Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Summer 2016*

From the Director's Desk

Summer is always a busy time for us and it is an important time for us to share research findings from several of our ongoing projects. The main venue for sharing is the annual, national meetings of the American Society of Animal Science and the American Dairy Science Association, which were held in Salt Lake City, UT in July. Due to administrative conflicts, this is one of the few meetings that I was not able to attend. So I conducted an informal survey and asked several of our scientists, who did attend the meetings, which session was the most enjoyable, the most memorable for them and I would like to share their choices with you.

One memorable session was entitled "Impacts of Livestock Production on Environmental Reactive Nitrogen." This session highlighted the fact that nitrogen emissions, especially from concentrated animal feeding operations, can impact the environment of the surrounding area. Nitrogen compounds from these operations, such as ammonia, can impact soil and plant biomes. Much attention has been paid to carbon dioxide and methane but little to nitrogen. A second memorable session was entitled "Resilience to livestock to Changing Environments." This session highlighted heat stress and its negative impact on livestock production and methods to mitigate heat stress; some managerial and others genetic/genomics. I was not surprised that this session would be of interest to our scientists because in Research Spotlight on page 3, you can read about research that we are conducting on heat stress and using genetics/genomics to select for individuals who will be better adapted to withstand heat stress. I will also touch upon this topic latter in this missive. A third memorable session was entitled "Enhancing Small Ruminant Profitability." This session highlighted several factors impacting the small ruminant industry in the United States. Again, I am not surprised by the selection of this session because it is central to our mission here at Langston University. Our mission is to develop and transfer enhanced goat production system technologies through excellence in a results-driven, highly productive research program and lately we have included hair sheep in some of our research. An additional draw for this session is the fact that our own Dr. **Steve Hart** was the organizer and chair of this session. Lastly, a session entitled "The Future of Pastoral Production Systems" was cited as memorable. This session highlighted the plight of pastoralists around the world. As you know, the majority of the world's sheep and goats are found outside of the United States in grazing/grassland environments. Increased population pressure is changing the way of life for millions of people.

I always encourage In-

Goat Newsletter is published quarterly by the Cooperative Extension Service of the E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, Oklahoma.

Dr. Marvin Burns,
Dean,
School of Agriculture and Applied Sciences

Dr. Vernon Jones,
Associate Dean,
School of Agriculture and Applied Sciences

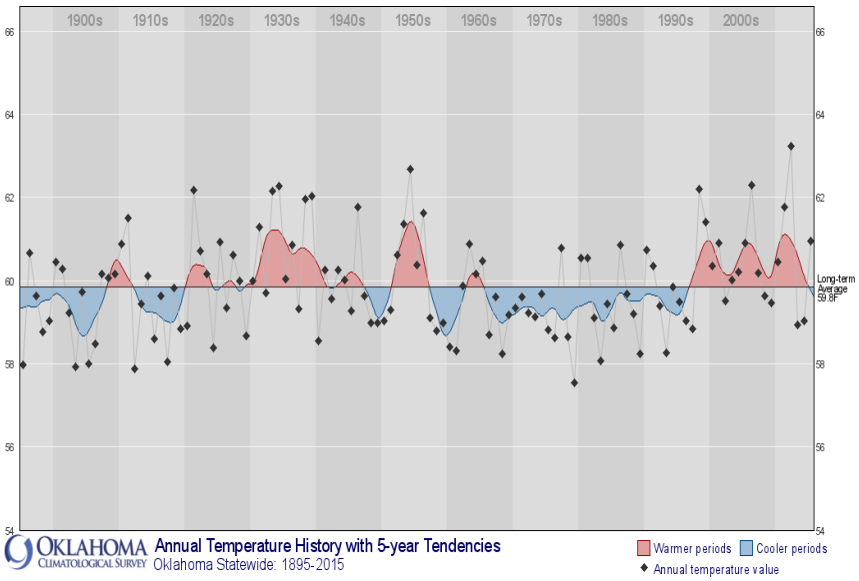
Dr. Tilahun Sahlu,
Director,
E (Kika) de la Garza American Institute for Goat Research

E (Kika) de la Garza American Institute for Goat Research
Langston University
P.O. Box 730
Langston, OK 73050
Phone: (405) 466-3836
FAX: (405) 466-3138
http://www.luresext.edu
Newsletter Editor
Dr. Terry A. Gipson

stitute scientists to attend the annual national meetings. It is important for us to disseminate our research findings amongst our peers but it is also important for our scientist to learn from their peers and to return to the Institute invigorated for new research endeavours.

I often semi-complain about the summers in Oklahoma. Traditionally, our summers are hot and dry. In last summer's newsletter, I reported to you that May 2015 was the wettest month on record. However, June 2016 was the 48th driest month on record according to the Oklahoma Mesonet with a statewide average of 3.3 inches, 1.3 inches below normal. Climate scientists have predicted that normal rainfall patterns will be disrupted, not that the climate will become drier as some people believe. The one thing that climate scientists agree upon is that temperatures will rise worldwide. I have included a graph from the Oklahoma Climatological Survey showing average annual temperature in our state. As you can see, there are up-and-down trends. My concern is for the future. If the skeptics are correct then we should expect a cooler than normal period fairly soon. If the climate scientists are correct then we will see the red area on the graph fluctuate but stay red. Even a small change in ambient temperature can have a major impact. To summarize one of the presentations at the recent national ASAS/ADSA meeting, homeotherms (warm-blooded animals) live a precarious existence. We (humans included) live in the upper levels of a safe body temperature zone. Above a certain temperature, proteins begin to denature, that is, degrade. We bump up against this danger zone all the time. Every parent knows how imperative it is to quickly bring down a high fever in a small child. Every construction worker knows to avoid heat stroke in the summer. Sheep and goats are no different and I hope that our research on this subject will have a positive, lasting effect.

Stay cool, you and your goats.



Research Spotlight

Resilience to Heat Stress in Hair Sheep.

Fourteen mature Dorper (D), 13 Katahdin (K), and 8 St. Croix (SC) female sheep were used to evaluate responses to high heat load index (HLI) conditions. After 4 week of thermoneutral conditions (70 HLI), in 3 sequential 2-week periods daytime HLI was regulated near 85, 90, and 95 and that at night was 70, 77, and 81, respectively. Rectal temperature (TEMP) at 0700 (7:00a), 1300 (1:00p) and 1700 (5:00p) h was lowest for SC (101.0, 101.1, and 102.1 for D, 100.9, 101.9, and 102.0 for K, and 100.9, 101.6, and 101.6 ºF for SC at 0700, 1300, and 1700 h, respectively). A similar interaction occurred in panting score (PANT), which is measured on a scale of 0 to 4.5. A PANT of 0 indicates normal breathing with no panting and a PANT of 4.5 indicates head down, open mouth breathing with tongue fully extended. PANT were 0.10, 0.64, and 0.54 for D, 0.09, 0.70, and 0.58 for K, 0.02, 0.42, and 0.40 for SC at 0700, 1300, and 1700 h). Breed differences in PANT resulted from highest HLI in period 3 (0.07, 0.17, and 1.03 for D, 0.08, 0.15, and 1.14 for K, 0.04, 0.06, and 0.73 for SC in period 1, 2, and 3). Period, week, and time interacted in respiration rate (RESP) (period 1: 41, 102, and 97 in week 1, 50, 124, and 115 in week 2; period 2: 56, 158, and 124 in week 1, 65, 160, and 134 in week 2; period 3: 76, 219, and 161 in week 1, 130, 164, and 148 in week 2 at 0700, 1300, and 1700 h). There was a corresponding interaction in RESP:TEMP as an index of energy expended to minimize TEMP (period 1: 0.40, 1.00, and 0.96 in week 1, 0.05, 1.22, and 1.14 in week 2; period 2: 0.57, 1.55, and 1.22 in week 1, 0.66, 1.58, and 1.31 in week 2; period 3: 0.75, 2.14, and 1.58 in week 1, 1.28, 1.61, and 1.44 in week 2 at 0700, 1300, and 1700 h). In conclusion, some measures suggest greater tolerance of high HLI by SC than D or K. There appeared considerable adaptation in RESP from week 1 to 2 of period 3 to minimize TEMP in the early afternoon, which was at least partially facilitated by higher RESP in the early morning before HLI increased.

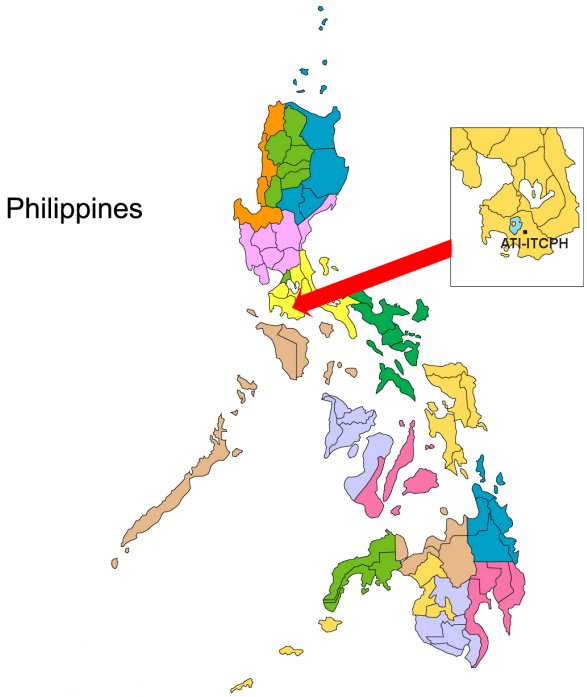
Tadesse, D., R. Puchala, T. A. Gipson, Y. Tsukahara, and A. L. Goetsch. 2016. Responses of hair sheep breeds to high heat load index conditions. Journal of Animal Science 94(E-Suppl. 5):823.

Factors Affecting Rumination Time in Goats.

Rumination time is one of the many key factors in determining animal wellbeing; however, rumination time may depend upon many factors. The objective of this experiment was to investigate the effects of forage quality and breed on rumination time in goats. The experimental arrangement consisted of 2 breeds (Alpine and Spanish) and 4 treatments [24-hour fasting (FAST), low-quality hay (LOW; mixed grass), LOW plus concentrate [CONC; 80% corn and 20% soybean meal at 1% bodyweight on a dry matter basis], and high-quality hay (HIGH; alfalfa)]. Twelve mature does of each breed were placed in individual metabolic crates and given free access to hay unless fasting. There were 4 periods of 72 h with 3 rotations of 8 does/day (24 hours x 3 days). Does were digitally recorded for 24 hours, then observations were encoded for ruminating bouts and bout duration. Feed intake relative to metabolic bodyweight ($BW^{0.75}$) was 0, 17, 28, and 21 g/kg $BW^{0.75}$ for FAST, LOW, CONC, and HIGH, respectively and 17 and 16 g/kg $BW^{0.75}$ for Alpine and Spanish, respectively. Total rumination duration was affected by breed and treatment. Alpine goats ruminated longer than Spanish (310 vs. 249 minutes/day, respectively and rumination duration while fasting was lower than for other treatments (229, 313, 282, and 295 minutes/day for FAST, LOW, CONC, and HIGH, respectively). Forage treatment did not affect the number of rumination bouts; however, Alpines had a greater number of bouts than Spanish (29 vs. 20 bouts, respectively). Average bout duration was affected by both treatment and breed. Average bout while fasting was shorter than for other treatments (10, 13, 13, and 15 minutes/bout for FAST, LOW, CONC, and HIGH, respectively). Spanish had longer rumination bouts than Alpine (14 vs. 11 minutes/bout, respectively). In conclusion, similar dry matter intake among non-fasting treatments may have prevented effects on rumination, although greater differences between breeds and fasting state had marked influences.

LeShure, S., T. A. Gipson, R. Puchala, A. L. Goetsch, and T. Sahlu. 2016. Effects of forage quality and breed on rumination time in goats. Journal of Animal Science. 94(E-Suppl. 5):806.

Philippine Visitors



The American Institute for Goat Research continues to nurture international relationships. This past April, Dyesebel D. Andaya, DVM, Sammy L Calonzo, Engr. Joey A Belarmino, and Gerry R. Pagarigan, DVM from the Agricultural Training Institute, International Training Center on Pig Husbandry (ATI-ITCPH), Department of Agriculture of the Philippines, came to Langston University to receive training on goat management and production. Their visit was arranged by Dr. Roger Merkel of the Institute and Dr. Ruth Miclat-Sonaco, ATI-ITCPH Center Director, as part of a Philippine program sending agricultural extension trainers to other countries for training and to observe livestock management techniques and production. The one-week training program focused on farm management, herd health, and reproduction. Participants also had the opportunity to observe extension services and how the Institute disseminates research and technology to farmers and our local community.

During their time at the Institute the visitors interacted with and received training from Institute scientists and the research farm staff. They learned about nutrition, internal parasitism and resistance from Dr. Steve Hart; artificial insemination, animal management, farm operations, milking operations and mastitis detection from Dr. Erick Loetz, Mr. Jerry Hayes, Ms. Amanda Manley, Mr.

Mr. Joey A Belarmino, Dr. Gerry Pagarigan, Dr. Tilahun Sahlu, Dr. Roger Merkel, Dr. Dyesebel Andaya, Mr. Sammy Calonzo (l to r) during a certificate ceremony.

Inspecting young bucks.

Italo Portugal, and Ms. Angelica Corpeno; genetic improvement strategies and fresh semen collection and its use from Dr. Terry Gipson; herd health from Dr. Lionel Dawson; and mortality composting from Dr. Roger Merkel. The participants were especially thankful to Dr. Erick Loetz for sharing information on what it takes to run a large-scale farm operation. Overall, they were very impressed with the amount of technology used at the institute's facilities. The participants also visited goat farms and spoke with producers.

Anytime is a good time for a selfie.

When describing the AIGR staff the visitors felt the team was incredibly organized, knowledgeable and approachable. They expressed how they appreciated the teamwork and level of accommodation the AIGR staff shared with them. They felt more than confident to share what they learned during their stay because of the assurance of successful practices used at the AIGR. They were so pleased with their experience and they would encourage, without hesitation, producers, lawmakers, and policy makers in the Philippines to come to Langston University and participate in this program. They all felt very fortunate to have had the opportunity to come to the Institute and expressed how their time here exceeded their expectations.

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Langston University Hosts University of Puerto Rico at Mayagüez Summer Interns

Three students from the University of Puerto Rico, Mayagüez Campus came to the American Institute for Goat Research for a six-week summer internship to gain knowledge and experience on goat production and management. The three students were Ms. Yahaira Torres Burgos, Ms. Cristina Coriano Pérez, and Ms. Carla Linera Ramírez, all majoring in Animal Science. They were excited to spend time at the Institute and its research farm. They knew they would be given a multitude of opportunities to learn and sharpen their skills but had no idea they would build lifelong memories along the way.

The interns were very busy during their time at the Institute with daily farm duties allowing them to gain hands-on experience at our Main and South Farms with Mr. Jerry Hayes and Dr. Erick Loetz. They helped prepare goats for surgery, hoof trimming, performed a necropsy, learned about the propagation of plants, tanning a goatskin with Dr. Roger Merkel and performed artificial insemination with Dr. Lionel Dawson of Oklahoma State University. The artificial insemination process was very exciting for them, Ms. Ramirez stated, "Actually being able to inseminate the goat was a great experience and gave us the opportunity to perform some of the duties that veterinarians do in their everyday jobs." The interns also worked with Dr. Terry Gipson to learn more about GPS technology and its applications to goat research. Ms. Ramirez stated, "During our internship we had access to more technology on the farm, which was a great learning experience." The three young women also visited Oklahoma State University to view the veterinary and farm facilities

Emotions ran high as the interns reflected on their experience at the Institute and said they would miss everyone who made their time here very special. When describing the staff here Ms. Ramirez shared, "They are all amazing and work didn't feel like work with them." Ms. Burgos anticipates that the knowledge she gained on the basics of farm operations will help her to one day open her own farm. During their time at Langston University, they gained valuable work responsibility, professional maturity, and returned home more prepared to work on research in the future. They all agreed that you can learn anywhere but when you have an amazing crew like the one here at the Institute, learning becomes so much easier.

The Institute wishes to thank all of the scientists and farm crew who helped train and make the stay of Yahaira, Cristina, and Carla special.

2016 UPRM summer interns, Cristina Pérez, Yahaira Burgos, and Carla Ramírez (l to r).

Italianate Landscape

by T. Gipson

The Getty: Open Content

While museum going, I always look for Italianate landscape paintings, which are my favorites. On a recent trip to southern California, I had the opportunity to visit the Getty Museum and spied Jan Both's "Italianate landscape with travellers on a path" and I would like to share it with you. Jan Both was born in the early 17th century in Utrecht, Holland. As a young artist, he spent several years in Rome and painted landscape scenes from the surrounding countryside. In "Italianate landscape with travellers on a path", we can see several themes characteristic of a Jan Both painting; the golden glow of a setting sun as evident in the long shadows cast by people, animals, and trees alike, country folk on their way home after a long day of toil or long travel, and domestic animals of which the goat makes an oft-occuring appearance. In this specific painting, Both's setting is a mountain road with a fast-flowing, babbling brook. The dirt path winds around the brook and one can see a group on horseback or afoot. One can imagine that they are hurrying home to the safety and comfort of their homes. In the other direction, a lone man with two laden horses prepares for a journey to a distant city or perhaps a distant land. In sharp contrast to all this movement, two men and a women take time to rest by the path. They seem to be in no hurry. Are they the shepherds and goatherds for the sheep and goats that one can see directly behind them or have they simply picked this spot to rest on their weary journey? The travellers appear to be examining some object instead of engaged in deep conversation or light banter. As for the goats, one almost could overlook them if it were not for their central location in the painting. The two goats are placed in the only true advantage point at this curve in the path. They are able to assess danger coming from either direction. In addition, the small patch of grass upon which the goats lay or stand is bathed in the last rays of the setting sun; welcome warmth indeed in the chilly mountains. The goats look content, as they rightly should.

Noteworthy News

►In May, Dr. **Arthur Goetsch**, gave an invited presentation entitled "Regulation of the Nutrition and Feeding of Dairy Goats" at the 3rd Asian-Australasian Dairy Goat Conference in Yangling, China. Dr. **Goetsch's** presentation has been accepted for publication in the Professional Animal Scientist journal. Dr. **Goetsch** also conducted a workshop for dairy goat producers and governmental farm staff on the use of the Langston Interactive Nutrient Calculators (LINC, http://www.luresext.edu/Nutrient Calculators) system.

►In June, Dr. **Steve Hart** presented on nutrition and on year-round forage systems at a small ruminant conference hosted by Lincoln University in Jefferson City, MO.

►In July, Drs. **Terry Gipson**, **Arthur Goetsch**, **Steve Hart**, **Shirron LeShure**, **Ryszard Puchala**, **Dereje Tadesse**, and **Yoko Tsukahara**, Ms. **Luana Ribeiro**, and Mr. **Ali Hussein** attended the joint national meetings of the American Society of Animal Science and the American Dairy Science Association in Salt Lake City, UT to make research presentations and attend scientific sessions. You can read about some of the research finding in Research Spotlight on page 3.

►In June and July, Dairy Product Specialist Dr. **Steve Zeng** and agriculture student Mr. **Magnus Scott** undertook a Summer Research Team project in the Center of Excellence for Emerging and Zoonotic Animal Diseases of U.S. Department of Homeland Security (DHS) at Kansas State University during summer 2016. Their research "Application of Multiplex PCR Assay for the Detection of Seven Major *Escherichia coli* Serogroups and Associated Virulence Genes in Goat Milk and Feces" was funded by DHS to encourage undergraduate research in food safety and security. Results demonstrated that individual goat milk from three goat farms did not contain *E. coli*, indicating good milking procedure and healthy udder condition. However, all fecal samples had one or more *E. coli* strains of O157, O26, O45, O145, and the four virulence genes, *stx1*, *stx2*, *eae*, and *ehxA* with various prevalences, indicating lactating goats and farm environment were natural reservoirs of *E. coli*. Therefore, good practices in milking, farm management and animal health must be enforced to eliminate contamination of *E. coli* from goat milk for human consumption.

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P.O. Box 730
Langston, OK 73050