Goat Newsletter

Cooperative Extension Program
Langston University

The Newsletter of the E (Kika) de la Garza American Institute for Goat Research *Fall 2012*

From the Director's Desk

Another year comes to a close and I might add quickly. Every passing year goes by more quickly. It doesn't seem to matter if I come into the office early or come in on a Saturday to catch up on some work, the time flies by and I never seem to have enough time to accomplish all the tasks that I want. I often reflect back to the lyrics of an old Jim Croce song named Time In A Bottle. Croce sang "... there never seems to be enough time" and "If I could save time in a bottle, The first thing that I'd like to do, Is to save every day .." I wish that I could have bottled all of those slow-moving times when I was a child or young man and be able to open them now.

I know that this is not a unique experience. I have often heard other people also say that the years pass more quickly as they get older. A common explanation for this is that when we are young everything is new so we pay more attention and our brain records every detail; consequently, it feels like time expands. In his book entitled Incognito: The Secret Lives of the Brain, neuroscientist David Eagleman of Baylor College of Medicine asks us to remember back to our first kiss. Everything about that moment is novel — the touch of the lips, the excitement, the taste, the smell — and you aren't relying upon a bank of previous experiences, you are starting fresh. Eagleman says that when you recall your first kiss, early birthdays, your earliest summer vacations, they seem to be in slow motion. "I know when I look back on a childhood summer, it seems to have lasted forever," he says.

That's because there are so many things to remember when it's the "first". The list of encoded memories is so dense and detailed that remembering or reliving them gives you a feeling that they must have taken forever. But that's an illusion. "It's a construction of the brain," says Eagleman. "The more memory you have of something, you think, 'Wow, that really took a long time!'

"Of course, you can see this in everyday life," says Eagleman, "when you drive to your new workplace for the first time and it seems to take a really long time to get there. But when you drive back and forth to your work every day after that, it takes no time at all, because you're not really writing it down anymore. There's nothing novel about it."

With age, though, new experiences diminish and it tends to be more of the same, so time seems to pass more quickly. Whether or not this is true, there is some psychological evidence that time passes quicker for older people. One study has found that people in their 20's are pretty accurate at guessing an interval of 3 minutes, but people in their 60's systematically overestimate it, suggesting time is passing about 20% more quickly for them.

Back to Eagleman's Incognito: The Secret Lives of the Brain, if you haven't read it, I highly recommend it. Eagle-

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Dr. Terry A. Gipson

man is a brilliant scientist and a gifted writer. Here is an excerpt from his first chapter.

Take a close look at yourself in the mirror. Beneath your dashing good looks churns a hidden universe of networked machinery. The machinery includes a sophisticated scaffolding of interlocking bones, a netting of sinewy muscles, a good deal of specialized fluid, and a collaboration of internal organs chugging away in darkness to keep you alive. A sheet of high-tech self-healing sensory material that we call skin seamlessly covers your machinery in a pleasing package.

And then there's your brain. Three pounds of the most complex material we've discovered in the universe. This is the mission control center that drives the whole operation, gathering dispatches through small portals in the armored bunker of the skull.

Your brain is built of cells called neurons and glia — hundreds of billions of them. Each one of these cells is as complicated as a city. And each one contains the entire human genome and traffics billions of molecules in intricate economies. Each cell sends electrical pulses to other cells, up to hundreds of times per second. If you represented each of these trillions and trillions of pulses in your brain by a single photon of light, the combined output would be blinding.

The cells are connected to one another in a network of such staggering complexity that it bankrupts human language and necessitates new strains of mathematics. A typical neuron makes about ten thousand connections to neighboring neurons. Given the billions of neurons, this means there are as many connections in a single cubic centimeter of brain tissue as there are stars in the Milky Way galaxy.

The three-pound organ in your skull — with its pink consistency of Jell-o — is an alien kind of computational material. It is composed of miniaturized, self-configuring parts, and it vastly outstrips anything we've dreamt of building. So if you ever feel lazy or dull, take heart: you're the busiest, brightest thing on the planet.

Ours is an incredible story. As far as anyone can tell, we're the only system on the planet so complex that we've thrown ourselves headlong into the game of deciphering our own programming language. Imagine that your desktop computer began to control its own peripheral devices, removed its own cover, and pointed its webcam at its own circuitry. That's us.

And what we've discovered by peering into the skull ranks among the most significant intellectual developments of our species: the recognition that the innumerable facets of our behavior, thoughts, and experience are inseparably yoked to a vast, wet, chemical-electrical network called the nervous system. The machinery is utterly alien to us, and yet, somehow, it is us.

Enough about the brain and the perception of time. It is time for us to move on to the business at hand, which is news about our Langston community. We welcome Dr. **Zewei Sun**, who is a new visiting scholar. Dr. **Sun** is an associate professor in the Institute of Animal Sciences and Technology of Jilin Agricultural University in northeastern China. Dr. **Sun** will be working on Dr. **Zaisen Wang's** project entitled Effects of Selected Nutritional Components on Immunity to *Haemonchus* in Goats. We welcome Dr. **Sun**.

Research Spotlight

Goat Nutrition Based on Grazing.

More research has been conducted with goats in confinement than on pasture or rangeland; however, most nutrients consumed by goats throughout the world are derived by grazing. There are a number of considerations unique or of special relevance to grazing goats. There are no evaluated methods of predicting feed intake or the activity energy cost of goats while grazing, and development of accurate means will be challenging given the variable conditions under which goats are raised. The activity energy cost of grazing goats can have profound effect on energy required and available for production. In both confinement and grazing settings, high productivity of goat genotypes intensively selected for traits such as growth or milk production can be achieved only with conditions facilitating high nutrient intake. Goats are able to consume a diet considerably different in nutritive value than the average of vegetation available, but insufficient research has been conducted to allow accurate prediction of the composition of the diet actually consumed. Previous nutritional plane can have substantial effect on energy required by goats, with marked fluctuation in nutritional plane during the year for grazing relative to confinement settings. Likewise, based on some findings with sheep internal parasitism appears to have considerable effect on both energy and protein needs, the impact of which may increase in the foreseeable future as anthelmintic resistance increases. Plant secondary metabolites such as condensed tannins can have variable effects on conditions that influence performance by goats, although substantial negative impact may only occur with diets primarily of plants with high levels rather than more common diets of multiple plant species. In summary, there are numerous areas concerning the nutrition of goats while grazing where increased knowledge is needed, which in part relates to research challenges in grazing settings. Hence, efforts should focus primarily on conditions affecting nutrition that differ between grazing and confined animals.

Goetsch, A.L. and T.A. Gipson. 2012. Goat Nutrition Based on Grazing (Invited Talk). Proceedings of the 11th International Conference on Goats. p. 5. International Goat Association.

Feeding Behavior.

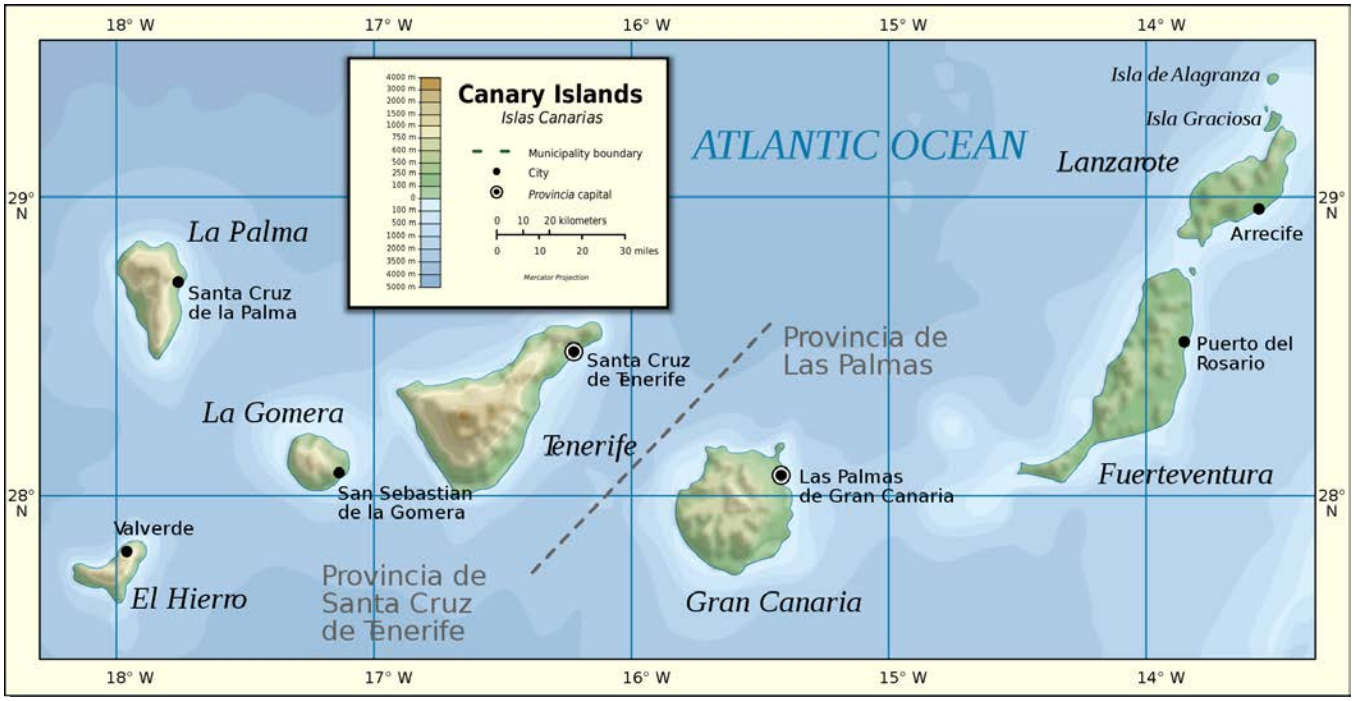
Effects of the number of Boer wethers (initial age and body weight of ¾ yr. and 75 lb, respectively) per automated feeder, allowing only one animal to consume feed at a given time, and length and time of feeder access on feed intake, growth performance, and behavior were determined during a 10-wk period. Treatments were 6 and 12 wethers per 20×20 ft pen and feeder with continuous access (C-6 and C-12, respectively); 2 and 4 wethers per feeder with 8 hour/day access during daytime (D-2 and D-4, respectively); and 4 and 8 wethers per feeder with 16 hour/day access at night (N-4 and N-8, respectively). Therefore, maximal feeder occupancy time per wether was 4 hour for C-6, D-2, and N-4 and 2 hour for C-12, D-4, and N-8. Dry matter intake (DMI) was greater for continuous vs. restricted feeder access and for night vs. daytime access (4.5, 4.4, 3.2, 3.3, 4.2, and 3.9 lb/day), and feeder occupancy time per wether tended to be greater for continuous access (1.83, 1.55, 1.23, 1.34, 1.51, and 1.25 hour/day for C-6, C-12, D-2, D-4, N-4, and N-8, respectively. There were effects of continuous vs. restricted and D vs. N access on ADG (0.52, 0.56, 0.38, 0.46, 0.54, and 0.47 lb/day for C-6, C-12, D-2, D-4, N-4, and N-8, respectively). ADG:DMI tended to be greater for night than for day access although residual feed intake (RFI) was greater for continuous vs. restricted access and tended to be less for day vs. night access and for 2 vs. 4 h/day of maximal occupancy time per wether. In summary, continuous feeder access allowed high ADG, but resulted in relatively inefficient feed utilization as assessed by RFI. Restricting feeder access to daytime minimized DMI compared with continuous access, which was due to factors other than feeder occupancy time and rate of DMI; however, efficiency of feed utilization for daytime access based on RFI, particularly for D-4, was high relative to continuous access. In conclusion, restricting feeder access influenced feed intake, growth performance, and behavior, with results impacted by time of access.

Tsukahara, Y., T. A. Gipson, R. Puchala, T. Sahlu, and A. L. Goetsch. 2012. Factors influencing feed intake, growth performance, and behavior by Boer wethers with an automated feeding system. Proceedings of the 11th International Conference on Goats. p. 326. International Goat Association.

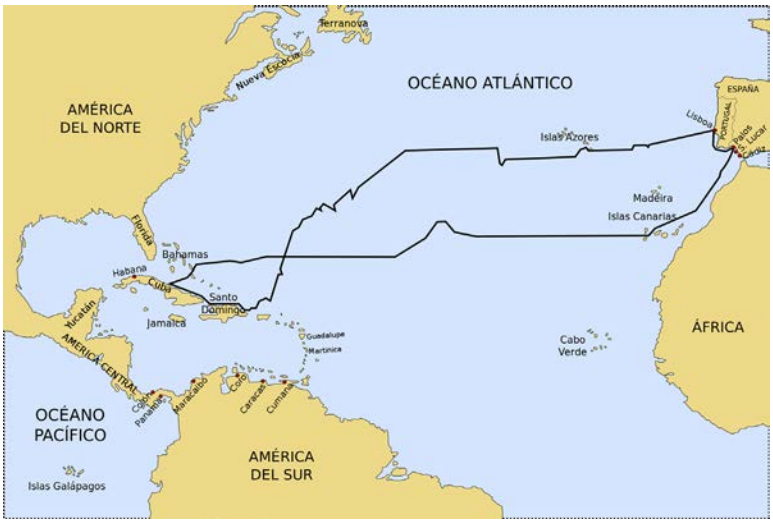
XIth International Conference on Goats

The XIth International Conference on Goats was held from September 24-27, 2012 in Las Palmas de Gran Canaria in Canary Islands (Spain) and was a huge success with more than 400 participants from 50 different countries. These islands are well known as a tourist destination with fabulous beaches, mountains and landscapes to enjoy and with excellent hotels and restaurants ranging from high-end luxury to economical.

The Canary Islands (Islas Canarias in Spanish) is located off the northwest coast of mainland Africa, about 60 miles west of the southern border of Morocco. The Canary Islands are one of Spain's 17 autonomous communities and are comprised of 13 islands, which include (from largest to smallest): Tenerife, Fuerteventura, Gran Canaria, Lanzarote, La Palma, La Gomera, El Hierro, La Graciosa, Alegranza, Isla de Lobos, Montaña Clara, Roque del Este and Roque del Oeste.



Culturally, these islands are a meeting point of the Atlantic cultures; Europe, America and Africa are close both geographically and culturally. The Canary Islands were an important launching point for the voyages of Christopher Colombus. A key element in the voyages of Columbus were the Trade Winds, a closely-held fact discovered/ learned by Columbus. The Trade Winds are a brisk westward wind from the east and propelled the Santa María, La Niña, and La Pinta for five weeks from the Canary Islands to the New World. To return to Spain, Columbus used the prevailing winds northeastward from the southern zone of the North Atlantic to the middle latitudes of the North Atlantic. So Colombus used the North Atlantic's great circular wind pattern, clockwise in direction, on both legs of his voyages.



Canarian cheese-maker displays her Majorero cheese made from the milk of the Majorera goat.

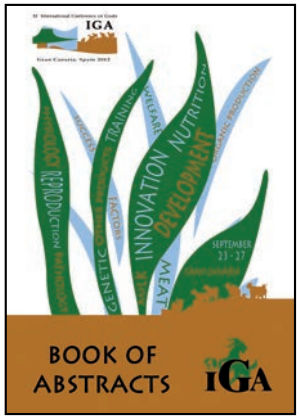
Typical Majorera doe. Editor's Note: the Majorera breed has a large pendulous udder and producers have developed a special S-shaped hook used in the milking parlor to raise the udder floor during the milking process.

As mentioned earlier, tourist, not goats, are associated with the Canary Islands. However, when Spain conquered the Canary Islands in the 13th and 14th centuries, goats were already present on the islands. Indigenous people had been raising goats for several centuries, and today goats are the most important livestock species on the islands (more than 400,000 head). There are three native dairy goat breeds in the Canary Islands and almost 100% of their milk is used to make traditional cheese.

Presentations by Langston researchers included:

- Effects of (-)-Epigallocatechin-3-gallate (EGCG) on viability of *Haemonchus contortus* and immune responses in white blood cells of goats in vitro.
- Effects of creep grazing and stocking rate on diet selection and nutritive value of does and kids.
- Effects of level and length of supplementation on leather characteristics of yearling Boer and Spanish wethers.
- Effects of pasture access regime on yield and composition of milk produced by Alpine goats.
- Factors affecting behavior of goats in pens with electric strand additions to cattle barb wire fence.
- Factors influencing feed intake, growth performance, and behavior by Boer wethers with an automated feeding system.
- Goat nutrition based on grazing (Invited Talk).
- Prediction of heat production in Boer goats using heart rate.
- Spatial-temporal movements of grazing goats.

Drs. Tsukahara, Goetsch, Gipson, Sahlu, and Puchala (left to right) enjoy the technical tour.



The conference theme was entitled "Industrial, Scientific and Rural Activities in the Goat Sector" and entailed 18 technical sessions, 5 round tables, and 3 satellite seminars. You can view the proceeding abstracts at: *http://www.iga-goatworld.com/attachment/373010/.*

Sustainable Small Ruminant Production Through Selection for Resistance to Internal Parasites

Langston University was successful in seeking funding from the USDA Capacity Building Grants Program for its proposal entitled "Sustainable Small Ruminant Production through Selection for Resistance to Internal Parasites." A brief overview of the project entails:

Introduction

- Internal parasitism is an increasingly important constraint to small ruminant production.
- Controlling internal parasites (worms) is very important for sheep and goat producers.
- Sustainable and practical management practices to address internal parasitism are lacking.
- Development of dewormer resistance has greatly increased the difficulty of controlling worms in sheep and goats.
- Selection of small ruminants for internal parasite resistance has not received adequate attention and offers a sustainable method of production.
- We lack knowledge on how genetic selection for resistance to worms can be conducted using a buck/ram test or if genetic selection can be applied on the farm.

Objectives

- Determine early progress in selection of small ruminants for resistance to internal parasitism using a buck/ram test or on farm selection.
- Determine if selection for resistance to worms has negative effects on animal performance such as daily gain, weaning weight, or reproduction.
- Develop and implement a new second generation central sire performance test for sheep and goats at Langston University.
- Determine if genetic markers can be developed for resistance to worms so that a blood test could be used to identify resistant animals.
- Evaluate economic benefits of selection for resistance to worms.
- Disseminate potential benefits of selection and associated economic and management considerations for adoption by small ruminant producers.
- Publish information on results of the study in producer publications and on our website and breed association websites.

Collaborators with Langston University (LU)

- USDA ARS Dale Bumpers Small Farms Research Center (DBSFRC), Booneville, AR.
- Department of Animal Science, Oklahoma State University, Stillwater, OK.
- Department of Agricultural Economics, Oklahoma State University, Stillwater, OK.
- 2 sheep producers.
- 2 goat producers.

In the proposal, we stated that we would collaborate with two sheep producers and two meat goat producers. For the proposal stage, it was not necessary to identify those four producer collaborators but now as we move into the implementation stage, we would like to seek out those producers who would like to collaborate with us but more importantly, those producers who meet the requirements for collaboration as stated on the following page. If you meet the requirements or know of any producers who you think might, please contact Dr. Tilahun Sahlu at 405-466-6148 or at sahlu@langston.edu.

We are very excited about implementing this project and developing the partnerships with producer collaborators and with the breeders' associations they might represent.

Checklist of Producer Requirements for Langston Parasite Resistance Project

General

- ☐ Accurate computer and/or handwritten records must be kept. Langston can provide assistance in this area if necessary.
- ☐ Feeding management can be as normal. However, a free-choice mineral supplement must be given. Langston can assist in selection of a mineral supplement if necessary.
- ☐ Initially, a minimum of 150 breeding females and 20 males are required. Thereafter, a minimum of 150 breeding females is required. Females do not have to be the same from year to year; however, the minimum number must be maintained. After the first year, the number of males will be adjusted according to the male testing criteria below.
- ☐ Good management practices are necessary.
- ☐ Kidding/lambing will be in mid- to late spring. Breeding dates may have to be modified slightly in order for animals from each location to be at a similar age at the beginning of the buck/ram test mentioned below.
- ☐ There should be 6 fenced areas available for conduct of single sire pen breeding.
- ☐ Males, females, and lambs/kids must be identified; ear tags are acceptable but tattooing is preferred.
- ☐ Langston will provide $3,000 annually to each producer for materials and supplies and other inputs. If necessary based on needs, a slightly greater amount could be agreed upon.

Initial male selection and testing

- ☐ 15 kids/lambs will be submitted to the Langston buck/ram test each year for 3 tests, with all males returned to the producer. There is no cost to the producer for the test, and the producer will receive all test data. The selection of males in year 1 (2013) will be random.
- ☐ Of the 15 males from a producer's herd/flock submitted to the ram/buck test, Langston will identify 5 candidate males with relatively high resistance and 5 candidate males with medium or moderate resistance based on data from the buck/ram test. Producers will be able to select 3 males from each candidate pool for breeding to selected females. Any of the remaining 9 males can be used for breeding with females not selected.

Initial female selection

- ☐ Langston will determine FAMACHA© score 3 times annually and fecal egg count (FEC) of females at weaning, with producer assistance. One blood sample will be collected annually as well for DNA and other analyses.
- ☐ Langston will select 45-50 females with high resistance and 45-50 with medium resistance. Females not selected can be bred to any of the non-selected males.

Initial breeding

- ☐ Each of the 3 selected males with high resistance determined in the buck/ram test will be used to mate at least 15 females with high resistance. Likewise, each of the 3 selected males with medium resistance will be used to mate at least 15 females with medium resistance. The selection of the specific 15 females within the 2 resistance female groups to be bred to specific males will be random.
- ☐ The producer and Langston will weigh lambs/kids at weaning at approximately 12 weeks of age.

Selection and breeding in years 2 and 3

- ☐ In years 2 and 3 (2014 and 2015, respectively), 4 male lambs/kids from each of the 3 resistant male bucks/rams will be randomly selected, and 2 male lambs/kids from each of the 3 median male bucks/rams will be randomly selected as well. These 18 males will be submitted to the Langston buck/ram test as noted above.
- ☐ Of the 18 males from a producer's herd/flock submitted to the ram/buck test, Langston will then identify 5 candidate males with relatively high resistance as noted above, and the 5 candidate males with medium or moderate resistance will be used as well. Producers will be able to select 3 males from each candidate pool for breeding to selected females as noted earlier.

Noteworthy News

►In August, Dr. **Steve Hart** spoke on Goat Management at a Women in Agriculture meeting in Norman, OK.

►In August, Drs. **Lionel Dawson** and **Terry Gipson** travelled to Malawi to conduct an artificial insemination workshop and training session for Bunda College of Agriculture and Malawian Ministry of Agriculture personnel. This trip was sponsored by CNFA Farmer-to-Farmer program.

►In August, Dr. **Roger Merke**l visited the Hides and Leather plant of Tyson's Food, Inc. in Amarillo, TX to discuss tanning methods.

►In August, Drs. **Art Goetsch** and **Tilahun Sahlu** travelled to Malawi to conduct a preliminary investigation on a one-year collaborative project with Bunda College of Agriculture. Project funding is through USDA Foreign Agricultural Service.

►In August, Dr. **Terry Gipson** travelled to Mali to conduct a training session on improved goat husbandry for a farmers' cooperative in southern Mali. This trip was sponsored by Winrock Farmer-to-Farmer program.

►In August, Drs. **Art Goetsch** and **Tilahun Sahlu** travelled to Kenya to conduct a preliminary investigation on a one-year collaborative project with Egerton University. Project funding is through USDA Foreign Agricultural Service.

►In September, Drs. **Terry Gipson**, **Art Goetsch**, **Ryszard Puchala**, **Tilahun Sahlu**, **Yoko Tsukahara**, and **Zaisen Wang** presented research findings and attend scientific sessions at the 11th International Conference on Goats in the Canary Islands.

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

►In October, Dr. **Art Goetsch** and Mr. **Kesete Tesfai** travelled to Malawi to assess the status of laboratory equipment for the one-year collaborative project with Bunda College of Agriculture.

►In October, Dr. **Steve Hart** gave presentations on internal parasite control, mineral nutrition, and basic management at the National Goat Expo in Des Moines, IA and at the Cornell Sheep and Goat Conference in Ithaca, NY.

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