



# Wild & Woolly

VOLUME 7, ISSUE 2 □ SUMMER 2008

Maryland's Sheep & Goat Producer Newsletter

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For more information, visit:  
[www.sheepandgoat.com](http://www.sheepandgoat.com)

Shepherd's Notebook Blog  
<http://mdsheepgoat.blogspot.com>

## Goats Begin Performance Test

Sixty-two (62) male goats from 20 consigners from 10 states (DE, IL, KS, KY, MD, MO, MS, OK, PA, and VA) began the 2008 Western Maryland Pasture-Based Meat Goat Performance Test on June 7. It is the third year of the test, which is sponsored by the University of Maryland and is conducted at the Western Maryland Research & Education Center (WMREC) in Keedysville, MD. Eighty-two (82) goats were nominated for the test, but only 62 could be accepted due to the finite pasture resource (10 acres).

The goats are a mixture of full blood and percentage Kiko and Boer, Boer x Kiko, and other crossbreds. At the start of the test, the goats ranged in weight from 34 to 90 lbs. and averaged 49.9 lbs. Upon arrival to the test site, they were required to stand in a foot trough of zinc sulfate for 10 minutes (to prevent hoof problems). They were weighed and dewormed with anthelmintics from two different chemical classes.



*Sherrie Losch (L) and friend. Sherrie is a new consigner from Pennsylvania*

The purpose of deworming all of the goats is to make sure they start the test equally. Only three goats would have required deworming, based on FAMACHA© scores (4 or 5). The purpose of using anthelmintics from two different chemical classes is to make sure no resistant worms survive. FAMACHA© eye anemia and body condition scores were determined for each goat. Individual and pooled fecal samples were collected.

*Continued on page 2*

## Fifty Years of Shearing Sheep



Twenty-six people learned to shear sheep at the 2008 Maryland-Delaware Sheep Shearing School, held March 28-29 in Westminster, MD. Each year, approximately 25 people participate in the beginners' shearing school. An advanced school is also offered every year.

The annual shearing schools are sponsored by the Maryland Sheep Breeders Association, Delaware Sheep & Wool Producers, and University of Maryland and Delaware Cooperative Extension. This year's instructors include David Greene, retired Carroll County extension agent; Rich Barczewski, Chair of the Agriculture and Natural Resources Department at Delaware State University; Aaron Geiman, Carroll County Vo-Ag teacher; and Linda Shane, certified wool classer.

At this year's school, David Greene was honored for having taught at the shearing school for 50 years.

### *Goats Begin Performance Test (continued from page 1)*

During the first three days of the test, the goats were treated (in the water) for coccidiosis. In addition, their minerals contain a coccidiostat (Rumensin®).

While on the test, the goats will be evaluated for growth performance, parasite resistance, and carcass merit. The goats will be worked every 14 days to determine body weights, body condition scores, and FAMACHA© eye anemia scores. The need for deworming will be based on FAMACHA© scores, as well as other indicators of clinical parasitism (e.g. body condition score, bottle jaw).

Fecal samples will be collected every 14 days until the goats require deworming. Fecal egg counts will be determined by Delaware State University, using the modified McMaster procedure. A pooled fecal sample will be collected from random goats to determine the mixture of stomach worms affecting the goats. The pooled sample will be analyzed by the University of Georgia. Towards the end of the test, carcass traits will be estimated using realtime ultrasound. Some of the goats will be slaughtered to collect actual carcass data.

While on test, the goats will consume a pasture-only diet. They will be supplemented (with nutritional tubs and/or grass hay) only in the event of extreme weather conditions, such as a prolonged drought (like last year). The grazing system consists of five, 2-acre paddocks. It is enclosed in 6-strand high-tensile electric fence. There is a 2-acre paddock of chicory and a 2-acre paddock of pearl millet.

Chicory is purported to have “anthelmintic-like” properties, while pearl millet is a warm season annual grass that does the majority of its growing in July and August, when the cool season forages taper off. The rest of the paddocks are composed primarily of orchard grass and Max Q™ tall fescue. There is a small section (less than 1

acre) of forage kale. The goats will always have access to a central laneway containing shelters, water, minerals, and the handling system.

The top 20 bucks (based on growth performance, parasite resistance, carcass traits) will be eligible to sell at the 1<sup>st</sup> Western Maryland Goat Field Day and Performance Tested Buck and Invitational Doe Sale on Saturday, October 4, at the Washington County Agricultural Center in Boonsboro (an adjacent property). Consigners to the goat test are eligible to nominate doelings for the sale. They are being encouraged to consign does which are half-siblings (have same sire and/or dam) to the bucks on test.



*Willie Lantz (L) and Lawrence Burke (R)*

The featured speaker at the field day will be Dr. Dan Waldron from Texas A&M University. Dr. Waldron is an expert on the performance testing of small ruminants.

To follow the progress of this year's test, be sure to visit the blog at <http://mdgoatstest.blogspot.com>. Ask to be added to the goat test e-mail list, so you'll receive blog entries via e-mail. Test reports can be downloaded from the blog. Images from the test can be viewed at <http://www.flickr.com/photos/baalandsets/72157605491412625/>.

Contact us if you would like to visit the test site or learn more about the performance testing program. The goat test committee includes Susan Schoenian (University of Maryland Extension - WMREC), Jeanne Dietz-Band (University of Maryland Extension-WMREC and Washington County), Jeff Semler (University of Maryland Extension-Washington County), Dr. Dahlia Jackson (Delaware State University), Willie Lantz (University of Maryland Extension-Garrett County), and Mary Beth Bennett (West Virginia University Extension-Berkeley County). Dr. Kevin Pelzer from the VA-MD Regional College of Veterinary Medicine serves as the consulting veterinarian.

**To learn more about the**

**Western Maryland Research and Education Center, visit us online at: <http://wmrec.umd.edu>**

## Sheep & Wool Skillathon at Festival

Ninety-five (95) youth from six states (MD, VA, WV, PA, NJ, and OH) and thirteen Maryland counties (Allegany, Anne Arundel, Baltimore, Calvert, Carroll, Cecil, Charles, Frederick, Garrett, Howard, Montgomery, St. Mary's, and Washington) competed in the 3<sup>rd</sup> Sheep & Wool Skillathon hosted by the Maryland Sheep & Wool Festival on May 4 at the Howard County Fairgrounds.

A skillathon provides youth with the opportunity to blend knowledge and skills acquired in livestock judging, demonstrations, and care and exhibition of animals into a single activity. A skillathon competition consists of a series of stations where youth are tested on their knowledge and abilities related to livestock.

### 2008 Results

The top-placing junior in this year's skillathon was Katie Burroughs, a 9-year old from Calvert County. Katie's Calvert County team was the first place junior team. Other team members included Becky Jones and Jocelyn and Ethan Abbott.

The top-placing intermediate was Savannah Cook, an 11-year old from Montgomery County. Savannah's Montgomery County team placed second. The first place intermediate team was the Calvert County team composed of William Jones and Sarah and Josiah Manning.

The top-placing senior was Rachel Manning, an 18-year old from Calvert County. Rachel's team was also the first place senior team. Her teammates included Jamie Snider (Allegany County), Logan Charles (Charles County), and Molly Hancock (Charles County).



### Sponsors

The Sheep & Wool Skillathon is sponsored by University of Maryland Extension (UME). The Maryland Sheep & Wool Festival (a committee of the Maryland Sheep Breeders Association) provides ribbons and premiums to the top 10 individuals in each age group and Festival t-shirts to the members of the top 3 teams in each age group.

This year, each of the skillathon stations had a sponsor: Animal health, Sheepman Supply Company; Breed ID, Sheep! Magazine; Equipment ID, Premier Sheep Supplies, Ltd.; Feed and Forage ID, Kate's Koop: Farm Fresh Eggs; Meat ID, George Ruppertsberger & Sons; Hay judging (and evaluation), Talking Hooves Educated Hoof Care Services; Sheep Judging, Frederick County Sheep Breeders Association; Fleece/wool judging (and evaluation), The Delmarva Farmer; and Written Test and Senior Problem, Shepherd Magazine.

Discount lunch tickets were donated by Greene's Lamb and Many Rocks Farm Domestic Chevon. City Grafz (Eugene, OR) donated the table numbers. Karakul breeders provided yearling ewes for the judging class and gave skillathon participants an overview of the Karakul breed. Les Vough, retired university forage crops specialist, provided hay samples.

### Thanks

It takes a lot of volunteers to run the skillathon. Thanks to everyone who helped out this year: Dee Dee Allen, Chris Anderson, Bruce, Claire, and Kate Bennett, Sheryl Burdette, Melody Canfield, Anne DeMarsay, Kathy Gordon, David Gordon, Martin Hamilton, Dahlia Jackson, Dwayne Murphy, Jennifer Reynolds, Marilyn and Samantha Schoenian, Jordan Thomas, Shannon and Rhonda Uzelac, Les Vough, and Niki Whitley (and anyone we forgot to mention).

### Next year

Next year's skillathon will be held on the Sunday (second day, May 3, 2009) of the Maryland Sheep & Wool Festival. It is open to any youth between the ages of 8 and 18. Registration information will be available on the Festival's web site at [www.sheepandwool.org](http://www.sheepandwool.org). Study links are available on the skillathon web page at <http://www.sheepandgoat.com/programs/skillathon/skillathon.html>

## New Grass-Based Mentoring Network

Grass-fed, pasture-raised, grass-finished - all phrases that are appearing more frequently in the agricultural press, at producer meetings, and in the general media as consumers seek out more locally-produced and nutritionally-enhanced food.

The phrase has captured so much attention and enough market share to prompt the USDA to issue a grass-fed standard in October 2007. But now that we have built a definition of "grass-fed," will more producers adopt this production method?

The Maryland Grazers Network pairs experienced sheep, cattle, and dairy grazers as mentors to work with farmers wanting to improve their grazing systems or begin a grazing system (farmer partners).

The project also provides an opportunity for farmers wanting to improve their marketing or to start a direct marketing operation to work with a farmer mentor who is doing creative marketing to take advantage of the growing market interest in grass-based beef. Mentors receive strong support from research and field experts in pasture management, marketing, and fencing and watering systems, and can bring this expertise market interest in grass based beef. Mentors receive strong support from



research and field experts in pasture management, marketing, and fencing and watering systems, and can bring this expertise in to help farmer partners where needed.

This project has several major initiatives:

**Improving the bottom line \$\$** - A major element is to carefully track costs and sales to ensure that new or improved practices/systems/marketing benefit the farm financially.

**Grazing and water quality** - Improving pastures should not only improve the bottom line \$, but also help improve water quality in nearby streams. Participating farmers are encouraged to consider stream-fencing and installing watering systems that keep farm animals out of streams.

**Marketing** - Once a strong grazing system is in place the project will provide expertise to help farmers market grass-fed products to enhance farm profitability.

**Contacts** - If you are interested in participating in the Maryland Grazers Network contact either one of the people below:

Michael Heller, Chesapeake Bay Foundation, mheller@cbf.org (email) or 301 627-2549

## Hair Contaminates Wool

With the rising number of hair sheep has come rising incidents of hair fiber contamination in U.S. wool clips. A small amount of hair can contaminate a lot of wool.

Like any other contaminant, such as poly or vegetable matter, the presence of hair in a wool clip will devalue it immensely or make the wool worthless. Non-wool fibers such as hair, kemp, and medulated fibers present processing difficulties.

Producers who have both hair sheep and wool sheep have to be the first line of defense against hair contamination. Hair sheep and wool sheep should not be run together if the producer intends to sell wool, as shedded fibers will work their way into a wool fleece.



*Texel x Katahdin*

Hair sheep and wool sheep should not be sheared together, if sheared at all, and hair sheep should be sheared after all other wool sheep. Producers need to be very vigilant with wool/hair sheep crosses, especially the first generation. While their fleece may look like wool, it actually is hiding the hair fiber underneath. Hair x wool crosses should be sheared after wool sheep and their "fleeces" should be discarded.

Source: "Hair contamination still a problem in U.S. wool clip," Sheep Industry News, February 2008.

## Featured Web Site



### AgTrader.org

The Environmental Finance Center (EFC) located at the National Center for Smart Growth, has announced the launch of a new agriculture products exchange website located at <http://www.agtrader.org>.

The first of its kind in Maryland, [agtrader.org](http://www.agtrader.org) is a free exchange for farmers and others to buy, sell, and trade manure, compost, hay, fodder crops, fruits and vegetables, organics, equipment, livestock, and much more. All trades are made strictly between buyer and seller. The new website is intended to compliment state-run manure transport programs and provide a free, user-friendly marketplace where farmers and other interested parties can buy and sell agricultural products and services.

## Featured Publications



### Lamb Autopsy

The New South Wales (Australia) Department of Primary Industries' online publication entitled "Lamb autopsy: notes on a procedure for determining cause of death", which outlines procedures for performing autopsies to determine cause of perinatal lamb deaths.

The 25-page document (2004) discusses the equipment needed for autopsy, procedures to follow, and the characteristics of many common reasons for lamb death. It contains graphic images of animals that have been attacked by predators and pictures of animal autopsies.

[http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0006/177783/lamb-autopsy.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/177783/lamb-autopsy.pdf)

### Goat Herd Health Calendar

Virginia Cooperative Extension has published a new fact sheet, "Goat-Herd Health Calendar." The four-page fact sheet was written by Drs. Dee Whittier, Kevin Pelzer, and Nancy Currin -- all DVM's with the Virginia-Maryland Regional College of Veterinary Medicine.

<http://www.ext.vt.edu/pubs/goat/412-501/412-501.html>

### National Goat Handbook

For the past several years, the National Goat Handbook (also called the Extension Goat Handbook) has been difficult to find online. It is no longer available in print.

The handbook was originally developed at the request of leaders of the goat industry to provide an up-to-date and comprehensive source of information on goats. Some of the information is outdated, but most is still relevant to current goat production systems.

[http://www.uwex.edu/ces/cty/richland/ag/documents/national\\_goat\\_handbook.pdf](http://www.uwex.edu/ces/cty/richland/ag/documents/national_goat_handbook.pdf)

[http://outlands.tripod.com/farm/national\\_goat\\_handbook.pdf](http://outlands.tripod.com/farm/national_goat_handbook.pdf)

The "replacement" for the National Goat Handbook is the National Goat Database Goat Handbook which includes materials from collections at the National Agricultural Library.

<http://www.adds.org> [click on Infobases]

## Maryland Wool Pool

The 51st Annual Maryland Wool Pool will be held on Wednesday, June 18, 8 a.m. to 2 p.m., at the Maryland State Fairgrounds in Timonium, MD.

There will be three lines to accept wool. Consigners with square wool bales will be pulled out of line to unload at a third line. The other two lines will accept loose wool.

Prices are about the same as last year: Choice white-face, 0.76 per lb.; Medium white-face, 0.55 per lb.; Coarse white-face, 0.49 per lb.; non white-face, 0.47 per lb.; and short, 0.39 per lb.

The price you receive for your wool will be the announced price minus a deduction for pool expenses (usually 5 to 8 cents per lb.). A check will be mailed within several weeks of the pool.

Maryland Sheep Breeders Association annual dues of \$25 will be withheld on wool sales over \$40. The MSBA board of directors have made it a policy that no refunds be made. MSBA members receive the quarterly, *Maryland Sheep News*.

We are now using nylon square packs to ship our wool in.

*Continued on page 11*

## Goats in the Classroom ... by Sarah Looney Shriner

Goats are wonderful, useful, loving creatures and are the perfect size to bring to a school! The Maryland Agricultural Education Foundation (MAEF) is excited to form a new partnership with the Maryland Dairy Goat Association to provide baby goats (kids) for students to visit with in various schools across Maryland. Directly before the goat "kid" visit, students will learn about agriculture and goats through a lesson. This new program, **Goats in the Classroom**, will be a component of Maryland's Ag in the Classroom programs.

MAEF will provide goat lessons, based on the students' grade level, to teachers and/or high school FFA members. After the teacher completes the lesson, students will be taken outside to have an actual visit with goat owners and a few goat "kids." Three literacy lessons have been created for K-3<sup>rd</sup>, 3<sup>rd</sup>-6<sup>th</sup> and 5<sup>th</sup>-8<sup>th</sup>.



The K-3<sup>rd</sup> grade lesson was piloted at Thurmont Primary School in Frederick County, Maryland on Friday, February 29, 2008. Catocin High School FFA members taught the lesson and three adorable three-week old Oberhasli (breed) "kids" were introduced to 16 first-graders. The lesson created for K-3<sup>rd</sup> grade consisted of an informational article on goats, a puppet show to *The Three Billy Goats Gruff* where fact was distinguished from fiction, a visit with the goat "kids," a second puppet show to *Just a Friendly Old Troll* (the troll's point of view of the story) and making a paper bag puppet of a goat or a troll. All of the first-graders left excitedly with an understanding of goats and with plans to ask their parents for a goat of their own! After all, goats do provide milk, meat, fiber, and companionship!



Since the pilot, the K-3<sup>rd</sup> lesson plan has been taught at two additional schools with more in the works for June. The Frederick FFA Chapter taught the lesson to all of Parkway Elementary's K-3<sup>rd</sup> grade students. The K-3<sup>rd</sup> graders at Sharp-Leadenhall Elementary in Baltimore City experienced Goats in the Classroom with Camden Yards as the backdrop.

Oakdale Middle School's Crops and Critters Club was the pilot site for the 5<sup>th</sup>-8<sup>th</sup> grade lesson. Liganore FFA members taught a lesson consisting of the short story *The Goat Lady* by Jane Bregoli, making lemon goat's milk cheese and sampling goat milk products, learning about the FFA (school based agricultural leadership organization) with Maryland FFA Association Treasurer ,Brittany Bowman, and a visit with the Walkersville FFA Chapter to learn about goats and to meet two one-week old Saanen goat kids! Plans are underway for this program to happen at a couple more middle schools before school is out for the summer. A similar program was recently conducted at the Good Samaritan Nursing Center in Baltimore.

The 3<sup>rd</sup>-6<sup>th</sup> grade lesson will be piloted in the beginning of June. The lesson contains the story of *Beatrice's Goat* by Page McBrier, an informational article on goats, bookmark creation, and a visit with goat kids.

All of the above lessons are available for your school. Do you know of a school that would like a visit from a few goats? Would you like to volunteer to provide goat kids for these lessons? For more information contact Sarah Looney Shriner at [sshriner@maefonline.com](mailto:sshriner@maefonline.com) or (301) 663-

**DID YOU KNOW . . . The small intestines from eleven sheep are needed to make one tennis racket**

Source: <http://www.danekeclublams.com/>

## Scrapie Update

Scrapie is an always-fatal disease affecting the central nervous system of sheep and goats. It is a member of a family of diseases called Transmissible Spongiform Encephalopathies. Other TSE's include "mad cow disease" (BSE: bovine spongiform encephalopathy), chronic wasting disease (CWD; of deer and elk), Kuru and both classical and new variant Creutzfeldt-Jakob disease (CJD) affecting humans.

During the mad cow scare in Great Britain, scrapie was theoretically linked to mad cow disease which was linked to new variant CJD. The link between scrapie and mad cow disease has long since been discounted by scientists, as BSE is believed to be a new disease. Scrapie is not known to pose a human health risk.

While scrapie has been in existence for more than 250 years in the United Kingdom and Europe and in the U.S. since 1947, there is still much we do not know about the disease and how it is transmitted. The causative agent has not been completely characterized. The popular theory is that the infective agent is a prion, an abnormally-shaped protein. Other theories maintain that the infective agent is a virus or virino (a sub-viral particle).

The infective agent – whatever it may be – is resistant to heat and other sterilization processes. It does not evoke an immune or inflammatory response in the animal. It has a long incubation period. Infected sheep or goats do not usually show clinical signs until 2 to 5 years after infection. Symptoms can mimic other diseases including ovine progressive pneumonia (OPP), pregnancy toxemia, listeriosis, rabies, toxins, and external parasites. Scrapie was so-named because affected sheep often "scrape" themselves against objects.

### Transmission

Scrapie is thought to be spread most commonly from dam to offspring, via infected placenta and birth fluids. Genetically-susceptible ewes and lambs in the same lambing environment are considered at-risk for developing the disease. While rams and bucks can get scrapie, they are not believed to be involved in the transmission of the disease.

Other oral routes of transmission are possible. In fact, it was recently learned that infective scrapie prions can be transmitted to lambs through the milk. Soil may also serve as a reservoir for the disease. In Iceland, scrapie has re-occurred on farms that were depopulated and disinfected, as long as 16 years after the last sheep left the farm.

### Genetics of scrapie

Scrapie is not a genetic disease; however, an animal's geno-

type (DNA) affects whether it will develop the disease if it is exposed to the infective agent. A simple blood or tissue test, done at any age, can be used to determine a sheep's resistance or susceptibility to scrapie. Genetically, susceptible sheep are not carriers for the disease. Nor will they develop the disease if they are not exposed to the infective agent.

Sheep have one pair of genes that affect scrapie resistance and susceptibility, called PRNP. A lamb receives one copy of the gene from each of its parents. All genes are made up of codons. Four codons are known to affect scrapie resistance and susceptibility. As there are different strains of scrapie, codon 171 is the major one that determines scrapie resistance and susceptibility in the United States.



Sheep that are RR at codon 171 are very resistant to scrapie. Sheep that are QQ are the most susceptible to scrapie, and almost all known cases of scrapie have been QQ sheep. Sheep that are QR are usually resistant to scrapie. Some states have programs to help producers get their rams tested for scrapie resistance/susceptibility. RR rams (or ewes) will not produce any offspring that are susceptible to scrapie.

So far, there doesn't appear to be any correlation between scrapie resistance/susceptibility and any important performance traits. Also, to date, no resistant genotypes have been identified in goats. Research is on-going.

### Slaughter surveillance

The incidence of scrapie in the United States is low. Slaughter surveillance studies conducted from February 2001 to March 2002 revealed a scrapie incidence of 2/10 of one percent in the U.S. sheep population (1 in 500 sheep). States east of the Mississippi River had a higher incidence of

## Revisiting Copper Toxicity

The last issue of *Wild & Woolly* included an article on using copper oxide wire particles (COWP) as a deworming agent in sheep and goats. Similarly, at the 2008 annual meeting of the Southern Section of the American Society of Animal Science, a graduate student presented the results of a study in which mature ewes were dewormed with copper sulfate.

The mention of copper (in any form) as a deworming agent should automatically send up a red flag to most sheep producers, as most producers understand sheep's sensitivity to copper.

Sheep are the species most prone to copper toxicity. Mature ewes of British breed origin appear to be the most vulnerable, and there is evidence to suggest that [Finn](#) and Texel sheep have a tendency to accumulate more copper in their liver than other breeds.

Sheep absorb copper from their diet in proportion to the amount of copper offered, not according to their body's need. Excess copper is stored in the liver. The storage level in the liver can take months or even years to reach a toxic level (> 1,000 ppm). Even then, it needs a stress to release the copper into the bloodstream. Copper toxicity results in liver disease, jaundice, and death.

The ratio of copper (Cu) to molybdenum (Mo) is the most important dietary factor affecting copper toxicity in sheep. Ratios of 10:1 or less will prevent toxicity in most cases. This is because molybdenum forms an insoluble complex with copper which prevents copper from being absorbed. Sulfur further complicates the Cu:Mo relationship by binding with Mo.

Copper absorption is more important than its concentration in the feed. Copper absorption in sheep is relatively poor, ranging from 1.4 to 12.8 percent; however, young animals may absorb up to 90 percent of dietary copper. The availability of copper is reduced by the presence of molybdenum, sulfur, and iron.

Fresh grasses are poor sources of copper in comparison to cured hay. Acid soils increase copper and lower molybdenum in forages. Liming can increase molybdenum in the forage and disturb the Cu:Mo ratio.

### Copper requirements

Copper is important for immune function in livestock. In 1975, copper requirements for sheep were set at 5 ppm (mg/kg). The requirements were increased to 7 to 11 ppm

in 1985. More recent recommendations use an equation to determine copper requirements for sheep. The equation includes various factors, including an absorption coefficient, which varies by the class and weight of sheep. The maximum tolerable copper concentration is considered to be 15 ppm for sheep, assuming normal levels of molybdenum (1-2 ppm DM) and sulfur (0.15-0.25 percent) in the diet.

Cattle require about 10 ppm of copper in their diet and can tolerate Cu levels ten times higher than sheep. Non-ruminants can tolerate even higher levels. This is why fertilizing pastures with pig or poultry manure can lead to copper toxicity in sheep. It is also why poultry litter should generally not be fed to sheep.

According to research, meat and dairy goats require and can tolerate much higher levels of copper than sheep. In 1991, copper requirements for goats were established at 8 to 10 ppm. Factoring in more recent data, the National Research Council (NRC) has recommended increasing the copper requirement of lactating goats to 15 ppm, mature goats and bucks to 20 ppm, and growing goats to 25 ppm. While goats, especially meat goats, may have a higher tolerance than other ruminants, scientists have not identified a toxic level for goats.

### Risk factors for copper toxicity

#### Species: sheep

Breed: some breeds more susceptible (e.g. Texel, Finn)  
 Age: young animals absorb more dietary Cu  
 Low Mo in soil, forages, or feeds  
 Use of feed or minerals formulated for other species  
 Fertilizing pastures with pig or poultry manure  
 Feeding poultry litter  
 Lack of zinc in the diet (zinc reduces Cu liver stores)  
 Acidic soils increase Cu and lower Mo  
 Copper water pipes  
 Stress

### The research on COWP

Widespread resistance to anthelmintics has led scientists to pursue various non-chemical alternatives for controlling internal parasitism in small ruminants. One such alternative is copper oxide wire particles (COWP). While their mechanism of action is not fully understood, COWP



### *Revisiting Copper Toxicity* (continued from page 8)

have been proven to reduce barber pole worm infection in sheep and goats, especially young stock.

Copper boluses (Copasure©) are available for use for copper deficiency in cattle. These boluses can be repackaged into smaller dosages (0.5 to 2 g) for use in sheep and goats. Dosage is not based on the weight of the animal. The boluses can be administered with a pill or balling gun.

As compared to copper sulfate, copper oxide wire particles are poorly absorbed, thereby reducing the risk of copper toxicity. Researchers have experimented with different doses of COWP and frequencies of treatment to determine not only the effectiveness of COWP as an anthelmintic, but also to assess the effect of treatment on copper concentrations in the liver and the risk of copper toxicity.

In the research trials, COWP have been used in sheep and goats, without creating unsafe levels of copper in the liver and without risk of copper toxicity. Most of the research has been done with hair sheep and meat goats. Results have varied. COWP appear to be more effective in young animals than mature ones.

Research is on-going. A summary of research trials can be found at [http://attra.ncat.org/attra-pub/PDF/copper\\_wire.pdf](http://attra.ncat.org/attra-pub/PDF/copper_wire.pdf).

### **Guidelines for using COWP**

Copper oxide wire particles (COWP) are not a "magical bullet" to control internal parasitism in small ruminants. However, they *may* offer a viable alternative to sheep and goat producers who are experiencing complete anthelmintic failure or who seek non-pharmaceutical approaches to worm control.

It is important to note that COWP are only effective against *Haemonchus contortus* (the barber pole worm). The barber pole worm is a blood sucking parasite that resides in the abomasum of sheep and goats. It is the primary worm species affecting sheep and goats in warm, moist climates that experience summer rainfall. Different methods are necessary to control coccidia and other gastrointestinal nematodes. To control the barber pole worm in mature animals, other methods may be more effective.

There are several **PRECAUTIONS** to follow when using copper oxide wire particles. COWP should not be the only method of parasite control employed on a sheep or goat farm. COWP should be part of an integrated parasite management program that includes many of the following practices: pasture rest and rotation, nutritional supplementation, genetic selection (between and within breeds), tanniferous forages, browsing, mixed species grazing, zero-grazing, harvesting hay and grain crops, minimum grazing heights, and selective deworming using the FAMACHA© eye anemia system. Fecal egg counts should be used to monitor pasture contamination and to test for drug resistance (and effectiveness).

Copper oxide wire particles **SHOULD NOT** be administered sub-therapeutically to sheep and goats. The FAMACHA© system should be used as a guide to determine which animals should receive a COWP bolus. It is generally recommended that sheep scoring 4 or 5 on the FAMACHA© eye anemia scale be treated for barber pole worm infection, whereas those scoring 1, 2, or 3 not be treated. It may be necessary to treat lambs, goats, and other at-risk animals that have FAMACHA© scores of 3, 4, and 5. Any animal showing symptoms of "bottle jaw" should be dewormed.

Sheep farms that have other risk factors for copper toxicity should probably not use COWP as a deworming agent.

Goats can experience copper toxicity, however, the risk is significantly less. Though there are breed differences, it is not known if hair sheep breeds have a higher tolerance for copper in their diets as compared to conventional woolled breeds.



## DSU Update from Dr. Dahlia Jackson

Kidding this year went over much better than it had last spring. We still had our problems, but not as many as we experienced last time. For instance, we had one female go down with ketosis, and three others that had breeched deliveries and by the time we got to them at least one kid had already died. In total, we had only 17 females that kidded with an average birth weight of 7.2 lbs with 2 kids per doe kidding. All of the females were bred to a 100% registered Boer buck that was purchased from the University of Maryland Eastern Shore early last year. All kids are growing really well and we expect to wean them in approximately 4 weeks.

With the parasite season here, we are gearing up to start work on our USDA and \*NESARE projects. Two graduate students, Jodi Lynn Eierman (DSU graduate) and Elizabeth Crook (Berry College, GA) were accepted into our Masters (M.S.) program in Agriculture (name recently changed from Plant Science to Agriculture Science to include animal science students). Jodi Lynn will be working on a project using timed-A.I in goats later this fall, while Elizabeth will be working on characterizing the level of resistance in sheep and goat parasites in the Mid-Atlantic U.S. (USDA funded project in collaboration with the University of Maryland Eastern Shore and the University of Georgia).

In addition, the Small Ruminant Program at DSU has gained three undergraduate students for the summer to conduct research on the efficacy of natural plant dewormers in controlling internal parasites in sheep and goats (NESARE funded) as well as on the impact of multi-species grazing (cattle and goats) in controlling parasites in goats.

For the USDA project mentioned above (characterizing the

level of resistance in sheep and goat parasites in the Mid-Atlantic U.S.) we are now getting in touch with producers who had expressed interest in determining levels of parasite resistance in their flock. We plan on starting this project in the next week or two. If anyone else is interested, please feel free to contact me in order to participate.

Again, the information gained from participating will help sheep and goat producers in implementing a chemical deworming strategy that is most effective on their farm in order to prolong the efficacy of available chemical treatments.



We look forward to conducting these projects as well as assisting with others over the next couple of weeks. As we get results, look out for technical reports that we will be sending out to keep everyone updated on our results. Again, if you would like more information on worm control or reproduction in sheep and goats please do not hesitate to contact me at (302) 857-6490 or [djjackson@desu.edu](mailto:djjackson@desu.edu). In addition, please contact me if you'd like to give your opinion about the type of research and programs that you would like to see conducted at Delaware State University.

\*Northeast Sustainable Agriculture Research and Education

## Using Oregano Oil to Control Coccidiosis

The results of an experiment using oregano essential oil in coccidiosis control of chronically infected goats were presented at the 9<sup>th</sup> European Society of Veterinary and Comparative Nutrition Conference.

In the study, researchers administered 20 mg of Regano 500 per kg of body weight daily for 30 days to goats with coccidiosis. The species of oregano they used was the Mediterranean variety, *Origanum vulgare L.*

They analyzed fecal samples at 0, 10, 20, and 30 days.

The fecal oocyte number started to decrease by day 10. By day 20, the fecal oocyte number was dramatically different for oregano-treated vs. control animals: 339 vs. 1,213. Fecal consistency was near normal on day 20 (1.6/3.0 for control and 2.6/3.0 for the oregano-treated group).

In a 2003 Greek experiment with broiler chickens, oregano essential oil also exerted an anticoccidial effect, though its effect was lower than exhibited by lasalocid (Bovatec®).



**Scrapie Update (continued from page 7)**

scrapie (0.52 percent) than other regions in the U.S. While scrapie can affect any breed of sheep or goat, it is most commonly diagnosed in black-faced sheep and their crosses.

Though goats are just as susceptible to scrapie as sheep, only 21 goats have ever been diagnosed with scrapie in the U.S. Surveillance of scrapie incidence in goats is currently underway. None of the first 685 goats in the study (from Texas) tested positive for scrapie.

In December 2007, a 3-year old Nubian goat from a farm in Michigan tested positive for scrapie. Four additional goats have been diagnosed with scrapie. It is not known how the original goat contracted the disease. Sheep had previously been kept on a farm where the goat was kept, but the goat did not have any direct contact with sheep. Goat-to-goat transmission most likely occurred.

**Live animal testing**

For many years, the only way to detect scrapie was to perform a necropsy and examine the brain tissue of the dead animal. It wasn't until 1998 that a pre-clinical test for live animals was developed. The third eyelid test extracts lymph tissue from the third eyelid.

In early 2008, rectal biopsies were approved as another live animal test for scrapie. As compared to the third eyelid test, rectal biopsies are easier to perform, have less complications, and are just as accurate.

Also in 2008, a company in Europe announced the detection of exogenous prions in the blood plasma of asymptomatic scrapie-infected sheep. Amorfix Life Science, Ltd. is currently in discussions with potential partners to get regulatory approval and commercialize the test. A simple blood test to detect scrapie would aid greatly in the worldwide eradication of scrapie.

**Atypical scrapie**

Last year, the first case of Nor98 atypical scrapie was diagnosed in a sheep in the United States. Four additional cases have followed. Nor98 is so-named because it was first discovered in 1998 in Norway.

Nor98 differs from classical scrapie. It occurs mostly in sheep that are over 5 years of age. Twenty-five percent of the cases occur in sheep that are over 10 years of age. Nor98 seldom occurs in more than one sheep in a flock, unless it is a very large flock.

It is not known if and how Nor 98 is transmitted. It may occur sporadically. Nor98 can affect sheep that are genetically

resistant to classical scrapie. The distribution of prions in sheep affected with Nor98 is different from classical scrapie. The current live animal tests do not detect Nor98.

**Scrapie eradication**

The goal of the National Scrapie Eradication Program is to eliminate scrapie from U.S. sheep and goats by 2010 and for the United States to be recognized as "scrapie-free" by 2017.

Scrapie eradication efforts are paying off. According to USDA-APHIS, the incidence of scrapie in cull sheep sampled at slaughter has been going down each year since 2003. As of October 30, 2007, the incidence of scrapie in black and mottled-faced sheep was 0.27% as compared to 1% five years ago.

All sheep and goats are required to carry official (USDA) scrapie ID when they leave their farm of origin. Scrapie ID allows trace-back of infected animals and identification of infected, source, and exposed flocks. To get free ear tags and the applicator to apply them, sheep and goat producers need to contact their area USDA APHIS office. In Maryland and Delaware, call (410) 349-9708.

There is a voluntary scrapie flock certification program which enable sheep and goat producers to have their flocks declared "scrapie-free" after five years of scrapie-free monitoring.

**Maryland Wool Pool (continued from page 5)**

Any producer bringing wool to the pool in the nylon square packs weighing 250 pounds or more will receive a 5 cent per pound bonus payment for their wool. A replacement wool pack will be issued with each pack containing 250 pounds or more.

Smaller lots of wool can be delivered in plastic trash bags (clear bags preferred) or loose in your vehicle. Never use polypropylene feed bags and please avoid using burlap bags. Wool delivered in polypropylene bags will be refused and wool delivered in burlap will be deducted 3 cents per pound.

Black and gray wool and wool from hair sheep or hair sheep crosses will not be accepted. Wet wool cannot be accepted.

For more information, contact pool manager Rich Barczewski at (302) 857-6410 (day time) or (302) 659-1211 (evenings, before 9 p.m.) or via e-mail at rbarczewski@desu.edu.

## Calendar of Events

### June 18 - Maryland-Delaware Wool Pool

Maryland State Fairgrounds, Timonium, MD

Info: Dr. Rich Barczewski at (302) 857-6410 or rbarczew@desu.edu

### August 2 - Pennsylvania Performance Tested Ram and Buck Sale

Pennsylvania Livestock Evaluation Center, PA Furnace, PA

Info: Glenn Eberly at geberly@state.pa.us

### August 23 - Virginia Ram Lamb Performance Test Sale

Shenandoah Valley AREC, Steel's Tavern, VA

Info: Scott Greiner at (540)231-5087 or sgreiner@vt.edu

### August 30 - Annual VA Tech Sheep Center Production Sale

Alphin-Stuart Arena, VA Tech, Blacksburg, VA

Info: Scott Greiner at (540) 231-5087 or sgreiner@vt.edu

### September 26-27 - Katahdin Hair Sheep International Annual Gathering

Sheraton Four Points Hotel and Washington Co.

Agricultural Education Center

Info: Susan Schoenian at (301) 432-2767 x343 or sschoen@umd.edu or

<http://www.khsi.org>

### October 4 - Performance-Tested Buck and Invitational Doe Sale & Goat Field Day

Washington Co. Agricultural Education Ctr., Boonsboro, MD

Field Day held at the W MD Research & Education Center

Info: Susan Schoenian at (301) 432-2767 x343 or sschoen@umd.edu

For additional events, visit <http://www.sheepandgoat.com> and click on the "Upcoming Events" link on the right.



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Comments and suggestions regarding the newsletter are always welcome. References to commercial products or trade names are made with the understanding that no discrimination is intended and no endorsement by University of Maryland Extension is implied.

More information on sheep and goats can be accessed at:  
<http://mdsheepgoat.blogspot.com>  
<http://www.sheepgoatmarketing.info>.

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