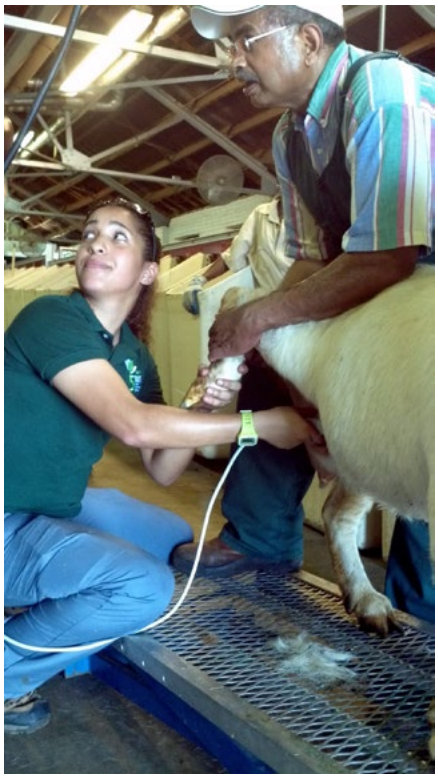
Group of Kenyan Dual-Purpose Goats at the Kenya Agricultural Research Institute in Naivasha.

UPRM Student Interns

UPRM students, Marie Negron, Eva Pacheco, and Alexandra Reyes (l to r) with Dr. Tilahun Sahlu.

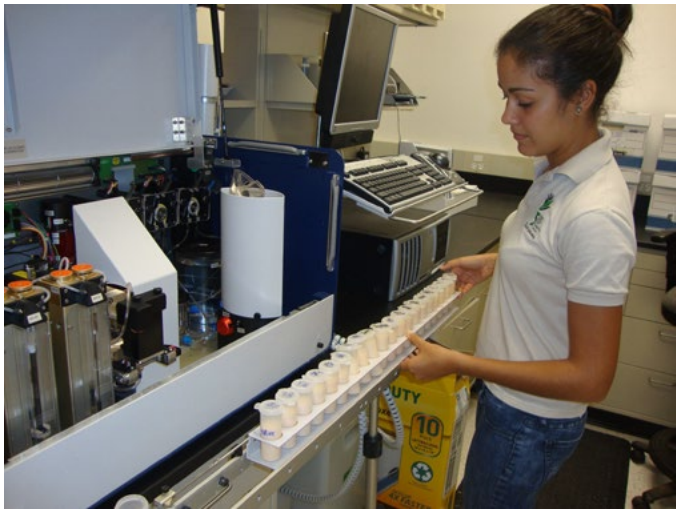
This past summer, the American Institute for Goat Research once again welcomed student interns from the University of Puerto Rico – Mayagüez (UPRM). Three interns, Marie Negron, Eva Pacheco, and Alexandra Reyes, spent six weeks at Langston University during the months of June and July. Their duties included working at the farm, receiving training in goat production from Institute scientists, and conducting research projects relating to mortality composting.

The majority of the interns' time was spent at the goat research farm learning production and management techniques. The interns had an opportunity to work with kids in aspects from hand feeding colostrum to weaning and adjusting kids to solid feed. They learned management techniques such as disbudding and castration via banding. The interns worked most with the Institute's dairy goat herd and learned how to do a dairy clip, tip horns, and trim hooves. The interns were also trained in the milking parlor on how to use the milking equipment as well as sanitation during milking to prevent udder infections. As an extension of working in the milking parlor, the interns also learned about the Dairy Herd Improvement program of Langston University and conducted milk analysis under the watchful eye of the DHI laboratory coordinator, Ms. Eva Vasquez.



Alexandra Reyes conducts pregnancy diagnosis using ultrasound; Dr. Lionel Dawson is assisting.

Herd health and reproduction were other areas of training. The interns took animal weights and body condition scores to assess animal productivity. As internal parasites are a problem world-wide, the interns were trained on the proper use of FAMACHA scoring system and deworming techniques and drugs available. Dr. Steve Hart trained the interns in strategic use of dewormers and management methods to cope with internal parasites. The interns also learned how to do packed cell volume and conduct fecal egg counts. Dr. Erick Loetz, Farm Manager, worked with the interns on reproductive issues. Dr. Lionel Dawson spoke to the interns on herd health, vaccination



Marie Negron analyzes goat milk samples in the LU DHI Lab.

procedures, and showed them how to ultrasound goats to ascertain pregnancy status. The interns also toured the College of Veterinary Medicine of Oklahoma State University and visited Reproductive Enterprises, Inc. of Stillwater, Oklahoma where they learned about semen collection and freezing and about embryo collection, freezing, and transfer. The interns tanned goat skins with Dr. Roger Merkel and learned about statistical analysis and interpretation with Dr. Terry Gipson.

Eva Pacheco checks the compost pile temperature using an infrared thermometer.

Each student conducted a short research trial dealing with mortality composting during her time at Langston University. Monitoring pile temperature is important in determining whether a mortality compost pile is working and to see if a sufficiently high temperature was reached to inactivate most pathogens, reducing the potential for presence of pathogens in the resulting compost. Compost pile temperatures can be measured using a long-stemmed compost thermometer. These can cost over $100 each, an expense that many small producers may be unwilling to incur. To ascertain if a compost pile is heating, a metal rod can be thrust into the pile's core, withdrawing it occasionally and grabbing the tip to see how hot it feels. However, the actual temperature cannot be determined with this method.

Two of the UPRM students conducted short research trials to gauge the accuracy of using infrared thermometers to measure the temperature of metal rods as a substitute for a long-stem thermometer. Ms. Marie Negron conducted a trial to determine the effect of ambient temperature and time before measuring surface temperature on infrared temperature measurement of reinforcing bar. She put pieces of rebar in an oven at varying temperatures and used an infrared thermometer to measure surface temperature at room temperature, in a cooler, and in a freezer. Her findings indicated that using rebar to measure oven temperature was not accurate and that air temperature and time both affected the recorded temperature. Ms. Eva Pacheco built butcher waste compost piles and compared pile temperature recorded by a thermometer with that recorded by using an infrared thermometer and long pieces of rebar thrust into the pile. She found the using an infrared thermometer to record temperature of rebar was acceptable, but not as accurate as the thermometer.

Small producers with few animals may not wish to build mortality compost piles to dispose of kid mortality. Ms. Alexandra Reyes compared composting kid mortality in a traditional compost pile with mortality composted in large trash bins. She recorded temperature of both traditional and trash bin composting using long-stem thermometers. She found that the traditional compost pile recorded higher pile temperatures than the trash barrel composting but, when piles were opened after 30 days, the kid mortality in the trash barrels had decomposed to a greater extent. These findings were very interesting and may lead to further research at the Institute.

Alexandra, Eva, and Marie enjoy their time in the kid barn.

Dr. Ramaswamy visits LU

In early August of this year, Dr. Sonny Ramaswamy, Director of the USDA's National Institute of Food and Agriculture (NIFA) visited Langston University. Dr. Ramaswamy was appointed to serve as Director of NIFA on May 7, 2012. As part of USDA's Research, Education, and Extension mission, he oversees NIFA awards funds for a wide range of extramural research, education, and extension projects that address the needs of farmers, ranchers, and agricultural producers. The objective of Dr. Ramaswamy's visit was to meet the Langston administration and researchers.

Prior to joining NIFA, Dr. Ramaswamy served as Dean of Oregon State University's College of Agricultural Sciences and director of the Oregon Agricultural Experiment Station. He provided overall leadership for the college's academic programs at the Corvallis campus and OSU programs at Eastern Oregon University in La Grande, for-credit extended education, informal education through the Agricultural Sciences and Natural Resources Extension Program, and research at OSU's main campus and 11 branch experiment stations throughout the state.

Previously, Dr. Ramaswamy was Associate Dean of the Purdue University College of Agriculture and directed the university's agricultural research programs from 2006 to 2009. Prior to joining the Purdue faculty, Dr. Ramaswamy was head of Kansas State University's Department of Entomology from 1997 to 2006, where he held the title of Distinguished Professor and was named the Presidential Outstanding Department Head in 2002. He also served on the faculty of Mississippi State University and as a research associate at Michigan State University. As an insect physiologist, he worked on the integrative reproductive biology of insects.

Dr. Ramaswamy has received research grants from many federal agencies, including USDA, National Science Foundation, National Institutes of Health, Environmental Protection Agency, and the United States Agency for International Development, as well as from state agencies, commodity groups, and industry. He has published nearly 150 journal articles, book chapters, and a book. He has received a number of awards and honors as a scientist and department head, including being named a Fellow of the American Association for the Advancement of Science; Fellow of the Entomological Society of America; and Distinguished Graduate Alumnus of Cook College, Rutgers University.

He received a Bachelor of Science in agriculture and a Master of Science in entomology from the University of Agricultural Sciences, Bangalore, India, and his doctorate in entomology from Rutgers University.

NIFA

The National Institute of Food and Agriculture (NIFA) is an agency within the U.S. Department of Agriculture (USDA), part of the executive branch of the Federal Government. Congress created NIFA through the Food, Conservation, and Energy Act of 2008. NIFA replaced the former Cooperative State Research, Education, and Extension Service (CSREES), which had been in existence since 1994. NIFA manages a broad portfolio with 12 National Emphasis Areas.

- Agricultural Systems
- Animals
- Biotechnology & Genomics
- Economics & Community Development
- Education
- Environment & Natural Resources
- Families, Youth & Communities
- Food, Nutrition & Health
- International
- Pest Management
- Plants
- Technology & Engineering

Noteworthy News

► In July, Drs. **Arthur Goetsch**, **Steve Hart**, **Ryszard Puchala**, **Yoko Tsukahara**, and **Zaisen Wang** attended the joint national meetings of the American Society of Animal Science and the American Dairy Science Association in Indianapolis, IN to make research presentations and attend scientific sessions.

► In July, Drs. **Terry Gipson**, **Arthur Goetsch**, and **Steve Zeng** traveled to Egerton University in Kenya to fulfill objectives of the India–Africa–US Trilateral Partnership for Food Security project, which is funded by the US Agency for International Development.

► In August, Dr. **Steve Zeng**, was once again invited to be a technical judge to the American Cheese Society (ACS) Cheese Championship in Madison, WI .

► In September, Dr. **Steve Zeng,** was an invited speaker to the National Goat Conference in Greensboro, NC. His topic was "Cheese sensory evaluation and tasting: hands-on demonstration."

► In September, Dr. **Steve Hart,** gave a presentation on internal parasite control at the National Goat Expo in Bloominton-Normal, IL.

► In October, Dr. **Terry Gipson,** conducted an artificial insemination workshop at Kansas State University in Manhattan, KS.

► In August, Dr. **Arthur Goetsch** traveled to Ethiopia to fulfill objectives of the USDA Foreign Agriculture Service - Scientific Cooperation Research Program project entitled "Handbook for Livestock Research on Smallholder Farms in Developing Countries."

► In September, Dr. **Arthur Goetsch** traveled to China to fulfill objectives of the USDA FAS - SCRP project.

►In September, Dr. **Steve Hart** provided goats for the State Fair of Oklahoma Birthing Center and for the Tulsa State Fair for their respective Birthing Centers and was Superintendent of the State Fair of Oklahoma Open Boer Goat Show sanctioned by ABGA.

► In October, Mr. **Kesete Tesfai** traveled to Bunda College of Agriculture in Malawi to fulfill objectives of the India–Africa–US Trilateral Partnership for Food Security project, which is funded by the US Agency for International Development.

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