Fall 2019 – Volume 31, Issue 4

Hoof Print

The Small Ruminant Magazine

HERD HEALTH
COCCIDIOSIS
URINARY CALCULI
& LISTERIOSIS

TALES OF THE
KENTUCKY FIBER TRAIL

BUDGETING
THE 100-EWE FLOCK

2019 KENTUCKY
ANNUAL PRODUCER CONFERENCE
OCTOBER 26, 2019

Register Today!

www.kysheepandgoat.org/annual-producer-conference

KEYNOTE SPEAKER:
Susan Schoenian, Sheep and Goat Specialist
University of Maryland Western Research & Education Center

Kentucky SHEEP & GOAT DEVELOPMENT OFFICE

Kentucky Proud

TOPICS INCLUDE:

- Using genetics to increase parasite resistance
- Feeding, water and shelter systems for rotational grazing
- Alternative parasite control
- Managing gut health and nutrition to maximize immunity

KGPA and KSWPA Annual Association Meetings & Board Member Elections – Submit Your Name Today!
www.kysheepandgoat.org/board-member

Kentucky Sheep & Wool Producers Association

Kentucky Goat Producers Association

$25/person or $40/couple
(FAMACHA training additional $15)

Check-in at 8:30am, program starts 9:00am.

CLARK CO. EXTENSION OFFICE
1400 Fortune Drive
Hwy. 627, North
Winchester, KY 40391

Hoof **Print** Magazine
Published Quarterly
$24 per year
Free with paid membership to one or more of our partner organizations.

***Hoof*Print**: *The Small Ruminant Magazine* is a periodical to promote better animal health, husbandry, and knowledge among sheep and goat producers. ***Hoof*Print** is the joint effort of members of the sheep and goat industries and serves as a united voice for all small ruminant producers.

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Hoof **Print**
The Small Ruminant Magazine

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12 Urinary Calculi in Small Ruminants
14 Listeriosis in Sheep and Goats

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3 Spread the Word: Wool is Wonderful

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Kentucky State Fair Goat Show Successes

The KY Proud Wether Dam Champion and Reserve Champion this year was won by Taylor Graves (pictured top left).

The KY Proud Market Goat Champion was awarded to Avery Holman (top right) and the KY Proud Reserve Market Goat Champion went to Chance Flach (not pictured).

The Kentucky State Fair 2019 Dairy Goat Showmanship Winners were:
Champion: Adam Light (pictured bottom left) and Reserve Champion: Faith Hitch (bottom right).

Congratulations!

Kentucky State Fair Promotions

KGPA had the opportunity to represent our industry at the 2019 Kentucky State Fair at the Commissioner in Ag Breakfast and in AgLand. KGPA highlighted fabulous goat bacon at the Commissioner Breakfast, which is the opening event for the fair. Thank you to all the volunteers who made the event a success! KGPA member, Dee Daniels, also offered goat milk soap and lotion samples in AgLand opening weekend of the fair. Dr. Beth Johnons participated on a producer panel telling fair goers about raising goats.

KENTUCKY GOAT PRODUCERS ASSOCIATION

JOIN or RENEW TODAY!

KGPA Membership Application

Your $30 membership provides:

- 4 issues of the *Hoof***Print** Magazine plus the newly designed 2019 Sheep and Goat Management Calendar
- A unified voice for the goat industry on the state and national level
- Representation on important committees such as the Check-Off and the Animal Care Standards boards
- Support of various educational and youth activities
- Youth Membership forms can be found at kysheepandgoat.org/KGPA.html
- **And much, much more!**

Visit www.kysheepandgoat.org to join today!

Name: _____

Address: _____City: _____State: _____Zip:_____

Phone: _____E-Mail: _____

Please enclose a check for $30 made out to KGPA and mail to:

Kentucky Sheep and Goat Development Office
P.O. Box 4709, Frankfort, KY 40604-4709.

CALENDAR OF EVENTS

OCTOBER

10 **graded sale Bowling Green**
10 **Jessamine County Goat and Sheep Association;** Jessamine County Fairgrounds; 7:00pm
14 **graded sale Richmond**
15 **graded sale West Kentucky Auction Barn**
15 **South Central Goat & Sheep Producers Association;** Barren County Extension Office, 6:30pm
17 **KSU Goat Third Thursday**
17 **Fort Harrod Goat and Sheep Association Meeting;** Mercer County Extension Office; 6:30 pm potluck and 7 pm meeting
19 **graded sale Springfield**
22 **graded sale Paris**
24 **graded sale Bowling Green**
26 **KY Annual Producer Conference** register: www.kysheepandgoat.org

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21 **graded sale Springfield**
22-30 **Chanukah**
25 **Christmas**

Contact us to add your event or meeting to the calendar of events.

Letter from the President

KGPA NOTE'S FROM THE KIDDING BARN

Dear KGPA Members,

As I am writing this column, "Dorian" is pounding the East Coast of the United States and we are extremely dry in Central KY; weather sure can throw a few curve balls our way. The heat and dryness has helped curtail some of the intestinal parasite issues this summer, but cooler temperatures and wetness that come with fall and winter trigger the parasites to become active once again, so don't let your guard down on parasite issues in your herd.

I hope that many of you were able to visit the Kentucky State Fair and comingle with the Dairy Goat and Meat Goat Exhibitors. A big thank you to all of our members that helped out with the Commodity Breakfast on the first day of KY State Fair. And thanks to Denise Martin, Martin Meadows Farm, for supplying the goat bacon at the breakfast!

Hopefully, most of our KGPA members will be able to attend the KY Annual Producer Meeting, October 26th at the Clark County Extension Office. If you have never had the opportunity to read or listen to the many resources created by Susan Schoenian, especially https://www.sheepandgoat.com/, you need to attend the conference to hear from her first hand. You won't be disappointed.

Hopefully you have started with your breeding plans to produce your best kid crop ever this coming kidding season. If I can ever be of assistance to you please let me know, remember...

"It's not what you look at that matters, it's what you SEE"
– Henry David Thoreau

Beth Johnson, DVM
President, KGPA

KENTUCKY GOAT PRODUCERS ASSOCIATION

Become a Board Member!

www.kysheepandgoat.org

KGPA is looking for motivated individuals interested in serving the KY goat industry. Consider being a part of our board so you can share and implement your great ideas on how to make the goat industry grow and prosper. Submit you application here:

https://www.kysheepandgoat.org/board-member

Hello from Tennessee!

The first hints of fall are arriving here in Middle Tennessee with cool night temperatures and dryer air. We've had enough rain off and on to support our pastures but do realize, there are places where it might have gotten a little dry. Fall hay cutting is underway as well so here's hoping your crop is plentiful to provide winter forage.

We are working on the agenda for our annual meeting and conference scheduled for December 6 &7. As speaker commitments are being finalized, I encourage you to set the dates on your calendar and plan to join us. Lebanon is just east of Nashville (about 25 minutes) and a great place to visit.

Speaking of Lebanon, our very own Wilson County Fair just ended and was home to The Birthing Barn, an educational exhibit featuring live births. Five species of farm animals (pigs, cattle, horses, goats and sheep) were showcased during the fair which was celebrated as the Year of Wool. Pigs and kids were born however sheep were well represented in the Birthing Barn. The Powell family had two Dorset ewes lamb during the week fair, as well as, my family having two Katahdin ewes lamb. Hundreds viewed births in person however thousands attended from all over the world during live feeds on Facebook. The experience was breathtaking for those having never been around livestock and as you can imagine, there were many questions! The Birthing Barn, sponsored by Edwards Feeds, Inc. is raising funds to build a permanent educational facility there at the fairgrounds. If you would like to see video from this year, visit www.birthingbarn.org.

I'm hoping to see you in December. Until then, I'm hoping the best for you and your flocks!

Be well,

Debbie Joines
President
TN Sheep Producers Association

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If you are interested in a committee please select below:

_____ Wool
_____ Youth
_____ Jr. Expo
_____ Sale
_____ Production Education
_____ Membership/Revenue
_____ Publicity
_____ Annual Meeting

JOIN ONLINE TODAY!

TSPA Membership Application

Annual Dues: Adult: $30.00 Junior $10.00

Name: _____

Address: _____ City: _____ State: ___ Zip: _____

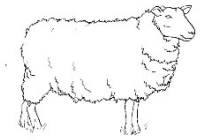
Phone: _____ E-Mail: _____

Breed(s) of Sheep: _____

Please enclose a check for amount made out to TSPA and mail to:
Tennessee Sheep Producer's Association • 4233 Poplar Hill Road, Watertown, TN 37184

Pay dues and join online at www.tennesseesheep.org/joinonline.htm

Tennessee Sheep Producers Association
Sheep Production Conference and Annual Association Meeting



December 6 & 7, 2019

Ward Ag Center, Q-Barn
945 E. Baddour Pkwy
Lebanon, Tennessee
Tentative Schedule

Cost: $20/adult; $10 Children

Reservation: Contact Mark Powell (shepherdboy1@yahoo.com or 615-519-7796) by November 19 with number attending

Bring: Items for Silent Auction and Door Prizes.

Friday, April 5

6:00 pm	Registration/Reception
	Enjoy Lamb Hors d'oeurvres while visiting with sheep friends and acquaintances
6:30 pm	Record Keeping for Profit – Adam Hopkins (UT Extension)
7:30 pm	Lamb Board Update -Jim Percival- American Lamb Board
8:30 pm	Break
8:40 pm	Tennessee Sheep Producers Association Annual Meeting

Saturday, April 6

8:00 am	Updates: (10-15 minute information bits)
	Wool Pool – Mark Powell
	Marketing Opportunities– Blake Ramsey, Anthony Shelton or Tom Rison
	Australian Lamb Industry Tour- Jim Percival, American Lamb Board
9:00 am	Multi Species Grazing and other Grazing Opportunities – Johnny Rogers (Amazing Grazing group and Rogers Cattle Company)
10:00 am	Break/Silent Auction
10:30 am	Using Technology to Facilitate Out of Season Breeding – Jessy Shanks (UT Animal Science)
11:30 am	Lunch

Become a Board Member!

www.kysheepandgoat.org

KSWPA is looking for motivated individuals interested in serving the KY sheep industry. Consider being a part of our board so you can share and implement your great ideas on how to make the sheep industry grow and prosper. Submit you application here:

https://www.kysheepandgoat.org/board-member

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- Richard Popham, Brandenbug, KY – rapopham@gmail.com
- Sue Churchill, Versailles, KY – thistlesend@gmail.com
- Eileen Donohue, Willisburg, KY – eod1954@yahoo.com

Friendship Spinners at the 2019 KY State Fair (Top Photo)
Commisioners Breakfast (lower left) **and Soap Felting** (lower right)

Kentucky State Fair PROMOTIONS

KSWPA had the opportunity to represent our industry at the 2019 Kentucky State Fair at the Commissioner in Ag Breakfast and in AgLand. KSWPA highlighted fabulous lamb sausage at the Commissioner Breakfast, which is the opening event for the fair. Thank you to all the volunteers who made the event a success! KSWPA members also put together great demonstrations on soap felting by Janella Miller, Red Barn Wool, and fiber arts by the Ky Friendship Spinners. Jim Mansfield, Four Hills Farm, also participated on a producer panel telling fair goers about raising lamb.

Kentucky SHEEP & WOOL PRODUCERS ASSOCIATION

JOIN or RENEW TODAY!

Visit www.kysheepandgoat.org

KSWPA Membership Benefits

- Quarterly issues of HoofPrint Magazine plus the newly designed 2019 Sheep and Goat Management Calendar
- A unified voice for the sheep industry and representation on important state and national committees
- Assistance with new marketing opportunities such as The Kentucky Sheep and Fiber Festival and HoofTrader.com
- Receive a membership to the American Sheep Industry, our national lobbying, marketing and promotional support system.
- Support of various educational and youth activities

Name: _____ **Phone:** _____ **E-Mail:** _____

Address: _____ **City :** _____ **State:** _____ **Zip:** _____

Please enclose a check for $30.00 made out to KSWPA and mail to:
Kentucky Sheep and Goat Development Office
P.O. Box 4709, Frankfort, KY 40604-4709.

PRESIDENT'S LETTER

Dear Kentucky Sheep and Wool Producers,

This summers' forage has been great for growing our 150 Katahdin ewes and 250 lambs, however we have had a real challenge finding good quality hay for the winter feeding due to lots of early summer rain. I have learned over the years that bad hay is nearly as bad as no hay. Our sheep just won't eat it when it is poor quality.

Please mark your calendars and plan to join us for our 2019 Kentucky Sheep and Goat Development Office annual educational conference to be held on Saturday October 26. Our keynote speaker this year is Susan Schoenian Susan is the sheep and goat specialist at the University of Maryland Small Ruminant Extension Program located at the Western Maryland Research & Education Center. Susan holds B.S. and M.S. degrees in Animal Science from Virginia Tech and Montana State University, respectively. She has been with University of Maryland Extension since 1988. Our annual conference is an opportunity to come together and meet other producers and share ideas and experiences in order to get better at raising our sheep. The speakers that join us are some of the best in the country and provide us with the latest news and science about dealing with our small ruminants. Please plan on joining us Saturday October 26.

The conference will be held on Saturday October 26th in Clark County at the UK County Extension Office. Registration at 8:30 with the program starting at 9:00.

Clark County Extension Education Facility
1400 Fortune Drive – Hwy. 627, North
Winchester, KY 40391

The Kentucky Sheep and Wool Producers (KSWPA) in cooperation with the Kentucky Sheep and Goat Development office had a very successful 10th annual Sheep and Fiber Festival at Masterson Station Park in Lexington. As usual I worked the front gate along with other KSWPA volunteers, and it pleases me that people repeatedly come to our festival from all over the region. I have met people from Missouri, Tennessee, Indiana, and Ohio, and they could not be more complementary of the festival workshops, the festival vendors, and the festival staff and volunteers.

For those of you who have not attend either the Sheep and Fiber Festival or the Bluegrass Classic stock dog trial I encourage you to come and see us next May. The dog trial runs Thursday through Sunday the same weekend as the Sheep and Fiber Festival and my family enjoys attending the festival and then going over and watching the dog trial finals on Sunday. This trial is one of the largest, most prestigious, longest running stock dog trials in the country. Admission is free to the dog trial and you will be absolutely amazed by what the dog handlers can do to guide sheep with their dogs.

Our goal is to increase the membership of the Kentucky Sheep and Wool Producers Association (KSWPA). To do that I need your help as members to ask all of your friends and family who are sheep producers, but not members to join you in becoming a member of the KSWPA. As a member you have access to our breeder's directory, our mentoring program, and a variety of educational programs including our online Small Ruminant Profit School (SRPS). Review the sample SRPS module on line at the YouTube link: https://youtu.be/HLFioNbPOds As always encourage your family and friends to join the KSWPA. Here is the link. https://www.kysheepandgoat.org/kswpa-membership-app.html

Best Wishes,
Bill Decker - President
Kentucky Sheep and Wool Producers Association

CALENDAR OF EVENTS

OCTOBER

8	**EweProfit School II, C. Oran Little Research Farm** Midway, KY
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25	**Christmas**

COCCIDIOSIS in Sheep and Goats

by Dr. Jerusha Lay, DVM Extension Veterinarian Kentucky State University

Throughout my years in practice, all too often I would get a call from a producer who said, "My goat has scours". I would go through the long list of potential causes of diarrhea. When I got to the most common cause, parasites, the next question would be "What is the best dewormer?" Well, that depends.

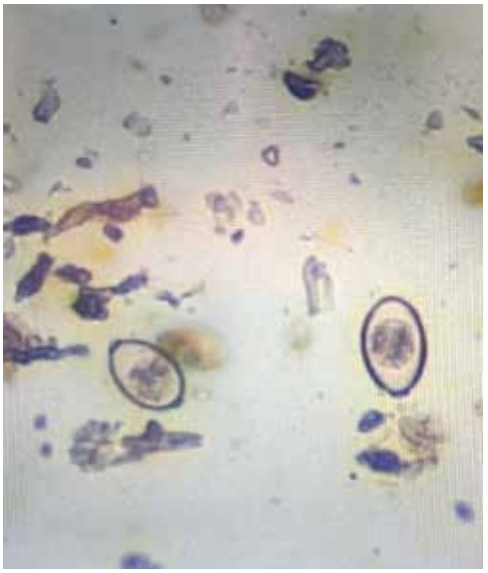
Often the words "parasites" and "worms" are used synonymously, but they are not always the same thing. While the worms we refer to as infecting goats and sheep (such as the barber pole worm and tape worm) are parasites, organisms like coccidia are also considered parasites, but not worms. This is important to remember because treatments for coccidia are different because coccidia are not affected by dewormers. Coccidiosis can also be more difficult to diagnose since it does not affect the color of mucous membranes, which many producers use to diagnosis parasitic disease.

Coccidia is a very small intracellular parasite that invades and destroys the cells lining the intestines. These cells have a vital role in animal nutrition because they help the animal absorb the nutrients they eat. When this area of the small intestine becomes inflamed and damaged, weight loss is common even if the animal seems to be eating normally. If the inflammation is severe, the inability of the animal to absorb nutrients will cause diarrhea. In cases of prolonged disease, scarring may occur, which can cause irreversible damage and chronic weight loss.

Most of our domestic species, including sheep and goats, are affected by coccidia. However, it is important to note that coccidia are species-specific, which means that each species of coccidia only infects specific species of domestic animals and these coccidia cannot be transmitted to other species. For example, chickens with coccidia will not transmit the disease to sheep or goats. In small ruminants, the most common coccidia are Eimeria species. There are multiple types within this genus and some will cause more disease or more severe symptoms than other strains.

The life cycle of coccidia is very complex since it involves both endogenous and exogenous phases (inside and outside the animal) as well as stages of as0exual reproduction and sexual reproduction. The important thing to remember is animals that are infected or carrying coccidia will pass oocysts (microscopic egg-like structures) through their feces. The oocyst will go through a process of sporulation or hatching, which takes 2-7 days depending on temperature and moisture. The transmission then occurs by the infective stage when an animal ingests oocysts from the environment. After reaching the small intestines, the organism has two phases. In the first phase, the organism will replicate and infect cells surrounding it, which increases the infection within an animal. The second phase will involve a different process whereby the organism makes new oocysts that pass through the feces to other animals.

Coccidia is generally considered a disease of young animals, although occasionally there are a few exceptions. Most animals will be exposed to coccidia when they are young and develop immunity. Older animals that have been exposed to coccidia earlier in life that have developed immunity against them may still be infected and pass the organism through feces; however, older animals usually do not develop disease from this later exposure. Even though these adults only shed oocysts in small numbers, this is enough to contaminate the environment and expose young animals to coccidia. Because of this possible source of exposure, sanitation in kidding/lambing pens is very important. It is believed that



microscopic view of Coccidiosis

some immunity to coccidia is passed to young animals through colostrum since very young animals exhibit a little more resistance and susceptibility gradually increases after 4 weeks of age, which is when the maternal antibodies begin to fade. "Bottle babies" are also very susceptible to coccidiosis; however, this could be related to stress or their being raised in confinement.

The rare cases of adult goats that develop coccidiosis are usually animals with a weakened immune system. It is important to note that this may include stressed animals or those facing nutritional issues. This means that high-producing adult dairy goats may develop coccidiosis since the stress from lactation may make them more vulnerable to disease. Anything that may cause stress in animals, including weaning, adverse weather conditions, overcrowding, and transporting the animals to livestock shows, can weaken the immune system and make the animal more vulnerable to disease. If these stressors cannot be avoided, animals should be monitored closely and fecal flotation exams performed quickly if coccidia exposure is suspected.

Nutrition also plays a crucial role in the immune system and determining whether infected animals will develop clinical disease or not. Since coccidia is more common in young animals, providing a high-quality creep feed is recommended. Creep feeding also will decrease the stress of weaning since it reduces the effects of a sudden change in the diet. It is also important for the immune system function

to ensure the animal has sufficient dietary minerals like copper, selenium, and zinc.

Environmental conditions also play a large role in coccidiosis. As mentioned earlier, coccidia are transmitted when an animal ingests fecal material. If animals are ingesting large amounts of oocysts, they will be more likely to develop disease. This means animals kept in pens that are overcrowded or not cleaned regularly will be more susceptible. When the oocyst first passes through the feces, it is not infective to other animals and is relatively easy to eliminate from the environment. However, once the oocyst becomes sporulated (which takes 2-7 days), it becomes very difficult to kill and is resistant to many common cleaning chemicals. This means cleaning pens of young animals every 24-48 hours is very important to preventing infections. Also, you should keep feed and water troughs clean from fecal matter. It takes extreme heat or cold (above 63 °C or below -30 °C) or direct sunlight to kill the oocyst once it is sporulated. Whenever possible, it is recommended after cleaning to leave feed troughs, water buckets, and any other equipment in direct sunlight to kill any residual organisms. Also recommended is elevating feed troughs and preventing animals from defecating in feed or water troughs.

Infections may be described as clinical or subclinical. Animals with clinical infections may show severe symptoms, including severe, watery diarrhea (sometimes bloody), dehydration, anorexia, low protein levels, depression, and abdominal pain. In some cases, severe straining may lead to rectal prolapses. Animals may also exhibit subclinical disease, which is generally characterized as unthriftiness. These animals will have lower growth rates, lower body weight, or lower performance. They often have a dull hair coat and are often the animals considered "poor doers".

If an animal is suspected to be infected by coccidia or is at high risk for this disease, a fecal floatation test may be performed to detect oocysts. Since many animals may have the parasites without it causing clinical disease, diagnosis is based on both confirming the presence of the oocyst in the feces as well as the animal showing clinical signs of diarrhea or poor growth.

Coccidia may be treated with a few medications; however, the use of these medications in sheep and goats is considered "off-label" because these medications have not been approved for this use in these species. Legally, off-label use of any medications on animals intended to be food must be at the direction of your veterinarian to ensure that there are no issues with medication residue in meat or milk. The most common treatments for coccidiosis are sulfonamides, amprolium, and toltrazuril/ponazuril. For specific directions and use of these medications, consult your veterinarian. If caught early, treatment of coccidiosis is generally successful although in severe cases the organism could cause enough tissue damage and scar tissue formation so nutrient malabsorption is a chronic issue.

Depending on individual farm plans and the environmental conditions, some farms will elect to treat animals prophylactically or in mass-treatment. If a farm has a history of kids with coccidiosis or an aggressive species of coccidia, it is recommended to treat the kids/lambs at the time of weaning or before. In many instances, exposure to coccidia in small amounts is needed for the animals to develop immunity, so mass treatment is often not needed on many farms. You should consult with your veterinarian about your farm history and management techniques.

Coccidiostats are common additives used in livestock feeds. Monensin is approved by the Food and Drug Administration (FDA) for goats, lasalocid is a FDA-approved product for sheep and decoquinate is approved for both species. These products are available in many commercial feeds and should be labeled as "medicated". These products are sometimes added to creep feeds and starter feeds however, they have a bitter taste so some feeds for young animals will not contain them; be sure to read all feed labels. Also, feed with coccidiostats may be fed to adults during the kidding/lambing season to decrease the amount of oocysts shed by the adults and reduce or prevent infections in their offspring. If you have animals that are in high risk for coccidia, discuss the use of these products with your local veterinarian.

Coccidiostats are designed to help control coccidia by preventing transmission, but they cannot be used as a treatment in animals that already have coccidiosis. If animals have consumed oocysts, coccidiostats will not kill the organisms. Instead, these medications will only decrease the shedding of oocysts and interfere with specific parts of the lifecycle.

Worldwide, coccidiosis has a severe economic impact on small ruminant production. Most goat herds in Kentucky are relatively small, which means any losses are even more devastating. There are the obvious losses due to death of animals, but infection with coccidia can cause animals to decrease performance (i.e., have slower rates of growth, reduced milk production, etc.) and make animals more vulnerable to other illnesses, which can cause even more economic losses.

However, it is a manageable disease. Understanding how it is transmitted and the effects this disease has on infected animals is important so producers can be aware and monitor herds closely. Coccidiosis is harder to diagnose than other types of parasites, which makes diagnostic fecal flotation examinations very important. To prevent coccidiosis, all farms should practice good sanitation and provide animals proper nutrition while minimizing stress. If your herd has issues with this disease, consult your farm veterinarian for medications to treat and prevent new infections.

Dr. Jerusha Lay, *DVM works with the Kentucky State University Extension Program. She earned her Bachelor of Science in Agriculture from Eastern Kentucky University. She followed with her Doctor of Veterinary Medicine, from Auburn University. Dr. Lay has spent 8 years practicing in central Kentucky with an emphasis on small ruminants before joining the faculty at KSU.*

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URINARY CALCULI in Small Ruminants

by Dr. Beth Johnson, DVM

Doc, my sheep/goat is straining to defecate, what is wrong? When I was in practice, my heart sunk when asked this question. Sheep and goats have an excellent gastrointestinal tract and should never be constipated. So what causes this clinical sign? The small ruminant is straining to urinate, NOT defecate! Unfortunately the condition urinary calculi (also known as urinary urolithiasis, water belly, etc.) can be fairly common on some farms with improper nutrition or management. There are not many treatments for this condition that are 100% curable or inexpensive therefore prevention is the key!

Urinary calculi rarely causes a problem in female sheep/goats due to the larger urethral diameter of the urinary tract and the shorter length and straightness of the urethra in females vs. males. The male urinary tract is depicted in **Figure 1**.

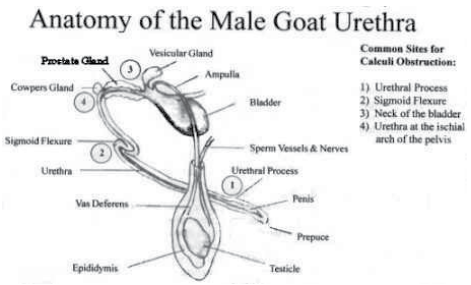


Figure 1. Normal urinary tract of a male small ruminant.

As you can see, not only is the urethra rather long, it makes a "S" curve called the sigmoid flexure and has an extremely small urethral process at the end of the urethra which is where a large number or urinary calculi lodge and results in the inability to urinate.

CLINICAL SIGNS OF URINARY CALCULI

As mentioned, the most obvious clinical sign is straining to urinate. The animal will stretch out, raise their tail, and may even vocalize while it is straining. An acute observer may notice a pulsing under the skin just below the rectum. This is the urethra trying to expel urine. Depression with initial elevated rectal temperature followed by a decrease in body temperature near death. A decreased appetite, "bloated" appearance, sternal recumbency, edema in ventral abdominal skin and sudden death are all signs that occur in the later stages of urinary obstruction due to urinary calculi.

Figure 2. Struvite/Phosphate Uroliths in a bladder.

Figure 3. Calcium carbonate stones

TREATMENT

Obviously, the goal of treatment is to remove the obstruction in the urinary tract and establish a patent urethra. This requires removal/dissolution of urinary calculi within the bladder/urethra and changes in the diet to accomplish treatment. It is important to identify what type of calculi you are dealing with. Most calculi are derived from elevated levels of phosphate (struvite, which appear like sand) but some calculi are calcium ammonium magnesium carbonate stones (look like BB's, very hard) as seen in **Figure 2 & 3**. Consult with your veterinarian to identify the calculi so that appropriate diet modifications can be performed to prevent urinary calculi development. **DO NOT PROVIDE BAKING SODA TO MALE SHEEP AND GOATS.**

Immediate medical attention is necessary to save the affected male sheep or goat. It may be as simple as snipping the urethral process at the end of the penis or as complex as abdominal surgery. I utilize a mild sedative which allows me to set the male sheep or goat on his rump, extend the penis and examine the urethral process. If I identify a calculi in or near the urethral process, then I snip the end of the process and hope that the animal can pass urine after performing this procedure. If I do not get urine at this point, then I proceed to other alternatives which may include bringing the urethra out below the rectum or in more advanced cases, bladder surgery. In all cases, the animal is placed on antibiotics and ammonium chloride drench daily for 7-10 days, if the calculi are phosphate or struvite in composition. An anti-inflammatory is also administered to prevent scarring of the urethra and give pain relief.

PREVENTION

As you can see, it is much easier to prevent urinary calculi then it is to treat. Most of the urinary calculi cases occur in market wethers being raised for 4-H/FFA livestock projects because they are consuming high grain diets. Grains generally contain elevated levels of phosphorus and low levels of calcium. Your goal should be to maintain an overall calcium:phosphorus (Ca:P) ratio of 2:1 or greater in the animal's diet. Forages usually contain higher Ca:P ratios and should be incorporated into small ruminant diets. If you are unsure of your feedstuff's Ca:P

ratio, then have an analysis performed. Forages from a heavily fertilized field may contain low Ca:P ratios. Also be sure all animals have access to a trace mineral mix which obviously includes salt in order to increase water consumption. Restriction of water intake is one of the leading causes of urinary calculi. Provide fresh, clean water at all times.

USE OF AMMONIUM CHLORIDE

Ammonium Chloride is incorporated into the ration of many small ruminant grain diets to aid in dissolving the phosphate/struvite stones. If you are experiencing a problem with Calcium stones, then the ammonium chloride will not help with prevention. Consult with your feed dealer to be sure that ammonium chloride is at the appropriate amount in your feed which is 2% of the grain ration.

Animals that have experienced a blockage from phosphate calculi, should receive 10 grams of ammonium chloride daily for 7-10 days after treatment for the obstruction. Due to the bitter taste of ammonium chloride, it is usually recommended to drench the animals with the ammonium chloride dissolved in water with sugar or syrup added to increase palatability.

Research has shown that pulsing ammonium chloride, i.e. feed for 3 days, then off for 4 days, then back on, may decrease the ability of small ruminants to compensate. The goal is to maintain the urine pH below 6.5, but above 5.5. You can test the animals urine pH by using urine test strips which can be purchased from your veterinarian. The easiest way to catch urine is attaching a cup to a stick and collecting after an animal has been in a rest period.

TIMING OF CASTRATION

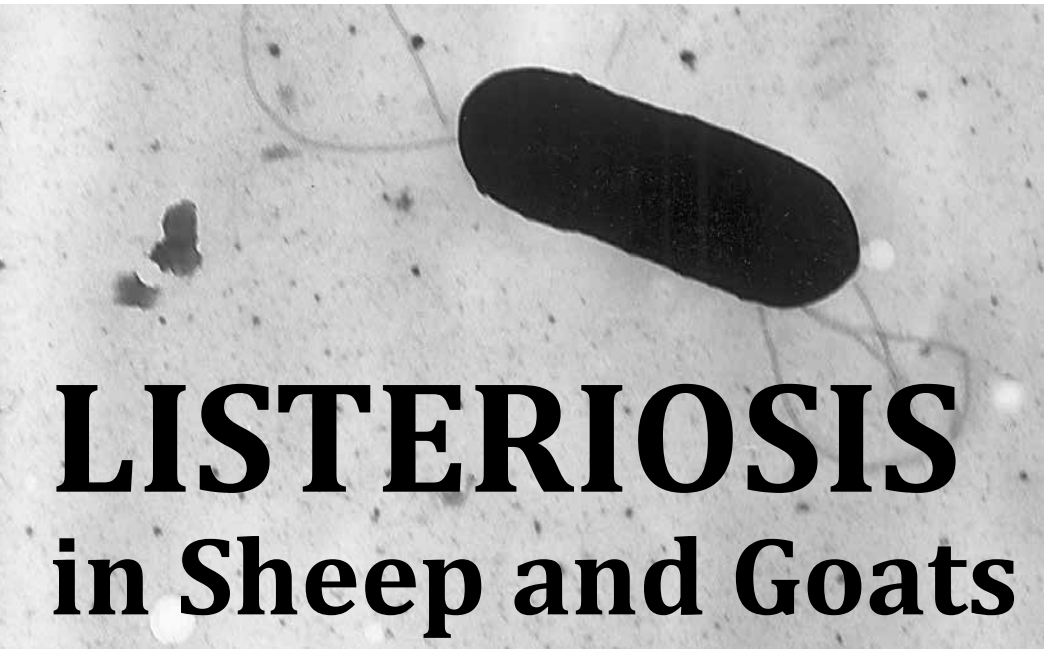
Research has shown that delaying castration to 2-4 months of age allows the male hormones to develop the width of the urethra. Because sexual maturity usually begins around 4 months of age and the adhesions that are normally present between the prepuce and penis in young animals are broken down by this time, waiting until 4 months to castrate will allow the urethra diameter to be as large as possible. The adhesions of animals castrated younger than 4 months, generally do not break down as thoroughly which makes the extension of the penis for examination in the case of urinary calculi extremely difficult.

Finally, I strongly feel that genetics may play a role in the development of urinary calculi. When you have a group of male lambs/kids and one develops urinary calculi and all the others are fine, this animal's metabolism makes him more prone to develop urinary calculi than others. If you notice an increase in urinary calculi cases out of a common sire, and the diet is unchanged, you should consider a genetic predilection to urinary calculi and cull those animals.

CONCLUSION

Hopefully, you will never have to experience a valued pet or livestock project sheep/goat with this problem but if you do please contact your veterinarian as soon as possible for assistance.

Dr. Beth Johnson *is a Staff Veterinarian in the Kentucky Department of Agriculture and has 40 years of experience raising and treating small ruminants. Her family farms in Parksville, KY where she raises Gelbvieh cattle and Boer goats.*



LISTERIOSIS in Sheep and Goats

by Dr. Jerusha Lay, DVM Extension Veterinarian Kentucky State University

What is listeriosis and what causes it?

Listeriosis is a common disease in sheep and goats. Listeriosis is caused by the bacteria Listeria monocytogenes. The disease may present in multiple forms. First is an encephalitis (infection of the brain) that shows as neurologic disease. However, Listeria may also cause uterine infections or septicemia, presenting as abortions or general illness.

Listeria species can grow in a wide range of temperatures and is extremely resistant to cold temperatures. In fact, unlike other bacteria, temperatures below freezing may not kill the bacteria, but instead promote its growth. Thus, although it can occur throughout the year, listeriosis is more commonly seen in the winter and spring months. Generally peaking in the months of January-April in Kentucky.

Once ingested the bacteria is absorbed through the small intestines and travels through the blood stream to localize in the brain stem, uterus or less commonly the eye or udder. From the time the animal is exposed until it begins showing symptoms may be up to 3 weeks. This makes determining the actual source more difficult.

Where does Listeria come from?

In general listeria is consider ubiquitous, meaning that it may be present in many environmental sources such as contaminated water, decaying plant material, soil or feces.

Two common routes of transmission of Listeria are:

1. The most common route of transmission, especially in cattle, is from decaying vegetation. This may be in the form of round bales of hay that have begun to rot, silage that was not properly fermented, and feed bunks/bins that are not cleaned regularly.

2. A more common source of Listeria in goats is fecal-oral transmission from other animals (goats, wildlife or birds). Healthy animals may have Listeria in their gastrointestinal (GI) tract. These animals are often referred to as carriers. As they do not show any symptoms, by passing the bacteria in their feces, they can be a source of infection for other animals.

What are the symptoms of Listeria?

Neurologic listeriosis has a much faster progression in small ruminants than it does in cattle. In severe cases, death may occur 24-48 hours after the initial symptoms. At first, animals are depressed and possibly off-balance when walking. The next symptom is generally a unilateral facial paralysis (drooping of one side of the face). As it continues to progress, animals

often lose the ability to swallow and begin walking in circles or falling to the affected side. Listeriosis is commonly referred to as 'circling disease'. As the disease and ataxia progresses, the animal becomes unable to stand, and if treatment is not successful, die within the next 24 hours.

How do I prevent Listeriosis?

Supply high-quality hay and grain. Feed should be stored properly and not fed if wet or decaying. Discard any feed sources that are decaying. Square bales are usually preferred for goats since they are fed more frequently and less waste if left to rot. Also, whenever possible, keep hay protected from the weather by a cover over the hay feeder or feeding inside a shelter.

Wet grain that is spoiling in the edges of troughs may also be a source of Listeria therefore it is best to clean troughs daily. Make sure feed and water troughs are free of feces from birds. Similarly, if feed or water troughs contain fecal material, they should be cleaned thoroughly.

Stress, mineral deficiencies, and malnutrition may weaken the animals' immune system. This may increase incidence of Listeria. The weather itself may be a stressor in the winter months, so providing quality feed sources are essential in herd health.

Is it treatable?

If listeriosis is caught early, it may be treated with antibiotics and anti-inflammatory drugs. If you have an animal that you suspect has Listeriosis, have your veterinarian examine and recommend treatment options. Once an animal is recumbent (unable to stand), the prognosis is very poor.

Zoonotic Potential

When discussing listeria, it is important to note the zoonotic potential, which means

that it may be transmitted to humans as well. A common source may be dairy products from goats. Listeria is killed by heat, so pasteurizing milk is always recommended. Also make sure meat is cooked thoroughly and sanitation while cooking is a must.

If you suspect an animal has listeria, where gloves and wash hands thoroughly after handing animal. When handling fetuses or tissue from does having abortions, gloves should always be worn.

Dr. Jerusha Lay, *DVM works with the Kentucky State University Extension Program. She earned her Bachelor of Science in Agriculture from Eastern Kentucky University. She followed with her Doctor of Veterinary Medicine, from Auburn University. Dr. Lay has spent 8 years practicing in central Kentucky with an emphasis on small ruminants before joining the faculty at KSU.*

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tales from
The Kentucky Fiber Trail
Fall 2019

Weaving Art with Agriculture Across Kentucky

by Sarabeth Parido

In 2017, The Kentucky Sheep and Goat Development Office received a grant from KADF to begin building The Kentucky Fiber Trail in an effort to provide fiber marketing and education as well as to build a network for fiber producers, retailers, agritourism locations and fiber related events. Over the last two years, we have done exactly that and have seen the benefits.

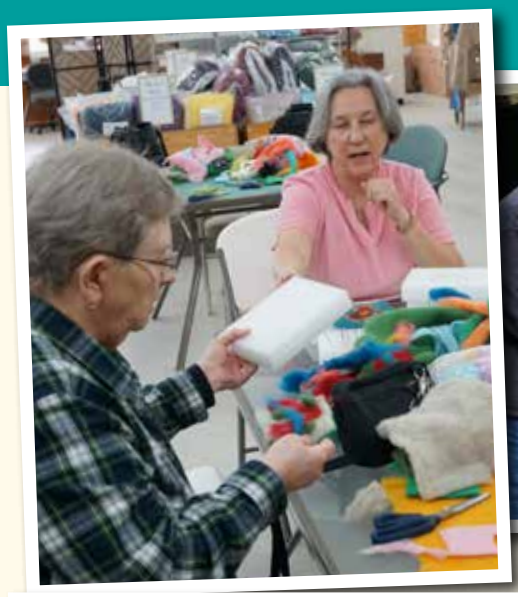
The Kentucky Fiber Trail is an interactive online network and physical travelable trail for its patrons. Our goal was to give a clear map for consumers to when locating local farms, shops and fiber products. We began a passport program where trail consumers were encouraged to pick up their Trail Passports at participating member locations and then get their passports "stamped" as they visited locations along the trail. Completed passports are then traded for Kentucky Fiber Trail Swag like clothes and water bottles.

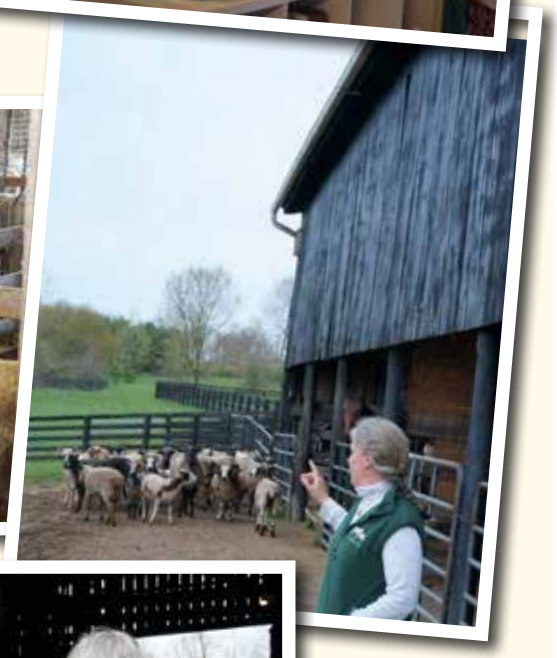
Over the last two years, the Kentucky Fiber Trail hosted the workshops for the Kentucky Sheep and Fiber Festival offering classes on agribusiness, e-commerce, farm management, fiber processing and skill specific classes. We had close to 250 students attend these classes, many returning for extra classes.

Even as the grant comes to a close, we look forward to the future and sustaining the efforts we have worked towards. We have more pop up markets planned for our members as well as plans to expand the trail in the future. Our members continue to bring new opportunities for the fiber market in Kentucky, and the Kentucky Fiber Trail still has room for more pins on their map.

Sarabeth Parido *is the Director of the Kentucky Sheep and Fiber Festival and The Kentucky Fiber Trail. She raises her own small flock of sheep in Clark County, Kentucky along with her husband and four sons. She spins and dyes her fiber into yarn and has taught knitting classes for nearly 20 years. Sarabeth is passionate about Kentucky fiber and wants to see great things happen for Kentucky wool producers.*

Adventures from Along the Trail





Spread the Word: Wool is Wonderful

Spread the word about wool. It is a unique fiber: 100% natural, 100% biodegradable, and 100% renewable. It is also a natural fire retardant, naturally wrinkle resistant, and breathable, it will wick moisture away from your skin to keep you dry. Wool's all-natural attributes are keeping global wool demand strong, and supporting premiums at retail. A 2015 Nielsen study found that 66 percent of global consumers are willing to pay more for sustainable goods and 73 percent of Millennials, (Curtin, M., 3/2018).

Wool Pool Successful

In Kentucky, a wool pool purchases wool and then gathers wool of like styles to offer buyers. This year, the Tennessee, Kentucky and Virginia wool pool saw continued success and offered the following prices: $0.50 per lb. for black faced sheep wool and $0.50 per lb. for white face. Reduced prices were offered for burry wool ($0.42/lb.), short lamb wool ($0.40 per lb.), and $0.10 per lb. for black wool.

Burry wool is wool that contains burrs from any plant. Heavy burrs decrease yield, the amount of useable wool for retail apparel, blankets or carpets. Black wool is from fleeces from sheep containing gray, brown, or black wool. Black wool's use is limited because it cannot be dyed into a rainbow of colors.

Lamb wool also receives a discount. Wool from lambs is often shorter than wool from ewes and rams simply because it hasn't had as much time to grow. The shorter fibers are also limiting in processing. "Staple" length wool refers to longer wool fibers (about 2 inches) and can determine the end use of wool. Staple length wool can be combed and processed into worsted yarn that is used in apparel.

In the wool pool this year there were still some buyers that had significant straw and manure contaminates in their wool. Growers are encouraged to take a few moments at the farm to ensure that all visible contaminates are removed before arriving at the pool. If significant contaminates are found at the pool, the volunteers must remove the trash, reweigh the bag, and correct the buyer's ticket by recording a lower weight. All this is an unnecessary cost to the pool and in the end, means wool pool price offers are perhaps lower than could be.

Wool grown on farms and ranches is normally sold and moved to processing centers "in the grease." However, its value is always determined from a measure or estimate of both qualitative and quantitative aspects of the clean fiber present, (ASI, 3/2007). If a bale of wool is riddled with pieces of straw or manure clumps, then this will significantly reduce the available clean wool for processing.

U.S. Wool Season Slowed

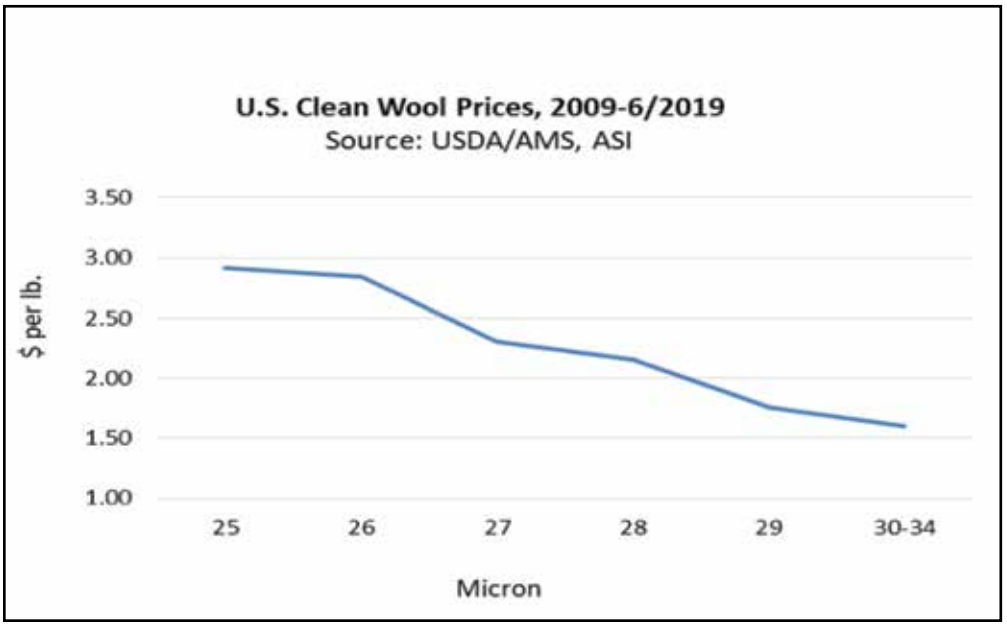
The U.S. wool season began this spring very good, with prices even higher than last year, but then by May slowed considerably. A "train wreck" was how one wool market participant called it. Due to the 25 percent tariff imposed by China on raw wool exports, fewer Chinese buyers were interested in U.S. wool, and price offers were sharply lower. Other buyers followed suit: Prospective buyers from India were present, but also made discount offers, and U.S. buyers followed.

By early August, there was still a significant volume of U.S. wool left unsold. In general, wool growers would rather sell their wool than store it. The global wool market is already sensitive to global growth factors including the Chinese slow down and European growth stagnation. Adding a trade war exacerbates marketing.

U.S.-China tariffs directly affected U.S. raw wool exports to China. In January to June, greasy raw wool exports (on a clean basis) to China dropped 47 percent in volume and 55 percent by value year-on-year. In January through June, raw wool exports – to all countries -- were down 34 percent in kgs and down 14 percent by value. Some of China's U.S. wool imports were picked up by Egypt. The bulk of U.S. wool exports occurs in July and August, so a broader comparison cannot yet be made.

Wool Value Starts with Breed

The American Sheep Industry Association (ASI) reminds us that while some sheep grow wool of more value than others, all sheep have valuable wool. In western U.S. and internationally, wool fiber diameter—micron—is the primary price guide for wool. As micron readings get lower, the fineness of the wool increases, and price premiums rise. On average, 25 micron wool receives an 82-percent premium over 30-34 micron wool. A 26 micron wool receives a 77-percent



premium over 30-34 micron wool.

Wool Preparation

On-farm management can boost wool value. ASI maintains that wool production is a year-round process. Quality wool is a function of both environmental conditions, but also management decisions. Environmental conditions might include pasture management and feeding practices. Management decisions include when to shear and the cleanliness of the shearing area.

A reputable wool grower in western U.S. reported that many growers do an excellent job preparing wool, but there are those that could do better. Many growers typically practice bellies out untied (BOU) whereby the dirty belly is separated from the remainder of the clip. However, this is not enough to maximize value. Removing only the belly doesn't ensure all visible contaminates are removed. The grower should try to remove any and all urine stains and sweat and dung locks.

A quick visual inspection can increase the value of the wool by increasing its yield, the valuable portion of the clip. Contaminants may include dirt, vegetable matter, colored fibers, polypropylene pieces from baling twine, and medullated hair fibers from hair sheep.

International Wool Market Strong

Both demand and supply factors affect wool prices. Recently demand has faltered due to uncertain economic factors, but tight supply persists, supporting prices. U.S. wool prices are dictated by Australian wool prices and global demand. China is the single-largest wool buyer and reportedly, the largest consumer of wool apparel, as well. Any economic downturn in China, as has occurred in the last year, affects Australian wool prices, which then affects U.S. wool prices.

At the beginning of its 2019/20 wool season, the volume at Australian auctions was down 21 percent year-on-year, (AWI, 8/9/19). The drought has prompted a significant increase in adult sheep slaughter, reducing numbers of sheep shorn.

The Australian Wool Production Forecasting Committee's first forecast for 2019/20 is for shorn wool production to be down 5 percent in Australia year-on-year due to a reduction in the number of sheep expected to be shorn. This early forecast assumes normal seasonal conditions in 2019/20, (AWI, 4/2019).

The prolonged drought in Australian has shifted the characterization of its wool. The drought has enhanced the growth of finer wool relative to the 26 micron and broader wools. There is therefore a relative short supply of the coarsest wools, which bodes well for Kentucky.

Wool Price Forecasts

Australian wool reached record highs in 2018, but this year has weakened. The 2019 weakening is still very high; however, from a historic perspective. In early August, Australian wool prices had fallen to an 18th month low, but still above the 80th percentile for the last decade, (AWI, 8/9/19). "The Sino-US trade imbalance dispute continues to be the most quoted cause as to why the demand for wool has so rapidly gone off the boil. The dispute is having widespread influence over the global economy and all to the negative. Consumer and manufacturer confidence has been pummeled and the utmost of caution prevails at present," (Ibid).

Julie Stepanek Shiflett, PhD *consults for the American Sheep Industry Association. She also consults independently and is an Adjunct Professor of Agricultural at the Western Colorado Community College, a division of Colorado Mesa University, Grand Junction, Colorado. Julie received her PhD in Agricultural Economics from Michigan State University and currently raises Boer goats in western Colorado.*

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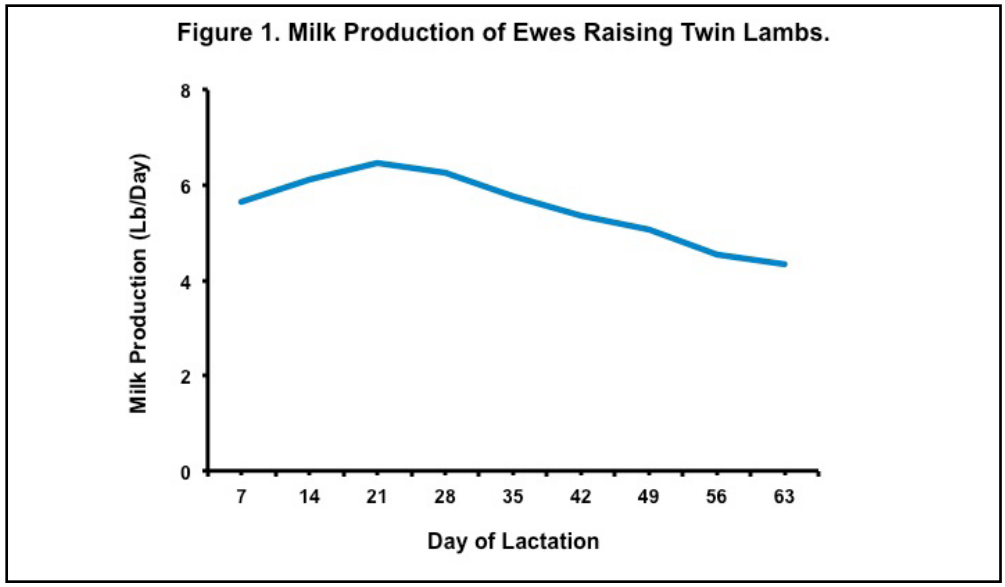
Factors Affecting Milk Production in Lactating Ewes

Dr. Debra K. Aaron, Professor, Department of Animal and Food Sciences, University of Kentucky

Sheep producers, today, expect ewes to drop and raise two lambs annually. Producers using highly prolific breeds in crossbreeding systems may expect even more. As a result, the importance of ewe milk production has escalated. The health and growth of these twin- and triplet-born lambs, especially during the first few weeks of life, depends on the quality and quantity of milk consumed. Although some ewes are able to raise three lambs, many can only raise two, and some barely produce enough milk for a single lamb. ***Why?*** Answering this question is the purpose of this article and, as you will read, it involves more than just genetics. So, instead of *genetically speaking*, we might call this article *lactationally speaking.*



First Things First: The Milk Production Curve and Lamb Growth

Before addressing factors that may affect milk production in lactating ewes, it is important to look at a typical lactation curve and to discuss its relationship to lamb growth. Milk production data complied from several studies at the University of Kentucky are graphed in Figure 1. These data represent average daily milk yields, in pounds, for mature Polypay ewes suckling twin lambs. All ewes were fed a standard alfalfa hay/corn lactation diet (62.5% roughage, 37.5% concentrate) at approximately 5 to 6% of body weight. For these ewes, average milk production increased to a maximum at 21 days postpartum and then decreased through approximately 60 days (weaning). Curves of similar shape have been reported by other researchers using various meat-type breeds. Generally, ewe milk production peaks 21 to 35 days postpartum and then declines steadily thereafter. If the milk production data in Figure 1 had been collected through 120 days of lactation, milk

Figure 2. Growth of Suckling Twin Lambs to Weaning.

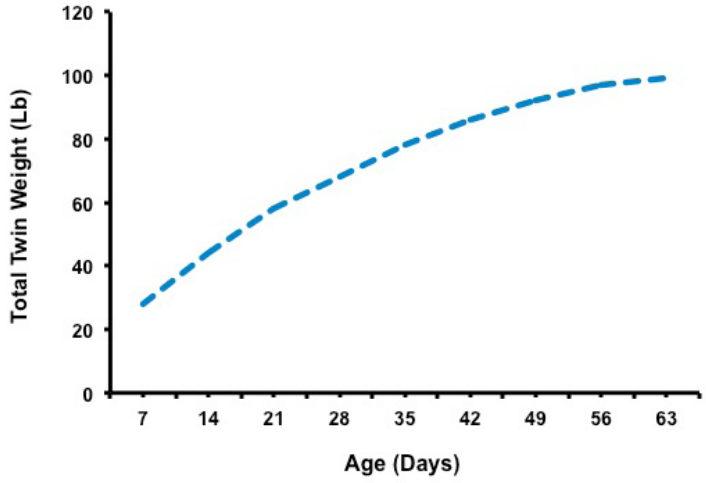
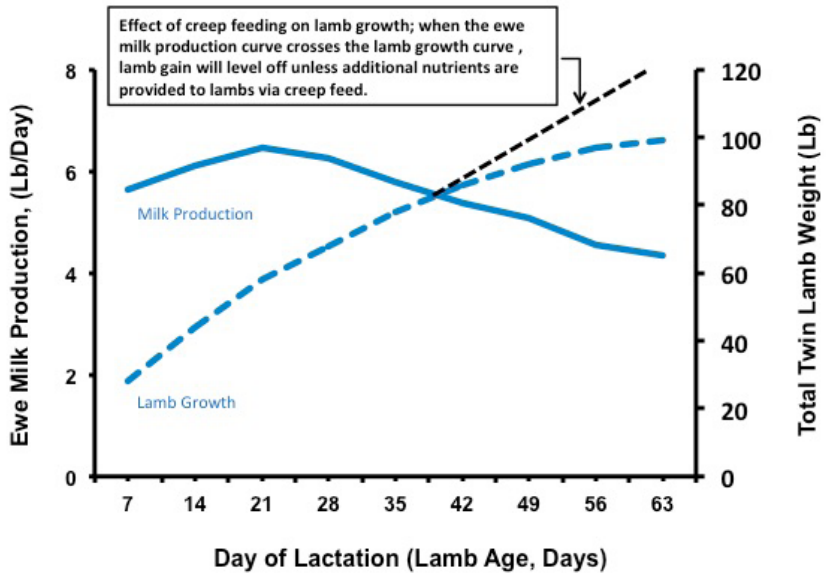


Figure 3. Relationship Between Ewe Milk Production and Twin Lamb Gain to Weaning.



yields would have continued to decline until ewes were producing little or no milk. The curve in Figure 1 shows greater persistency (a measure of how well milk production is maintained after peak) as opposed to the rapidly declining milk production curves frequently described in earlier lactation studies.

Figure 2 depicts growth of suckling twin lamb pairs from birth to weaning at approximately 60 days of age. Lambs did not have access to the ewe's feed and they received no creep feed. Thus, all growth is attributed to nutrients provided by the ewe's milk. As lactation progressed and lamb weight increased, rate of growth declined. By about 35 days of age, the growth curve has begun to level off, indicating a reduction in growth. From this point on, maintenance of the lamb's body was taking an increasingly larger portion of the nutrients consumed. This left fewer nutrients available for additional gain.

Putting together the shape of the milk production curve and the twin lamb growth curve, we see ewe milk production has the greatest effect on lamb gain during the first 5 weeks postpartum (Figure 3). Up through approximately day 35 of lactation, lamb pairs gained approximately 1.15 lb/day. From day 35 to weaning at approximately 60 days, twin lamb ADG decreased to approximately 0.85 lb/day. This illustrates that nutrient use by young lambs is very efficient and every effort should be taken to maximize milk production during this period of time. As lambs get older, however, additional nutrients are needed to supplement the milk they consume. In other words, lambs need creep feed. Remember, lambs providing data for these figures were not creep fed so that twin lamb growth could be assessed solely as a function of ewe milk production. In Figure 3, the black dashed line that extends lamb growth from approximately day 35 to weaning shows the effect of creep feeding. See *News to Ewes*, *HoofPrint, Volume 6, Winter 2012* for more on the importance of creep feeding. In this article, Dr. Don Ely answers the ewe's question, "*Will You Creep Feed My Lambs?*"

The purpose of the remainder of this article, however, is to answer the question, what factors affect milk production in lactating ewes?

Factors Affecting Ewe Milk Production

Several factors affect the shape of the lactation curve. The height of the curve at peak, as well as the persistency of lactation and, hence, total milk yield, may be affected by genetics, nutritional level, and physical status of the ewe. The number of lambs suckled also makes a difference. Even inherent differences among individual lambs may affect the amount of milk a ewe produces.

Genetics of the Ewe

Two options exist for increasing milk production through genetic means: 1) breed selection and/or crossing breeds with high milk production potential and 2) within flock selection for increased lactational performance.

Breed Selection and/or Crossbreeding.

Most non-dairy breeds of sheep in the U.S. have been selected for either lamb or wool production instead of high milking abilities. However, there are some differences

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among these meat-type (wool) breeds for milk production potential. Dorset, Hampshire, Polypay and Suffolk breeds have all been noted as good milkers. In a study conducted at the U.S. Sheep Experiment Station in Dubois, Idaho, Suffolk ewes with twin lambs produced 13 to 17% more milk than Rambouillet, Polypay or Columbia ewes with twins. The higher total yield of the Suffolk suggests a higher milking potential, which may be related to the larger body weight. The same would be true for Hampshire ewes. On the other hand, work at the University of Kentucky indicates that for their mature weight, Polypay ewes may be the most efficient milkers. Total lactation yields for domestic breeds have been reported to range from 110 to 175 lb over a 60-day lactation. Total milk production (63 days) of the Polypay ewes represented in Figure 1 was approximately 200 lb. Overall, crossbred ewes are generally expected to have better milk production than straightbred ewes.

Within-Flock Selection.

Milking abilities vary among ewes within breeds, and even among crossbred ewes. Some ewes inherently milk better than others. Thus, within-flock selection is the second genetic means for improving milk production. Milk yields *per se* are generally not measured in flocks, but superior milkers can be identified by differences in lamb weight at 30 days. Recall that lamb growth up to this point in life is largely dependent on ewe milk production (Figure 2). Thus, within rearing type (single, twin, triplet), ewes with heavier lambs at 30 days are expected to be better milkers compared with ewes with slower-growing lambs. Furthermore, repeatability of milk production is high. This means the top echelon of producers this year are likely to be in the top echelon next year. Thus, low producers should be culled. The best way to accomplish this is to weigh all lambs at 30 days and plan to cull all ewes, at weaning, that have below average-weight lambs at 30 days of age.

Another trait that reflects milk producing ability is total ewe productivity (pounds of lamb weaned per ewe exposed). This trait combines effects of fertility, prolificacy, lamb survival, milk production and lamb growth into one index of overall productive capacity. In well-managed flocks, where most variation in ewe productivity comes from variation in prolificacy and milk production, selection response can be considerable. Several researchers have reported moderate levels of heritability (15 to 20%) for ewe productivity. Thus, selection for total ewe productivity should result in increased milk production potential.

Nutrition of the Ewe

The ewe's potential for milk production is governed by genetics, but nutrition influences the extent to which she reaches her potential. Within genotype, the shape of the lactation curve is directly related to nutritional status of the ewe. Obviously, ewes that are fed less will give less milk at peak lactation than those ewes fed more of balanced rations. In addition, their milk production will decrease at a more rapid rate than ewes fed adequate amounts of high quality feed. Within genotype, better ewe nutrition increases milk production, especially in early lactation and, consequently, lamb weight at weaning.

Lactation, particularly during the first 6 to 8 weeks, places the highest nutrient demands on the ewe because of requirements for maintenance, milk production and, possibly, growth. Consequently, body reserves and nutrient intake may not be sufficient to support all needs during peak lactation, especially in prolific ewes. This negative nutrient balance may cause lower milk production, decreased lamb performance, and, possibly, metabolic disorders. Therefore, the highest quality feedstuffs should be available in largest amounts during early lactation.

Water is a nutrient that is often overlooked. Ewes must have a continual supply of clean, fresh water at a temperature that will optimize intake. Much of the water consumed by lactating ewes leaves the body via the milk. Significant decreases of water intake occur when environmental temperature drops below 20°F. This can be particularly important for ewes lambing in January and February. If water intake is reduced, significant reductions in milk production can result.

Physical Status of the Ewe at Lambing

Age, size or weight, and body condition score (BCS) at lambing are physical factors that affect milk production. In general, milk production increases with age from 1 year to maturity (3 to 6 years) and then declines for ewes over 6 years of age. As a result, nutritional management may vary among ewes of different ages. This is especially important if young ewes are to reach their milk production potential. Remember, in addition to nutrient requirements for maintenance and lactation, young ewes need nutrients for growth. With respect to size, larger ewes (as a result of breeding and/or maturity) are expected to produce more total milk than smaller ewes. Also, peak milk production is directly influenced by weight gain and body condition in late pregnancy. To achieve maximum milk production, ewes must have adequate body fat at lambing (BCS of 3.0 to 3.5 on a scale of 1=emaciated to 5=obese).

Mastitis. Mastitis is an inflammation of the udder. It can be caused by injuries, viral infections and bacterial infections. Mastitis is described as being clinical, meaning the condition is visibly apparent upon observation of the ewe and inspection of the udder, or subclinical, meaning the condition is not observable except by examination of the milk for elevated somatic cell counts.

Nearly all cases of mastitis in ewes begin by entry of bacteria through the teat end. Injured teat ends support the growth of bacteria and reduce the natural resistance offered by the streak canal. Clinical mastitis can be caused by bacteria found on the animal, in the animal, and in the environment. In clinical mastitis, milk appears abnormal and thick with flakes, clots, or chunks. It may have a bad smell. The udder is usually swollen, firm, and hot. The ewe may run a fever, be off feed, and refuse to let her lambs nurse. Her milk flow may even stop until she recovers her appetite. In severe cases, the ewe may die. Occasionally, severe inflammation of the udder may produce gangrene, which is commonly called *bluebag*.

Subclinical mastitis is not visually observable, but may still result in udder inflammation and damage to mammary tissue, resulting in lowered milk production and lamb growth. These infections seem to be most common during early lactation and immediately following weaning. Cases of post-weaning mastitis are not usually

noticed until the next lambing season when the ewe gives birth and has little or no milk in one or both udder halves. Thus, it is important to examine the udder, teats, and milk of ewes at lambing to make sure they appear normal. This practice helps prevent possible lamb starvation or stunted growth.

Environmental sanitation is important in the prevention of mastitis. Dirty housing during gestation and dirty lambing areas contribute to contamination of teats, which, in turn, may lead to mastitis. Lambs may also spread the bacteria. In addition, weaning lambs when ewes are still producing moderate to large amounts of milk appears to increase the incidence of mastitis. Reducing or withholding the ewe's feed and water for 24 to 48 hours following weaning aids in reducing milk production and the accompanying "caking" and edema or swelling that may lead to udder damage and mastitis.

Number of Lambs Being Raised

Milk production responds to the number of lambs suckling until the ewe's genetic capability in producing milk becomes limiting. In general, the quantity of milk produced during early lactation ranks in order with the number of lambs suckled. Total milk yield is estimated to be approximately 30% higher for ewes suckling twins than ewes suckling single lambs. Because this must be divided between two lambs, twins still get less milk than singles, making milking ability even more crucial for ewes raising multiple-born lambs.

Lamb Differences

There are inherent differences among individual lambs in their demand for milk. Some lambs suckle more often than others. Thus, even if milk production of the ewe is increased through genetic or nutritional means, milk consumption and lamb growth rate will be less if voluntary milk intakes are low.

Differences in demand for milk appear to be associated with birth weights and potential growth rates of lambs. Often, this is a breed or genotype effect. Lambs heavier at birth generally nurse more than lambs with lighter birth weights. Likewise, faster-growing, more aggressive lambs tend to suckle more frequently. In either case, the ewe is stimulated to produce more milk. For this reason, milk yield during the first 6 to 8 weeks of lactation is generally higher for ewes suckling crossbred versus straightbred lambs.

If the total demand of the lamb, or lambs, is below the ewe's milk producing capacity, an increase in milk demand can elicit a response in production. At some point in lactation, however, the ewe's milking ability will become the limiting factor of lamb intake and demand for milk will be progressively less satisfied. This stage will be reached sooner in the case of inherently low-producing ewes, undernourished ewes or ewes suckling more than one lamb, compared with ewes with a potential for sustained lactation, well-nourished ewes or ewes suckling a single lamb.

The Bottom Line

The goal of most sheep producers is to wean twin lambs, weighing at least 60 pounds each, at approximately 60 days of age. If lambs are marketed at 100 to 120 pounds at approximately 150 days of age, the preweaning period accounts for 40% of the time from birth to market. Furthermore, 50 to 60% of the lamb's market weight is dependent on ewe milk production. During the first 8 weeks of lactation, twin lamb gain is expected to increase 0.25 pounds for each additional 2 pounds of milk produced by the ewe. Thus, higher milk yields and/or improved persistency in milk production can improve lamb weaning weights and efficiency of lamb production. However, increasing weaning weight of lambs by increasing ewe milk production is likely to be expensive. Research at the University of Kentucky indicates that for each additional 1 pound of weight gain by twin lambs, 12 additional pounds of milk are needed from dams consuming 16 extra pounds of feed.

Producers should do all they can to improve milk production through genetic selection, improved nutritional management during early lactation, and improved health management.

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NEWS TO EWES

An Example Budget Estimate for a 100-Ewe Flock

by Donald G. Ely, University of Kentucky

Introduction

The sheep numbers in the eastern United States have been growing mainly because, with correct management, sheep raising can be a profitable enterprise. Compared with other livestock, sheep are easy to handle and do not require elaborate and expensive equipment and facilities to be a productive unit. They are one of the most environmentally friendly livestock and can provide income from meat, wool, and/or milk. Sheep offer a significant advantage over other enterprises for beginning or part-time farmers because they require a relatively small investment per dollar of income. A few years ago, Iowa State University (Duffy, M. and J. Calvert. 2010. Enterprise Budget: Sheep, Beginning Farmer Center, 4 pages) assessed some variables, on a low, medium, or high scale, that are a part of a successful sheep enterprise. Variables and assessments are listed below:

1.) Capital needed for startup	Low
2.) Managerial input needed	Medium
3.) Labor input required	Medium
4.) Years needed to develop production expertise	Low
5.) Years needed to develop marketing expertise	Medium
6.) Years to financial break-even point	Low
7.) Return on investment (%)	High

It seems that potential sheep producers should develop an economic budget so, in turn, they can eventually assess the success of their operation. In other words, they need to assess whether they are making a profit or not. Seasoned producers likely operate within an established budget and have completed their assessment of the variables listed above. Still, they need to continually "fine-tune" their budget to increase their profit potential. Therefore, the purpose of this article is to provide an "example" budget for a 100-ewe flock that produces slaughter lambs from a January/February lambing.

Assumptions

The example budget in this article is based on the following assumptions:

1.) Number of ewes = 100
2.) Percent lamb crop raised = 160
3.) Adult death loss = 5%
4.) Ewe replacement rate = 20%
5.) Number of rams = 4
6.) Ram replacement rate = 20%

Although the average flock size in Kentucky is only about 19 ewes, 100 head are needed for a sheep enterprise to warrant efficient labor usage and make efficient use of feed and facility resources. In addition, 100 ewes are about the minimum number necessary to exert significant selection pressure if producers are raising their own replacement ewes.

For 100 ewes, it is assumed that 160 lambs will be raised to market weight. The 160% lamb crop raised is typical for flocks that have average to high levels of reproduction management expertise. Average prolificacy values for some pure breeds are published. Some are higher than 160%; others are lower. Prolificacy of non-purebred ewes varies with breeds making up the crossbreds. Therefore, a 160% lamb crop is assumed for this budget because other published budgets used this value and it is probably representative of the percent lamb crop raised for all breeds and crossbreds produced in the U.S.

On average, and even with top management, about 5% of adult sheep die during the year due to age, injury, predation, metabolic disorders, etc. In the budget, the 5 of 100 ewes that expire have to

be counted in the 100 ewe flock. They incur expenses, but may or may not provide any return. It is assumed that another 15 ewes will be culled after lambs are weaned. Reasons for culling include age, structure and/or udder problems, injury, poor performance, or poor disposition (mothering and milking characteristics).

When lambs reach market weights, 20 ewe lambs are selected to replace culled ewes. These ewe lambs are likely born and raised as twins or triplets raised as twins and are in the top two-thirds of all lambs for daily gain from birth to weaning. As a result, they are some of the heaviest lambs at weaning and their post-weaning gains are among the highest in the flock. They are the most structurally correct of all the ewe lambs available for selection.

Four rams can be mated to approximately 25 ewes each for a breeding season from August 15 to October 1. Although mature rams (over 2 years of age) can service up to 50 ewes in a 6-week breeding season, ram lambs can service only 15 to 25 and yearlings 25 to 35 ewes in the same length of breeding season. Mating each ram to only 25 ewes adds genetic variation to the subsequent lamb crop which, in turn, allows selection of replacement ewe lambs to be mated to rams of different genetic make-ups. Finally, rams can become injured, crippled, and/or sterile before or during a breeding season. Then, the number of ewes per breeding group (ram) has to be increased to make sure all ewes are serviced.

A new ram should be purchased every year as one is culled. An average ram can normally remain productive for five breeding seasons (years). Thereafter, he can become sterile, injured, unable to mount ewes in the mating process, or his body condition may decrease to the point that he is unable to settle ewes satisfactorily. Also, some of the ewe flock will likely carry each ram's genetics. When this becomes too extensive for individual rams, they need to be culled to prevent excess inbreeding.

The Budget

Table 1 identifies sources and amounts of income from a 100-ewe flock. Tables 2, 3, and 5 supply hay and grain, pasture, and other costs, respectively, required for 100 ewes to raise 160 lambs to 100 to 110 lb each year. Table 6 is a summary table of tables 1, 2, 3, and 5. Table 4 is the ingredient composition of a complete feed mix with a concentrate pellet. When studying these tables, remember every producer's situation is different with regard to income, costs of production, and management. Therefore, the purpose of this example budget is to provide a guide that individual producers can use to develop their own budgets.

Income

Income shown in Table 1 includes proceeds from the sale of lambs, cull ewes and rams, and wool.

Table 1. Estimate of Annual Income for a 100-Ewe Flock Lambing in January/February - Selling Slaughter Lambs in May/June

Category	No. hd	Lb/hd	Price/lb	Total	Per Ewe
Market lambs	140	110	$1.50	$23,100	$231.00
Cull ewes	15	160	$0.70	$ 1,680	$ 16.80
Cull rams	1	250	$0.50	$ 125	$ 1.25
Shorn wool	104	7	$0.50	$ 364	$ 3.64
Total income				**$25,269**	**$252.69**

Lamb prices vary from year to year, season of the year, quality and sex of lambs, and marketing methods. Typically, prices per pound for 100 to 120-lb lambs are highest in the spring and lowest in the summer. Normally, the higher the quality, within sex (rams, wethers, ewes) and weight groups (60 to 80, 80 to 100, 100 to 120, 120 to 140 lb), the higher the live lamb prices per pound. Lighter weight lambs usually bring more per pound than heavy weights, but less per head. Prices received for 110-lb lambs can also vary by marketing method – stockyards, direct marketing to slaughter plants, individual (entrepreneur) sales, etc.

Prices for cull ewes and rams also vary within and among years. Extremely thin or fat sheep are usually discounted at the market. All cull ewes and rams sold through a stockyards must go to slaughter. **Never buy breeding stock from the stockyards.** If "culls" are still healthy and sound, they might be productive for other producers for a year or two. These sales have to be made on an individual producer basis, thus, prices may be higher or lower than shown in Table 1.

Wool prices vary by year, types/grades of wool, and marketing methods. Year to year variation is primarily a result of the world wool market that is dominated by Australia. Although individual producers are at the mercy of this world market, they can have an effect on the price they receive for their wool on the commodity market. Totally white fleeces (no dark fibers) with the smallest fiber diameter, the most crimps, the cleanest, and the longest staple length will sell for highest prices on the commodity market every year. The value per pound for the wool in Table 1 is assumed to be white wool that is shorn one time per year, is medium quality (1/2 blood, 3/8 blood, 1/4 blood, or low 1/4 blood), is typical of commercial sheep in the eastern half the U.S., and is normally produced by flocks where the primary income is derived from the sale of lambs rather than wool.

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Expenses

Although producers may believe the only way to make more money raising sheep is to increase total income, a more realistic way to increase **net income** is to reduce expenses and/or increase productivity. Feed costs are usually the largest expense for any livestock enterprise. These costs are usually for hay, grain, minerals, and pasture for ewes, rams, replacements, and lambs. Example hay and grain cost estimates are presented in Table 2. Pasture cost estimates are shown in Table 3.

All classes of animals in a January/February lambing sheep enterprise consume some hay, as illustrated in Table 2. Amounts and types of hay consumed varies with the productive function by class of animal (Example: mature ewes vs. replacement ewe lambs). Total cost of hay feeding then is a function of the cost per ton.

It is assumed that ewes consume 84 lb/hd of alfalfa hay (mid-bloom) for 28 days of late gestation (LG) equaling 3 lb/hd/d. They are fed 350 lb/hd of the same quality hay during lactation. In this example, rams consume the most total hay, but it is lower quality than that fed to ewes. Rams remain in confinement for most of the year to prevent injury, sterility, or other unforeseen occurrences and have to be fed some low-quality grass hay to maintain mature weights. Whether replacement ewe lambs, that become yearlings on January 1, need the quality and quantity of hay shown in Table 2 may depend on the weather, stockpiled forage availability, and/or alternative forage availability. However, after January 1, they will, for sure, need low quality hay plus daily concentrate supplementation until spring pasture becomes available.

The only times that ewes receive grain supplementation in this example is during LG and lactation (Lact). The combination of alfalfa hay and shelled corn fed during these production phases will result in balanced rations if fed in correct amounts. Rams consume a grain mix (1.0 lb/hd/d) to supplement low quality hay consumption, while in confinement, to maintain body weights. Ingredient composition of the grain mix is shown in Table 4 (page 27). Market lambs are self-fed this grain mix from creep feeding to market (average intake = 4.0 lb/hd/d). Replacement ewe lambs are also self-fed this grain mix for 73 days after weaning. Thereafter, they are supplemented with 1.0 lb grain mix/hd/d from June 1 to January 1. Grain supplementation is switched to shelled corn on January 1 and will continue to be fed at 1.0 lb/hd/d until October 1 (274 days; after first breeding).

Total grain cost per ewe is greater than total hay cost ($67.40 vs. $53.17). Most of the grain cost per ewe was expended on the market lambs ($46.72), whereas the hay cost was expended on ewes ($39.06). Table 3 shows a total pasture cost of $16.91 per ewe. This table illustrates that ewes, rams, replacement ewe lambs, and yearling replacement ewes are on pasture 267, 45, 213, and 274 days per year, respectively. Market lambs are raised in total confinement from birth to market in this example.

Table 2. Estimate of Annual Hay and Grain Costs for a 100-Ewe Flock Lambing in January/February – Selling Slaughter Lambs in May/June

Category	No. hd	Lb/hd	Cost/lb	Cost/tn	Total	Per Ewe
Hay						
Ewes	100	434	$0.09	$180	$3,906	$39.06
Rams	4	1107	$0.06	$120	$265	$2.65
Market Lambs[a]	160	37	$0.07	$140	$414	$4.14
Replacement ewe lambs[b]	20	120	$0.08	$160	$192	$1.92
Yearling replacement ewes[c]	20	450	$0.06	$120	$540	$5.40
Total Hay		**1,942**			**$5,317**	**$53.17**
Grain						
Ewes, Late Gestation[d]	100	28	$0.07	$140	$196	$1.96
Ewes, Lactation[d]	100	140	$0.07	$140	$980	$9.80
Rams[e]	4	300	$0.10	$200	$120	$1.20
Market Lambs[a,e]	160	292	$0.10	$200	$4,672	$46.72
Replacement ewe lambs[e,f]	20	213	$0.10	$200	$426	$4.26
Yearling replacement ewes[c, d, g]	20	247	$0.07	$140	$346	$3.46
Total Grain		**1,247**			**$6,740**	**$67.40**

[a] Includes 20 replacement ewe lambs with market lambs for 73 days after weaning.

[b] On pasture from June 1 to January 1. Begin hay feeding on November 1. Ewe lambs become yearlings on January 1.

[c] Previously ewe lambs. Breed August 15 to October 1 to lamb first at 2 years of age.

[d] Shelled corn @ $140/ton ($4/bu., 7¢/lb).

[e] Grain mix @ $200/ton (10¢/lb). See Table 4 for ingredient composition.

[f] June 1 to January 1.

[g] January 1 to October 1.

Table 3. Estimate of Annual Pasture Cost for a 100-Ewe Flock Lambing in January/February - Selling Slaughter Lambs in May/June

Category	No. hd	No. days	Cost/day	Total	Per Ewe
Ewes	100	267	$0.05	$1,335	$13.35
Rams	4	45	$0.05	$9	$0.09
Replacement ewe lambs[a]	20	213	$0.03	$128	$1.28
Yearling replacement ewes[b]	20	274	$0.04	$219	$2.19
Total income		**799**		**$1,691**	**$16.91**

[a] On pasture from June 1 to January 1. Ewe lambs become yearlings on January 1.

[b] Previously ewe lambs. Breed August 15 to October 1 to lamb first at 2 years of age.

Other costs

Estimates of other costs are summarized in Table 5. Vet/medicine costs include deworming and vaccinations. In this example, ewes are dewormed twice, rams once, and replacements twice per year. Market lambs are raised in confinement, so do not need to be dewormed. Lambs are vaccinated at 5, 8, and 11 weeks of age with CD/T (Enterotoxemia Types C and D as well as Tetanus). Ewes are boostered annually. The $8.30 cost per ewe includes medicines for pneumonia, scours, mastitis, and any other diseases/disorders that may arise during the annual production year.

If wool sheep are raised and shearers are hired, costs probably reach at least $4 to $5/ewe for once a year shearing. This budget item in Table 5 will obviously be zero if producers do their own shearing or if they raise hair sheep.

This example budget assumes one replacement ram is purchased each year to replace a mature ram that has been used for 4 to 5 years and serviced 100 ewes during his productive life. Continually introducing new genetics will reduce inbreeding. Costs of rams vary by age, breed, and production records. Although the $700 cost of replacement rams in this example may seem excessive, remember that 80 to 90% of the genetic improvement in a flock comes from the ram. When the genetics of rams are spread across the lambs from 100 ewes mated, the $7.00/ewe/yr does not seem too expensive.

Successful lambing in January/February requires some kind of protection from the weather. This means ewes will lamb on some kind of bedding in a confined area (barn). Bedding can come from wheat or rye straw, hay, wood shavings, and/or newspaper. Variation in types of bedding means variation in costs. The value for bedding in Table 5 was calculated from estimates made by the University of Maryland, Virginia Tech, and personal experience at the University of Kentucky. Similarly, costs of hauling animals to market were estimated by these three universities.

Mature sheep typically will consume about one pound of salt/mineral per head per month (12 lb/yr). The amount of salt in the mineral mix regulates the total consumption rate. Many complete mineral mixes, sold commercially, are highly palatable. Consequently, sheep consume more than needed if the mix is not diluted with 50% white salt. The consumption rate and cost of the mineral in Table 5 are based on diluting the complete mix with 50% white salt. This decrease in intake need not be alarming because, theoretically, normal daily intakes of balanced rations of roughages and concentrates will meet the mineral (except salt) needs of the animal. *Ad libitum* supplementation, in reality, may only be a safety factor.

Checkoff costs may not be charged in all states. If charged, they can vary from state to state. The cost in Kentucky is $0.50/100 lb live animal marketed (Table 5).

The January/February lambing system will require the barn bedding containing, manure, urine, etc. to be removed at least once a year. If the bedding is on dirt, after removal, apply Class I2 sand to the surface for drying. Building/fence repairs will vary from farm to farm, age of buildings/fences, and types of buildings/fences. The $3.00 expenditure per ewe per year for these

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Table 4. Complete Feed Mix with Concentrate Pellet

Ingredient	Percent
Cracked/whole shelled corn	80.00
Concentrate pellet[a]	20.00
Soybean meal, 48% CP[b]	63.33
Distillers Dried Grains	21.25
Ground limestone	4.38
Salt	3.13
Dicalcium phosphate	3.13
Ammonium chloride	2.5
Vitamin A, D, E premix	1.28
Vitamin E, 20,000 IU/lb	0.5
Vitamin A, 10,000 IU/lb	0.25
Vitamin D_3, 15,000 IU/lb	0.25

[a] Ingredient amounts expressed as percent of concentrate pellet.

[b] CP = crude protein.

Table 5. Estimate of "Other Costs" for a 100-Ewe Flock Lambing in January/February – Selling Slaughter Lambs in May/June

Category	No. hd	No. days	Cost/day	Total	Per Ewe
Vet/medicine[a]	284	365	$2.27	$830	$8.30
Shearing[b]	104	2	$234.00	$468	$4.68
Replacement ram[c]	1	365	$1.92	$700	$7.00
Bedding[d]	100	365	$1.37	$500	$5.00
Hauling[e]	161	3	$208.00	$625	$6.25
Mineral mix	284	365	$0.48	$177	$1.77
Checkoff[f]	161	3	$30.00	$90	$0.90
Clean barn	100	2	$364.00	$728	$7.28
Building/fence repairs	100	365	$0.82	$300	$3.00
Livestock guard dog[g]	100	1825	$0.27	$98	$0.98
Interest[h]		6% for 6 months		$480	$4.80
Total Other Costs				**$4,996**	**$49.96**

[a] 100 ewes, 4 rams, 160 lambs, and 20 yearling replacement ewes.

[b] 100 ewes, 4 rams.

[c] $700 purchase cost.

[d] 100 lb/ewe (ram) @ $100/ton.

[e] $5/hd for cull ewes/ram; $3/hd for market lambs.

[f] $0.50/100 lb live animal marketed.

[g] $500 purchase cost. Used for 5 years; 100 ewes/year.

[h] $16,000 borrowed.

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repairs is the same as used in budgets published by Iowa State University (Mike Duffy, Jodi Calvert, and Dan Morrical. 2010. Enterprise Budget : Sheep, Beginning Farmer Center – BFC 18), University of Missouri (Ron Plain, Extension Economist: Ewe Flock, Projected Budget for Lambs Sold in 2011), and Virginia Tech (Virginia Cooperative Extension Farm Business Management Staff. 2011. Sheep : Spring Lambing; Raise Replacements, Publication 446-048.). Purchase, maintenance, feed, and health care costs contribute to the cost if the farm uses a guard dog for sheep protection. The interest cost ($4.80 per ewe per year) is on operating money. In other words, if you are not a sheep producer and have invested equivalent money, how much can you make? The $16,000 borrowed is charged for 6 months at 6% interest.

Table 6. Summary of Budget for a 100-Ewe Flock Lambing in January/February - Selling Slaughter Lambs in May/June

Category	Total	Per Ewe
Income	**$25,269**	**$252.69**
Expenses		
Hay	$5,317	$53.17
Grain	$6,740	$67.40
Pasture	$1,691	$16.91
Other	$4,996	$49.96
Total	**$18,744**	**$187.44**
Return to capital and labor	**$6,525**	**$65.25**

Table 6 summarizes the income vs. expenses and the return to capital and labor. In this example budget, 91% of the annual income is from the sale of 100 to 120-lb (Av. 110-lb) slaughter lambs at 4 to 5 months of age (Table 1). Of the total expenses (Table 6), 73% is spent on feed (hay, grain, pasture) consumed by ewes, rams, lambs, and replacements (Tables 2 and 3). Hay cost makes up 56% of the total feed costs. Surprisingly, lamb feed amounted to only 37% of the total annual feed costs.

Implications

Finding two sheep production operations that are the same and have a stable expense/income on a daily, monthly, or yearly basis is an impossible task. Therefore, developing a budget that will fit every situation is impossible. Consequently, a budget, like the one presented in this paper, can be used only as a guide. On the other hand, today's technology allows keeping immaculate income and expense records as never before. Incorporating these into a budget format will show where income is derived and where dollars are expended. Maintenance of a daily diary for the production year, that begins on the first day of the breeding season, will explain why money movement was income or expense on a specific day. Then, analysis of the individually constructed budget will show where management efficiency can improve from one year to the next.

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502-682-7780 • info@kysheepandgoat.org

Kalmbach Feeds
419-310-4676 • www.kalmbachfeeds.com

Kentucky Goat Producers Association
www.kysheepandgoat.org

Kentucky Sheep & Goat Check-Off
www.kysheepandgoat.org

Kentucky Sheep & Wool Producers Association
www.kysheepandgoat.org

Ketcham's
ketchamssheepequipment.com
618-656-5388

MountainView Machine
605-253-2018 • mountainviewlivestock.com

National Livestock Producers Association
www.sheepandgoatfund.com
1-800-237-7193 ext. 10

Paris Stockyards
859-987-9945

Tennessee Sheep Producers Association
www.tennesseesheep.org

Ultra Fresh Optimum Lamb Milk ReplacerLand O' Lakes Animal Milk Co.
www.lolmilkreplacer.com

United Producers, Inc.
270-843-3224

University of Kentucky
www.uky.edu/AnimalSciences/sheep/sheep.html
www.uky.edu/AnimalSciences/goat/goat.html
www.ca.uky.edu

The Kentucky Sheep and Goat Check-Off Program

began in 2010 and collects $.50 for every $100 worth of sheep and goats sold in the Commonwealth. According to Kentucky law, Check-Off funds must be used for the purpose of promoting the increased use and sale of sheep and goats.

TO DATE, CHECK-OFF HAS PROVIDED:

- **$50,000 in New Farmer Recruitment loans** have been given to 25 new/ beginning producers in Kentucky since 2012
- **$40,000** given for special projects to help producers increase marketing efforts throughout the state since 2012
- **$10,800** spent in promotion of sheep & goat products in 2018
- **$3,000** given to conduct parasite research

KY Sheep & Goat Check-Off Sponsors the Try Something Different Tonight marketing campaign
# of people who tasted lamb and goat products: **25,000**
# of people who have learned about products and cooking techniques: **5 million**

To learn more about the Kentucky Sheep and Goat Check-off Program visit
www.kysheepandgoat.org/Check_Off.html

KY Sheep & Goat CHECK-OFF

BREEDERS PAGE

FAMILY OWNED

KALMBACH FEEDS®

EST. 1963

GIVE YOUR HERD WHAT THEY DESERVE

16% Ewe Pellets

Product Code: 616B

A complete pellet to be fed with forage to all classes of sheep.

Features and Benefits

- Contains Bovatec for coccidiosis control.
- Contains yeast culture for improved digestibility
- Contains ammonium chloride to help prevent urinary calculi
- Opti-Ferm XL® yeast added to aid digestibility and nutrient availability

Game Plan Breeder Plus Pellet

Product Code: 6600R

A complete pellet formulated to be fed with forage to your breeding herd.

Features and Benefits

- Contains Rumensin for coccidiosis control.
- Contains ammonium chloride to help prevent urinary calculi
- Chelated minerals for increased availability

We also carry two feeds for lactating dairy goats: 16% All-Natural Textured and Milk and Meat Pellet

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