AMERICAN INSTITUTE FOR GOAT RESEARCH
LANGSTON UNIVERSITY
E (Kika) de la Garza

Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Fall 2014*

From the Director's Desk

This fall has been a time of visitors for us. We normally have some visitors to campus but this fall has been especially busy with visitors. I would like to introduce you to some of our visitors.

In July, we were pleased to receive Dr. **Alexander Kahi** and Mr. **Wilson Karimi**. This was the second visit to our campus for Dr. **Kahi** and Mr. **Karimi**. Dr. **Kahi** is the Dean of the Faculty of Agriculture at Egerton University in Kenya and Mr. **Karimi** is a staff member in the same faculty. Both are actively involved in our India–Africa–US Trilateral Partnership for Food Security project, which is funded by the US Agency for International Development. Our trilateral partnership involves Langston University, Egerton University and Lilongwe University of Agriculture and Natural Resources in Malawi. In addition to discussing partnership issues, Dr. **Kahi** and Mr. **Karimi** visited the Noble County Fair. Last year, they visited the Payne County Fair. We enjoyed their visit and it provided us an opportunity to return the hospitality they have shown us on our visits to Kenya.

Not exactly visitors but we welcomed Mses. **Sophia Liu** and **Lily Zheng** and Messrs. **Jackie Song** and **Kevin Wang** to the Langston University campus. Mses. **Liu** and **Zheng** and Messrs. **Song** and **Wang** are exchange students from China and will be studying animal science at Langston University for one year. Earlier this summer, Drs. **Kent Smith, Jr.** (President of Langston University), **Clyde Montgomery** (Vice-President for Academic Affairs), **Marvin Burns** (Dean of the School of Agriculture and Applied Sciences), and **Steve Zeng** (Chair of the Department of Agriculture and Natural Resources) traveled to China to recruit exchange students. I am happy to say that they recruited these four very excellent students. Our hope is that this exchange program will flourish and grow.

About the same time as our exchange students arrived on campus, so did Drs. **Bridgit Muasa** and **Chrilukovian Wasike** from Kenya. Drs. **Muasa** and **Wasike** are USDA Borlaug Fellows and will be with us for a 12-week training session. Dr. **Muasa** is a veterinarian at the Central Veterinary Laboratories, Department of Veterinary Services in Nairobi, Kenya and Dr. **Wasike** is Chair of the Department of Animal Science in the School of Agriculture and Food Security at Maseno University in Maseno, Kenya. Dr. **Muasa** is training with Dr. **Erick Loetz** and is learning about assisted reproductive technologies in goats. Dr. **Chrilukovian Wasike** is training with Dr. **Terry Gipson** and is learning about the genomics of residual feed intake in dairy goats. Upon their return to Kenya, we hope that Drs. **Muasa** and **Wasike** will be able to apply their newly-learned skills to promote advances in livestock

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production. In the next newsletter, we will have a more detailed description of their training and experiences.

Our most recent visitors were Ms. **Susan Waage** and Mr. **Jonathan Hamrell** of the USDA Foreign Agricultural Service. Ms. **Waage** and Mr. **Hamrell** are the USDA administrators for our India–Africa–US Trilateral Partnership for Food Security project. They visited Langston University to discuss project details and to see our research capabilities. I have worked closely with Ms. **Waage** and Mr. **Hamrell** over the past two years of the project and as the project draws to a close, I will miss interacting with them.

In addition to the visitors, we have been busy with research projects, which are our lifeblood. I am very happy to announce that we have been awarded three new research projects. All three are supported by the USDA Capacity Building Grants program.

The first is entitled "Sustainable Control of Greenhouse Gas Emission by Ruminant Livestock" and Dr. **Arthur Goetsch** will be the principal investigator. Ruminant livestock account for 15 to 33% of world methane production, which contributes 20% of the irradiative force of greenhouse gases causing climate change and global warming. Hence, the long-term goal is to develop practical and sustainable means of minimizing methane emission by ruminant livestock. Previous research with goats at Langston University has shown considerable promise in decreasing ruminal methane emission by feeding the leguminous forage lespedeza and its condensed tannins.

The second is entitled " Comparison of Biological Control of Red Cedar with Goats to Conventional Methods of Control" and Dr. **Steve Hart** will be the principal investigator. Redcedar destroys biodiversity and creates an extreme fire hazard. Conventional methods of control of redcedar are often expensive and have various undesired consequences such as killing desired species, potential for pollution, and fire hazards for burning. Further experimentation needs to be done with goats to better understand why goats consume redcedar more readily in some areas than others and during the winter only in some areas and year-round in other areas.

The third is entitled "Enhancing Health and Productivity of Dairy Goats Using Smart Technology" and Dr. **Terry Gipson** will be the principal investigator. Many farmers would like to adopt smart technology to become better managers of their animals. The overall goal is to ameliorate the wellbeing and productivity of dairy goats via redesigned and improved smart rumen boluses that will monitor both body temperature and rumination time. Langston University and SmartStock, a technology company, will partner to accomplish project objectives.

As we progress our ongoing and on these upcoming research projects, I will keep you informed.

Research Spotlight

Mortality Compost Temperature Monitoring.

Two mortality compost piles were constructed using a mixture of goat mortality and butcher waste with ground hay as the carbon source to compare core temperature recorded by long-stemmed thermometers (LST) vs. an infra-red thermometer (IR) to read temperature of a reinforcing bar (RB) thrust into the pile. One LST was inserted into the core of each pile along with a 3-foot length of ⅜-inch-thick RB so that tips of both the RB and LST were in close proximity. For 30 days following pile construction, LST temperature was recorded daily between 1500 and 1600 hour. Each RB was then withdrawn from the pile and the tip's temperature determined using an IR. Date and treatment (T = LST and RB) ×date showed differences, whereas treatment was not significant (136 and 130°F for LST and RB, respectively). Date was used as a covariate because temperature in working mortality compost piles will spike soon after pile formation and slowly decline. As an example, LST recorded a temperature of 148°F on day 3 of data collection but only 123°F on day 30. The treatment×date test recorded a slope estimate (decrease) of -0.58 degree/day for LST and -0.03 degree/day for RB. These results suggest that RB can be used to monitor mortality compost pile temperature but is not accurate enough to model the normal decline in temperature over time. Temperature of RB may have differed from LST due to location on reinsertion into the pile (cooler or hotter spot than LST tip) and alignment of IR on RB to record accurate RB temperature and not temperature of surrounding material. Using an IR with RB may be an acceptable method for monitoring mortality compost pile temperature and would be a cheaper alternative for producers composting multiple mortalities than to purchase LST for each pile. However, RB is not appropriate for use when precise temperature measurement is needed.

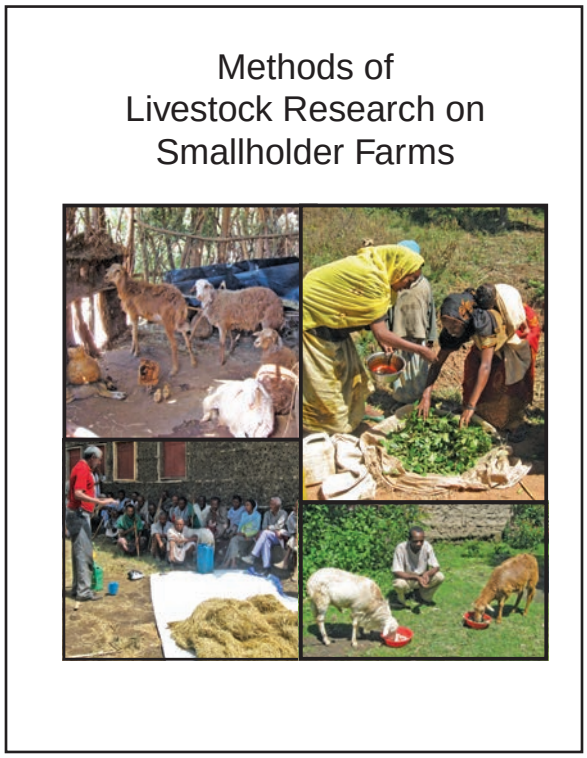
Pacheco, E., A. Reyes, M. Negron, T. A. Gipson, and R. Merkel. 2014. Evaluating the accuracy of using reinforcing bar and an infrared thermometer versus long-stemmed thermometers in monitoring mortality compost pile temperature. J. Anim. Sci Vol. 92, E-Suppl. 2:729.

Breeding for Parasite Resistance.

Twelve Dorper (D; 4.5 ± 0.44 months of age, 70 ± 3.8 lbs), 18 Katahdin (K; 3.8 months of age, 54 ± 1.7 lbs), and 12 St. Croix (C; 4.5 ± 0.17 months of age, 43 ± 2.2 kg) ram lambs were used to investigate among and within breed differences in the first year of a centralized test for growth performance and response to artificial infection with *Haemonchus contortus*. Rams were randomly selected from 3 commercial farms in Missouri and Oklahoma. The test at Langston University entailed an adjustment period of 2 weeks followed by 8 week of data collection. Breeds were housed separately in adjacent pens with automated feeders allowing free-choice access to a 15% CP (DM) and 50% concentrate pelletized diet. During adaptation, anthelmintic treatment resulted in low fecal egg count (FEC; < 550/g), after which 10,000 infective larvae were administrated orally. Packed cell volume (PCV) was measured weekly and FEC was determined 4 times in weeks 6–8. Production traits recorded were residual feed intake (RFI), ADG, and ADG:DMI. Rams were categorized into 3 groups within breeds based primarily on mean FEC and mean PCV (High, Medium, and Low resistance) using the cubic clustering criterion, which resulted in unbalanced numbers in the groups (5, 5, and 2 for D, 12, 5, and 1 for K, and 8, 1, and 3 for C, respectively). Group means were similar in ADG, DMI, and RFI but varied in mean FEC (627, 2137, and 3302 egg/g) and mean PCV (32.3, 30.2, and 29.2% for High, Medium, and Low, respectively). In conclusion, D appeared less resistant than C or K based on mean FEC after an artificial challenge with *H. contortus* larvae in a standardized environment. However, variability in mean FEC and mean PCV within breed was sufficient to allow assignment to different classes for use in a breeding program to enhance flock resistance.

Tsukahara, Y., T. A. Gipson, S. P. Hart, L. J. Dawson, Z. Wang, R. Puchala, T. Sahlu and A. L. Goetsch. 2014. Effects of hair sheep breed on performance response of ram lambs to artificial infection with Haemonchus contortus. J. Anim. Sci Vol. 92, E-Suppl. 2:934.

Methods of Livestock Research on Smallholder Farms



At many institutions around the world, resources available for livestock research are limited. Also, it is common for researchers to have little direct interaction with smallholder livestock producers and their problems. This is despite considerable attributes offered by on-farm research, which include attention to most significant production constraints, opportunities for researchers to conduct meaningful studies, and greater adoption by smallholders of advantageous technologies. However, few researchers, with emphasis on ones at junior and mid-level stages, perform on-farm livestock research, at least partially because of lack of training and knowledge in the design and conduct on-farm experiments, statistical analysis and interpretation of resultant data, and preparation of reports suitable for publication in peer-reviewed scientific journals.

To address issues noted above, recently the Institute placed a publication entitled "Methods of Livestock Research on Smallholder Farms" on its website. This is a product of a project supported by the USDA Foreign Agriculture Service Scientific Cooperation Research Program (i.e., USDA/FAS/SCRP; grant/agreement number: 58-3148-2-175), which was entitled "Handbook for Livestock Research on Smallholder Farms in Developing Countries." The project was slightly more than 2 years in length, beginning in the fall of 2012. The publication provides practical information considered important to conduct on-farm livestock research. However, a significant portion also is pertinent to livestock research regardless of where conducted. It does not cover any specific topics in great detail, but rather is meant to serve as a 'bridge' connecting different areas for the concerted effort required in effective livestock research. Major sections of the publication include: introduction; on-station vs. on-farm research; topic identification; protocols; experimental design; treatment considerations; experiment implementation; statistical analyses; dissemination with an emphasis on preparation, review, and revision of scientific manuscripts; and literature cited. Furthermore, a key component is the design and analysis of numerous example study scenarios, such as: farmer research groups – missing data, nature of the data; individual smallholder households – household animals on one treatment, household animals on each treatment, missing data and household animals on one vs. each treatment, households with subplots; group or village as fixed vs. random; studies in different seasons or years; year-round performance monitoring – continuous and categorical variables; and crossovers, switchbacks, and Latin squares. There are also comparisons of P values from different analyses (e.g., SAS® GLM and MIXED and GenStat®). Appendices contain the relevant statistical analysis statements and inputs, results, and simulated data sets.

Throughout the publication, activities of a recent project in Ethiopia in which Langston University participated are addressed. That project, "Ethiopia Sheep and Goat Productivity Improvement Program," was supported by the USAID Mission in Ethiopia. Though developing countries are all different, these references to conditions in Ethiopia will generally be applicable to many other areas of the world. At least a Bachelor of Science degree may be necessary to derive maximal benefit from this publication. In accordance, the target audience is junior- to mid-level researchers and extension personnel, but hopefully it

can be of value in training graduate students as well. The publication and its parts may be reproduced with proper acknowledgement and citation. Moreover, a limited number of hardcopies will be available soon.

Appreciation is expressed to the many individuals and institutions that participated to the project. Co-investigators on the project from the Institute were Drs. Terry Gipson and Roger Merkel. Collaborators were Dr. Girma Abebe (formerly Hawassa University, Hawassa, Ethiopia, and USAID Ethiopia Sheep and Goat Productivity Improvement Program; currently USAID Livestock Market Development Project, Addis Ababa, Ethiopia), Dr. Amlan Patra (West Bengal University of Animal and Fishery Sciences, Kolkata, India), Prof. Daowei Zhou (Northeast Institute of Geography and Agroecology, Changchun, Jilin, China), Dr. Khaled Al-Qudah (Jordan University of Science and Technology, Irbid, Jordan), and Dr. Maximino Huerta Bravo (Universidad Autónoma Chapingo, Texcoco, Mexico). Members of a project evaluation team were Dr. Tilahun Sahlu of the Institute, Dr. Allan Degen (Ben-Gurion University of the Negev, Beer Sheva, Israel), Dr. Will Getz (Fort Valley State University, Fort Valley, Georgia), Dr. Yoko Tsukahara of the Institute (formerly Kyoto University, Kyoto, Japan).

Important contributions to the project and publication arose from workshops that were held from July, 2013 to May, 2014 at institutions of the collaborators as well as some other locations. The workshops occurred at the following institutions, with coordinators listed in parentheses: Egerton University, Nakuru, Kenya (Prof. Alexander Kahi); Southern Agricultural Research Institute, Hawassa, Ethiopia (Mr. Asrat Tera Dolebo); Northeast Institute of Geography and Agroecology, Changchun, Jilin, China (Prof. Daowei Zhou); Northwest University of Agriculture and Forestry, Yangling, Shaanxi, China (Dr. Jun Luo); Jordan University of Science and Technology, Irbid, Jordan (Dr. Laith Rousan); Bunda College of Agriculture, Lilongwe University of Agriculture and Natural Resources, Lilongwe, Malawi (Dr. Fanny Chigwa); Universidad Autónoma Chapingo, Texcoco, Mexico (Dr. Maximino Huerta Bravo); West Bengal University of Animal and Fishery Sciences, Kolkata, India (Dr. Amlan Patra); and Tamil Nadu University of Veterinary and Animal Sciences, Chennai, India (Prof. A. K. Thiruvenkadan).

Finally, there is acknowledgement of the considerable time and effort spent by internal reviewers of the Institute (Drs. Steve Hart, Roger Merkel, and Terry Gipson) as well as external reviewers of Dr. Richard E. Estell (USDA Agricultural Research Service, Jornada Experimental Range, Las Cruces, New Mexico), Dr. Anastasio Argüello (Las Palmas de Gran Canaria University, Arucas, Spain), and Dr. Bruce A. McGregor (Institute for Frontier Materials, Deakin University, Geelong, Victoria, Australia).

Goats that Tweet

Earlier this summer, Langston University and the city of Oklahoma City entered into a partnership in order to clear unwanted vegetation along the Hefner Canal, which connects Lake Overholser to Lake Hefner. The canal had become overgrown with vegetation and the city was concerned about the safety of city employees in the clearing of the canal banks. So the city approached Langston University in the hopes that goats could be employed for the vegetation clearing task. Langston University was pleased to partner with the city and deployed goats for the task.

The goats have become instant celebrities and have become the subject of numerous television and newspaper articles. One such newspaper article can be found at *http://newsok.com/we-got-the-bleat-okc-goats-become-social-media-celebs/article/5338899*. In addition, you can follow the goats at @hefner_goats on Twitter.

Training Extension Personnel in the Philippines

In September, Dr. Roger Merkel traveled to the Philippines to be a Resource Person and lecturer for the training entitled "International Training of Trainers on Meat and Dairy Goat Production Technologies and Infrastructure for Smallhold Farms." This training was conducted by the International Training Center on Pig Husbandry, Agricultural Training Institute, Department of Agriculture, Republic of the Philippines as part of the agreement regarding the Association of Southeast Asian Nations (ASEAN) Working Group on Agriculture and Training Extension. This training on goat production was attended by 20 participants representing the countries of Indonesia, Viet Nam, Laos, and the Philippines. Participants included extension personnel, university lecturers, goat farmers, and the Deputy Director of Livestock Management Division, Department of Agriculture and Fisheries, Laos.

Dr. Merkel gave lectures on female and male reproductive anatomy as well as breeding schemes, artificial insemination, and estrus synchronization. Dr. Merkel also presented on farm business planning and farm records and on organic goat production, comparing organic regulations from the U.S. with those from the Philippines and Thailand. During his trip, Dr. Merkel visited several goat dairies

Salt licks made of a plastic soda bottle (left) and bamboo (right).

Comparison of traditional slatted wooden floor with plastic flooring that is easier to keep clean.

ranging from commercial operations to smallholder village units. One of the commercial dairies, JSJ Goat Farm, has a website you can visit to see their animals, buildings, and products, *http://jsjgoatfarm.com*/. Another dairy was vermicomposting its animal manure and feed waste and selling the resulting vermicompost to create an additional income stream. Two interesting things seen on the farm tours were the use of plastic flooring in elevated barns for sanitation and using old plastic soda bottles as mineral feeders. Rock salt is mixed with a little molasses and put into a plastic bottle in which holes are poked near the bottom. Other producers use sections of bamboo in a similar manner. The goats lick the bottles or bamboo to consume the salt.

Two days of the training were spent at Central Luzon State University (CLSU) doing practical sessions on forages, dairy goats, artificial insemination, castration, disbudding, silage making, and internal parasite detection. The Small Ruminant Center of CLSU has upgraded native goats with dairy breeds and Boer goats to enhance milk and meat production. In addition to artificial insemination, the center has also conducted embryo transfer in goats.

Dr. Merkel thanks Dr. Ruth Miclat-Sonaco of the International Training Center on Pig Husbandry of the Agricultural Training Institute for the invitation to attend the training and Dr. Asterio Saliot, Director of the Agricultural Training Institute, and Mr. Manuel Jarmin, Executive Director of the Philippine Livestock Development Council for their support of the invitation.

The group of trainees along with some of the staff of the Small Ruminant Center at Central Luzon State University.

Noteworthy News

►In July, Drs. **Arthur Goetsch**, **Steve Hart**, **Roger Merkel**, **Ryszard Puchala**, **Yoko Tsukahara**, **Yong-qing Guo**, and Ms. **Nhayandra Silva** attended the joint national meetings of the American Society of Animal Science and the American Dairy Science Association in Kansas City, MO to make research presentations and attend scientific sessions.

►In July, Dr. **Terry Gipson** traveled to Lilongwe University of Agriculture and Natural Resources in Malawi to conduct a training course in artificial insemination using fresh semen in order 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 September, Dr. **Roger Merkel** traveled to the Philippines to conduct a training for the Association of Southeast Asian Nations (ASEAN) Working Group on Agriculture and Training Extension.

►In September, Drs. **Terry Gipson** and **Tilahun Sahlu** traveled to Lilongwe University of Agriculture and Natural Resources in Malawi to assist in the reception of frozen semen imported 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 September, Dr. **Steve Hart** provided goats for the State Fair of Oklahoma 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 September, Dr. **Steve Hart,** gave a presentation at the Browsing Academy in Neosho, MO; hosted by Lincoln University of Jefferson City.

► In October, Dr. **Steve Hart,** gave presentations on internal parasite control and on minerals for goats at the Great Goat Gathering in Choteau, MT.

►In October, Drs. **Terry Gipson**, **Erick Loetz**, **Bridgit Muasa**, and **Chrilukovian Wasike** traveled to Des Moines, IA to participate in the World Food Prize Symposium.

► In October, Dr. **Steve Hart,** gave a presentation on internal parasite control at the Goat Boot Camp in Ada, OK.

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