Goat Newsletter

Cooperative Extension Program
Langston University

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

From the Director's Desk

Heraclitus is cited as saying "change is the only constant in life." That is most certainly true for the Institute; no earth-shattering changes, just small ones. Much like the small earthquakes that we have been experiencing in Oklahoma over the past 12 months.

One of our more constant changes is with personnel. Generally, these personnel are associated with a research project that has a definite lifespan. However, there are exceptions such as with Ms. **Courtney Jordan**, who is our new Agricultural Communications Specialist. Ms. **Jordan** recently completed her MS from Oklahoma State University in Agricultural Communications. She also has a BS from Austin Peay State University in Tennessee. On page 4 of this newsletter, you can read Ms. **Jordan's** article about our recent Borlaug fellows, Drs. **Bridgit Muasa**, and **Chrilukovian Wasike**.

Also this year, we welcomed Ms. **Nhayandra Silva**, a Ph.D. candidate from Universidade Estadual Paulista Júlio de Mesquita Filho in Brazil. Ms. **Silva** is enrolled in a PhD sandwich program at Universidade Estadual Paulista. Generally for American universities, PhD candidates in a sandwich program will study at an American university for their coursework, return to their home country to conduct research, and then return to the American university to defend their thesis. However, the Brazilian model is slightly different, in that PhD candidates take their foundational coursework at a Brazilian university, travel to the US or Europe to conduct some research and gain experience, and then return to their Brazilian university to defend their thesis. While at Langston University, Ms. **Silva** is conducting a research project entitled "Effects of restricted periods of diet access on production by lactating dairy goats" with participation of Drs. **Arthur Goetsch, Ryszard Puchala,** and **Terry Gipson**. The objectives of Ms. **Silva's** research are to determine effects of different types of restricted feed access on feed intake, milk yield and composition, efficiency of feed utilization, and feeding behavior of lactating Alpine dairy goats. The impetus for this research project was a recent study conducted by Dr. **Yoko Tsukahara**. In that latter study, the primary purpose was to investigate effects of different numbers of animals (growing Boer goat wethers) in a group on performance and related traits. In addition, some of the treatments entailed access of wethers to an automated feeder only during daylight for 8 hours or at night for 16 hours, compared with the two pen stocking rates of wethers with continuous feeder access. I will keep you informed on the results of Ms. **Silva's** dairy research as they unfold.

At the end of the year, we said goodbye to Drs. **Yongqing Guo**, **Bridgit Muasa**,

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and **Chrilukovian Wasike**. Dr. **Guo** returned to the Shijiazhuang Academy of Agriculture and Forestry Sciences in Hebei province, China. For the past year, he worked with Dr. **Zaisen Wang** in the area of nutritional manipulation of immunology in parasite-infected goats. As mentioned earlier, Drs. **Bridgit Muasa** and **Chrilukovian Wasike** were our recent Borlaug Fellow and both spent 12 weeks at the university. Dr. **Muasa** returned to the Central Veterinary Laboratories in Nairobi, Kenya, where she is a staff veterinarian and Dr. **Wasike** returned to Maseno University in western Kenya, where he is chairman of the Department of Animal Science in the School of Agriculture and Food Security.

As I mentioned earlier, most of these comings and goings are related to research and extension projects that have been funded from several sources. One such is the India–Africa–US Trilateral Partnership for Food Security project, which was funded by USAID and involved Langston University, Egerton University in Kenya, and Lilongwe University of Agriculture and Natural Resources in Malawi. The trilateral project came to an end in 2014. As mentioned in previous newsletters, Dr. **Alexander Kahi** and Mr. **Wilson Karimi** from Egerton University visited our campus twice; once in 2013 and again in 2014. Dr. **Kahi** was our principal collaborator in Kenya and Dr. **Fanny Chigwa** was our principal collaborator in Malawi. One of our Malawi collaborators, Dr. **Timothy Gondwe**, participated in a short two-week training session at Langston University in 1999. Ever since then, we have been actively seeking opportunities to work with Lilongwe University of Agriculture and Natural Resources, then called Bunda College of Agriculture, and we were very pleased to be chosen by USDA to collaborate with Kenya and Malawi on this trilateral project to improve goat production.

Another change (result) of a project that I would like to highlight is the recent printing of the Meat Goat Production Basics book, which you can read more about on page 6 and can order using the form on page 7. This basics handbook is an excellent resource for youth, especially for 4-H or FFA members interested in meat goat production. The basic handbook is an outgrowth of our very popular Meat Goat Production Handbook, which has been sold out for several months. Drs. **Roger Merkel**, **Terry Gipson**, and I have been busy editing the final version of the 500-plus page second edition of the Meat Goat Production Handbook and as you read this newsletter, it should be at OU Printing Services for printing. After we have looked at one or more proofs, the second edition of the Meat Goat Production Handbook will be printed and available. Our goal is to have it ready for sale at our 2015 Goat Field Day.

We hope to see you there.

Research Spotlight

Estimating Feed Requirements.

A simple means to estimate feed required for maintenance by Katahdin (K) sheep and Spanish (S) goats (initial BW = 67 and 48 lbs., respectively; 8 months old) by frequent body weight (BW) measurement and adjustment of feed offered was evaluated. Ten K and S wethers in 3.5×1.75 feet pens were fed grass hay (10.4% CP, and 55.4% TDN; DM basis), initially at 5.8 and 5.5% of $BW^{0.75}$, at 08:00 h for 5 weeks. Three times weekly BW was measured at 13:00 h and hay fed was varied thereafter by 0–5% to maintain BW. Breed (1.6 and 1.2 lbs. for K and S, respectively) affected daily air-dry intake (ADI). Variation among days in ADI differed between breeds in weeks 2 and 5. Body weights were smoothed using LOWESS and fitted by a segmented polynomial with the middle segment constrained to a flat line. Regression coefficients of the first and third segments and the two join points were estimated using nonlinear regression. The average of the first and second join points was 16 and 28 days, respectively, indicating BW stability between these times. Also, ADI of each wether was regressed against ADG in 2- and 3-day periods based on unsmoothed BW in weeks 2–5, 3–5, 2–3, 2–4, 3–4, and 4–5. The only weeks without an intercept different from zero were 2–5 and 2–4. Hence, the intercept of weeks 2–4 regressions was used to determine feed required for maintenance, with values of 1.6 and 1.2 lbs ADI, corresponding to a ME requirement for maintenance of 48 and 46 calories/lb $BW^{0.75}$ for K and S, respectively. Variability was homogenous between breeds, although intercept SE averaged 0.21 and 0.45 oz. ADI for K and S, respectively. In conclusion, after 2 weeks of adaptation, frequent weighing and change in offered feed for 2 weeks may offer a relatively simple means of estimating maintenance feed needs of small ruminants.

Goetsch, A. L. , R. Puchala, A. T. Dolebo, T. A. Gipson, Y. Tsukahara and L. J. Dawson. 2014. A simple method to estimate feed required for maintenance of small ruminants. J. Anim. Sci. Vol. 92, E-Suppl. 2:924.

Quantifying Pasture Utilization.

An understanding of pasture landscapes that promotes or hinders efficient utilization is essential for proper management. The objective of this study was to characterize pasture utilization of two separate herds of goats utilizing the same pasture in different years. The study area was a 35-acre pasture of predominantly fescue, bermudagrass, panicums, bahia grass, and broomsedge bluestem but was reverting to a wooded area containing predominately pecan, elm, and honey locust sapling-size trees. In year one (Y1), the study area was stocked with 36 Spanish goats, of which 10 were fitted with GPS collars and in year two (Y2), the study area was stocked with 58 Spanish goats, of which 19 goats were fitted with GPS collars. Different goats were used in Y1 and Y2. For the first 2 weeks of pasture introduction, goats wore the collars, which recorded a fix every 5 min. A GIS point-in-polygon (PiP) analysis was conducted for each year using the same grid (1792 33×33 feet squares) for each year. Moran's I, a measure of spatial autocorrelation, indicated a peak at 98 feet and that value was used in the hot-spot (Getis-Ord Gi* statistic) analysis conducted on the resulting PiP. Based on the resulting z-scores from the hot-spot analysis, each square was classified as very low (VL), low (L), moderate (M), high (H), and very high (VH) usage. Y1 had greater VL and lower VH squares (82% and 1%, respectively) compared with Y2 (80% and 3%, respectively). Hot-spot analysis revealed two areas of H and VH usage for both years. One of the areas was a small grove of trees that had almost a 100% overlay for both years. The degree of similarity in pasture usage was high as indicated by a Spearman's rank correlation coefficient (0.76) of the square z-scores for Y1 and Y2. Even though the two herds of goats never interacted and were separated by time, their pasture utilization was strikingly similar. Further work is needed to investigate the physical features of the pasture to understand the causes behind this similarity.

T. A. Gipson, S. P. Hart and R. Heinemann. 2014. GIS hot-spot analysis of pasture utilization of two separate herds of goats over time. J. Anim. Sci. Vol. 92, E-Suppl. 2:926.

Borlaug Fellows trained at Langston University in Goat Production

by Courtney Jordan

The Norman E. Borlaug International Agricultural Science and Technology Fellowship Program provides the opportunity for fellows from developing countries to engage in collaborative research and training, which would promote economic growth and food security across the globe. Drs. Bridgit Muasa and Chrilukovian Wasike were two USDA Borlaug Fellows from Kenya placed at Langston University for a 12-week training session.

Dr. Muasa's research focused on assisted reproduction technologies such as artificial insemination (AI) and embryo transfer. In Kenya, very few groups work with assisted reproduction technologies on goats; therefore, she wanted to further explore the process of embryo transfer within small ruminants. During her stay at Langston University, Dr. Muasa worked with Dr. Erick Loetz on researching the techniques and practices for *in virto* fertilization. Successfully implementing an *in vitro* fertilization program in Kenya would help farmers all around the country gain access to genetically appropriate animals suitable for their environment in the shortest amount of time possible.

In Kenya, the growing concern farmers have about the overall effectiveness of feed for animals prompted Dr. Wasike to examine how genetics influence residual feed intake (RFI) in goats. RFI is a measure of how efficiently an animal utilizes feed for meat production purposes or milk production purposes. During his time at Langston University, Dr. Wasike worked with Dr. Terry Gipson to explore the genomics of RFI using phenotypic data and SNP analysis. Dr. Wasike hopes his research will also aide Kenyan farmers in animal breeding practices by refining the application of genetic principles used for the improvement of animals.

The Borlaug Fellows were very busy during their time at Langston University including visits to the 2014 World Food Prize in Des Moines, IA, Texas A & M University, and the USDA Agricultural Research Center in Beltsville, MD. One of the most impactful visits for the fellows was the World Food Prize, which is a symposium on the importance of providing nutrition and food for people all over the world. Dr. Wasike said the symposium was life changing. He said, "It was very encouraging to witness all of the work being done to obtain global food security."

As Drs. Muasa and Wasike reflected on their experience at Langston University, they said they will take more than their research back to Kenya with them. Dr. Wasike stated, "This has been such a wonderful and transformative process. I will not leave Langston University the same way I came, and I am thankful." Dr. Muasa also shares her perspective on her time on our campus, "It has been a delightful experience and a perfect match for my research interests. I have thoroughly enjoyed the time I have spent with the faculty and staff here." They both share their gratitude towards their mentors, Drs. Gipson and Loetz and the team of scientists who helped them along their journey.

from l to r: Dr. Erick Loetz (mentor), Dr. Bridgit Muasa (Fellow), Dr. Tilahun Sahlu (Director), Ms. Karen Uetrecht (USDA Borlaug Fellows Representative from Washington, DC), Dr. Chrilukovian Wasike (Fellow), Dr. Terry Gipson (mentor).

Dr. Norman Borlaug and the USDA Borlaug Fellowship

Dr. Borlaug at the International Maize and Wheat Improvement Center (CIMMYT) in Mexico.

As was stated on the previous page, Langston University hosted its first-ever USDA Borlaug Fellows this last fall. For those not familiar with the name Borlaug, a brief history might help.

In 1914, Norman Borlaug was born near Cresco, a small farming community in northeast Iowa, where his parents raised corn, oats, cattle, pigs and chickens. He stayed on the family farm until he graduated high school in 1933.

Borlaug attended the University of Minnesota and graduated in 1937 with a BS in Forestry. He worked for the U.S. Forest Service in Idaho, Massachusetts, and Connecticut but soon returned to graduate school at the University of Minnesota. In 1942, Borlaug received his PhD in plant pathology.

In 1944, Dr. Borlaug accepted a position as research scientist in charge of wheat improvement in the Rockefeller Foundation's pioneering technical assistance program in Mexico, which would later be known as the International Maize and Wheat Improvement Center (more commonly known by its Spanish acronym CIMMYT; Centro Internacional de Mejoramiento de Maíz y Trigo). Dr. Borlaug would eventual serve as the director of CIMMYT before his retirement in 1979.

While at CIMMYT, Dr. Borlaug bred wheat varieties that were highly disease resistant, easily adapted to variable growing conditions across the planet, and high yielding. In 1970, Dr. Borlaug was awarded the Nobel Peace Prize for his achievements in alleviating world hunger. Dr. Borlaug has been lauded as the "father of the Green Revolution" and it is said that Dr. Borlaug has "saved more lives than any other person who has ever lived."

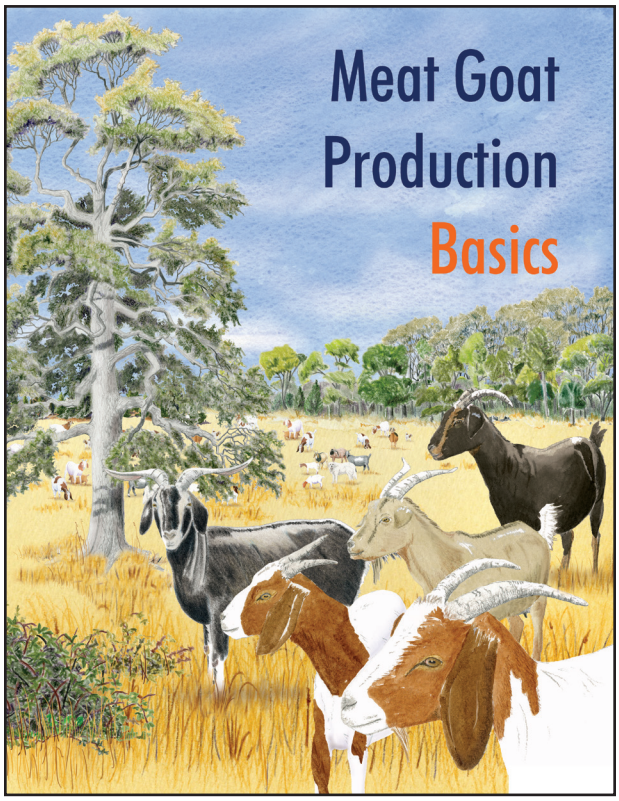
Thus in 2004, USDA established the Norman E. Borlaug International Agricultural Science and Technology Fellowship Program to further honor Dr. Borlaug's achievements and to promote food security and economic growth by providing training and collaborative research opportunities to fellows from developing countries. Since the program's inception, approximately 700 fellows from 64 countries have participated in research and training focused on a wide array of agriculture-related topics.

Tanning Goatskins Workshop

On Saturday, March 28, 2015, a tanning goatskins workshop will be held at Langston University from 8:00 a.m. to 12:30 p.m. The focus of the workshop will be tanning hair-on goatskins but the process of unhairing skins and making leather will also be discussed. After discussing the stages of tanning from how to handle and store a raw hide to softening and finishing a tanned skin, participants will have hands-on practice with goatskins in several of the different tanning steps. Various tanning methods will be discussed and examples of tanning kits and chemicals displayed. All of the tanning procedures presented and chemicals used are appropriate for home tanning with all of the work done by hand. The tanning processes learned can be used on goat, sheep, deer, coyote, and other skins. *Registration is limited to 10 participants. A registration fee of $20 is charged.* Refreshments will be provided.

For more information regarding the tanning goatskins workshop, contact Dr. Roger Merkel at (405) 466-6134 or rmerkel@langston.edu.
A registration form is available online at http://www2.luresext.edu/goats/extension/tanning.htm.

Meat Goat Production Basics



A new 158-page publication has emanated from Langston University's extension project entitled "Enhancing Production Capabilities of Socially Disadvantaged and Underserved Farmers via Low-Literacy Meat Goat Production Training Materials." This project was conducted in collaboration with Kentucky State University and the University of Puerto Rico at Mayagüez. The overall project goal is to develop low-literacy training materials in English and Spanish for production of meat goats for socially disadvantaged, underserved, and limited-resource farmers and ranchers. The specific objectives are 1) utilize existing core chapters from the Meat Goat Production Handbook to develop a low-literacy training manual for meat goat production and; 2) translate the low-literacy meat goat production training manuals into Spanish. The English language version is now available (see the order form on page 7) and the Spanish language version will be available later in 2015. Partial funding to develop these publications was from USDA/NIFA grant #2010-38821-21581.

A majority of goat producers raise goats as part of a small farm enterprise of which the income from sale of these animals is very important to their livelihood and ability to continue farming. A portion of these producers are limited resource farmers due to location, educational level, culture, and language abilities. It is important to ensure that these individuals have access to appropriate educational and training materials that can raise their knowledge base and skill levels in farming and animal production to make their enterprises more economically viable and sustainable.

These new publications will equip limited-resources producers with the basic knowledge, skills, and abilities necessary to operate a productive meat goat operation. These publications are also beneficial to youth such as FFA or 4-H members, who may not need or want the in-depth material found in Langston University's Meat Goat Production Handbook. The basics handbook is beautifully illustrated by Mr. Kenneth Williams of Science Graphics and Design and two of those illustration are presented below.

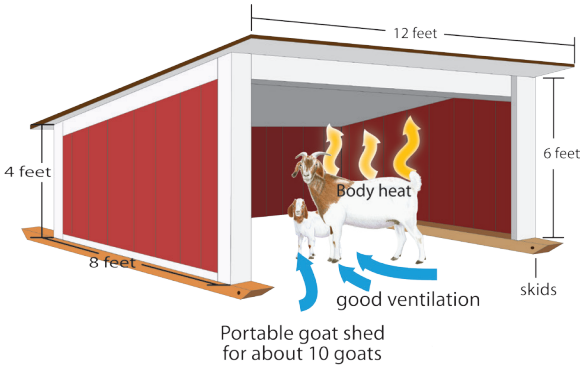


Illustration of good shed/housing design for meat goats (page 25 of the Meat Goat Production Basics).

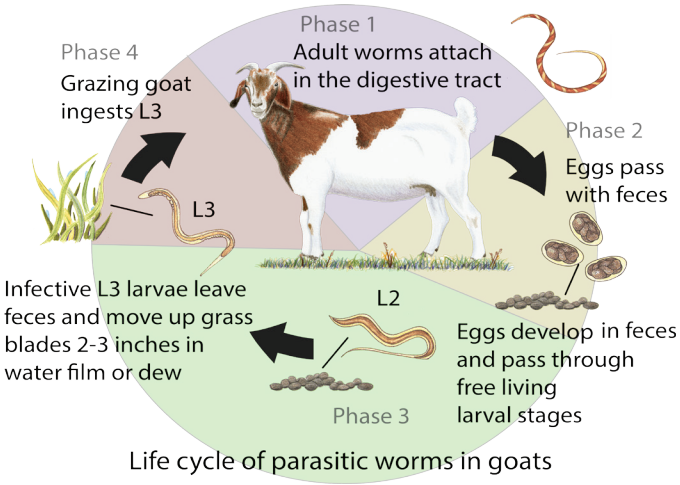
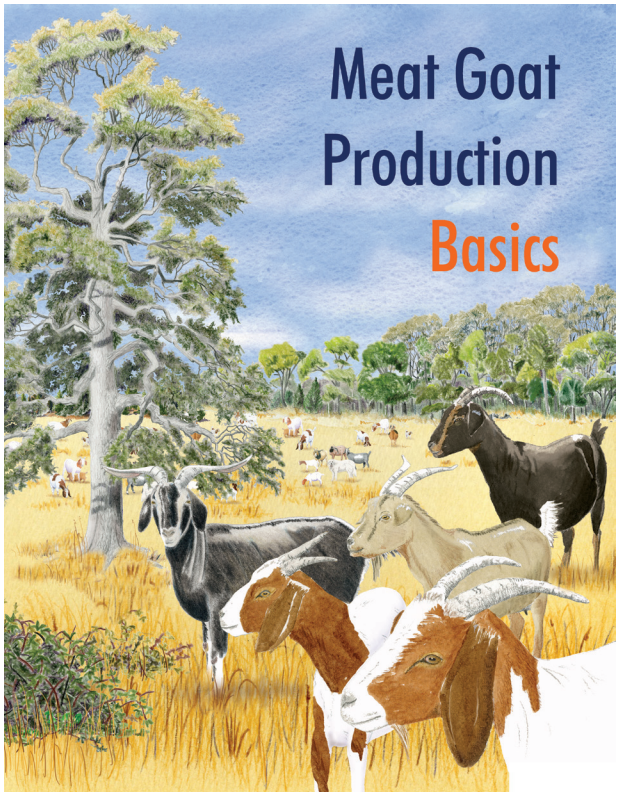


Illustration of the generalized life cycle of parasitic worms in meat goats (page 114 of the Meat Goat Production Basics).



Meat Goat Production Basics

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Noteworthy News

►In November, Drs. **Lionel Dawson**, **Terry Gipson**, **Arthur Goetsch**, **Tilahun Sahlu**, and **Steve Zeng**, traveled to Egerton University in Njoro, Kenya to conduct training exercises in nutrition, breeding, herd health, and dairy food technologies in order to fulfill objectives of the India–Africa–US Trilateral Partnership for Food Security project, which was funded by the US Agency for International Development.

►In December, Dr. **Arthur Goetsch** and Mr. **Jerry Hayes**, traveled to Egerton University in Njoro, Kenya to assist with nutrition and ration balancing, herd management skills, and participate in the project closing ceremony of the India–Africa–US Trilateral Partnership for Food Security project, which is funded by the US Agency for International Development.

►In December, Drs. **Terry Gipson** and **Tilahun Sahlu** and **Mr. Kesete Tesfai** traveled to Lilongwe University of Agriculture and Natural Resources in Malawi to conduct artificial insemination, provide herd management skills, provide laboratory maintenance/training, and participate in the project closing ceremony of the India–Africa–US Trilateral Partnership for Food Security project.

► In December, Drs. **Terry Gipson** and **Chrilukovian Wasike** traveled to Beltsville, MD to discuss genomic evaluations with researchers at the USDA Animal Improvements Program Laboratory.

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