Summer 2018 – Volume 30, Issue 3

Hoof Print

The Small Ruminant Magazine

ARTIFICIAL INSEMINATION

TALES FROM THE KENTUCKY FIBER FESTIVAL

OVINE PROGRESSIVE PNEUMONIA IN YOUR HERD?

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Purebred and Fullblood Dorper and White Dorper

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Hoof **Print** Magazine
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***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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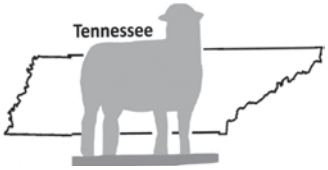
In This Issue

Association News & More



Special Features

President's Letter

Hello from Tennessee!

What started out as a cold, wet spring has turned into hot, summer days in Middle Tennessee where I live. Half of us have had rain but until the past few days, it's been quite dry. We are chomping at the bit to get some hay in. Perhaps next week that sweet smell of fresh forage will permeate our barns.

TSPA hosted a Sheep Shearing School in April and had a great crowd of shepherds from all around. Mr. Doug Rathke of Minnesota, did a fine job in the classroom in addition to hands on teaching. Fifteen students learned all aspects of shearing then practiced on a great set of ewes from Lou Nave's farm. We thankful to Lou for her generosity and to Doug for helping us with our school in 2018.

We will be hosting wool pools across the state this month. Our East TN collection will be Thursday, June 14th, at the Jefferson Farmers Coop(Dandridge) in the afternoon. Wool pool in West TN is scheduled for the following Tuesday morning, June 19th at Maury Farmers Coop in Columbia. For more information and directions, please visit our website at http://tennesseesheep.org/woolpool.htm.

Here's hoping your summer is good to you and your flock!

Debbie Joines,
President
Tennessee Sheep Producers

TSPA – UPCOMING EVENTS

Date • Details • Location • Website

June 14	**East TN Wool Pool,** Jefferson Farmers Co-op, Dandridge TN – www.tennesseesheep.org
June 19	**Middle TN Wool Pool,** Maury Farmers Co-op, Columbia, TN – www.tennesseesheep.org
July 5-7	**Tennessee Junior Sheep Expo**, Tennessee Tech University - Hyder Burks Pavillion https://ag.tennessee.edu/AnimalScience/4-H/Pages/Sheep.aspx
July 27-28	**Southern States Dorper & White Dorper Show & Sale**, Tennessee Tech University- Hyder Burks Pavillion https://dorpersheep.org/2018-events/ E-mail: dorpers@ymail.com

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

If you are interested in a committee please select below:

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

Pay dues and join online at www.tennesseesheep.org

A Renewed Appreciation for Wool

by Debbie Joines

I have a renewed appreciation for wool sheep and the expertise it takes to harvest their fleece. As a guest at a TSPA Sheep Shearing school many years ago, the process was incredibly challenging for me and much harder than it looks. Convincing a 175# ewe to sit on her haunches and that "it's not going to hurt" is a skill I don't possess.

The 2018 version of our Sheep Shearing School was held April 20-21 at the Middle Tennessee State University Livestock Building. Mr. Doug Rathke of Minnesota spend Friday teaching the class of 15 students tools of the trade and explained breed differences regarding fleece quality. Students came from Alabama, Georgia, North Carolina, New York, Virginia and of course, Tennessee, to learn the most efficient and proper way to shear sheep. Saturday morning came early and the race was on. A flock of Hampshire ewes were shorn, one by one until all were done around noon. Most ewes cooperated but some made life more difficult for the fledgling shearers providing a realistic experience. Several bags of wool were collected and students left with skills sure to help maintain their flocks. We are pleased with the turnout and hope our students learned helpful skills. Many thanks to their participation and to Mr. Rathke for providing an outstanding clinic. For more information, please visit our website at tennesseesheep.org.

KSWPA - UPCOMING EVENTS

JULY

9th **Graded Sale** - Richmond, KY
12th **Graded Sale** - Bowling Green, KY
12th **Jessamine County Sheep and Goat Meeting,** Jessamine Co. Fairgrounds; 7pm
17th **Graded Sale in West Kentucky Auction Barn**
17th **South Central Goat & Sheep Producers Meeting,** Barren Co. Ext Office, 6:30pm (CT)
21st **Graded Sale** - Springfield, KY
24th **Graded Sale** - Paris, KY
26th **Graded Sale** - Bowling Green, KY

AUGUST

9th **Graded Sale** - Bowling Green, KY
9th **Jessamine County Goat and Sheep Association,** Jessamine Co. Fairgrounds; 7pm
13th **Graded Sale** - Richmond, KY
16-26th **Kentucky State Fair**
18th **Graded Sale** - Springfield, KY
20-21 **Eid al Adha**
21st **Graded Sale in West Kentucky Auction Barn**
21st **South Central Goat and Sheep Producers Assoc.,** Barren Co. Ext Office, 6:30pm (CT)
23rd **Graded Sale** - Bowling Green, KY
28th **Graded Sale** - Paris, KY

SEPTEMBER

9-11th **Rosh Hashanah**
10th **Graded Sale** - Richmond, KY
11-12th **Islamic New Year**
11th **Central KY Sheep and Goat Assoc.,** Marion Co. Ext. Office 7 pm
13th **Graded Sale** - Bowling Green, KY

SEPTEMBER

13th **Jessamine County Goat and Sheep Assoc. Meeting,** Jessamine Co. Fairgrounds; 7pm
15th **Graded Sale** - Springfield, KY
18th **Graded Sale in West Kentucky Auction Barn**
18th **South Central Goat and Sheep Producers Meeting,** Barren Co. Ext Office, 6:30pm (CT)
20th **Fort Harrod Goat and Sheep Assoc. Meeting;** Mercer Co. Ext. Office; 6:30 pm potluck & 7:00 pm meeting
25th **Graded Sale** - Paris, KY
27th **Graded Sale** - Bowling Green, KY

OCTOBER

8th **Graded Sale** - Richmond, KY
9th **EweProfit School II,** C. Oran Little Research Farm Midway, KY
11th **Graded Sale** - Bowling Green, KY
11th **Jessamine County Goat and Sheep Association,** Jessamine Co. Fairgrounds; 7pm
16th **Graded Sale in West Kentucky Auction Barn**
16th **South Central Goat and Sheep Producers Meeting,** Barren Co. Ext Office, 6:30pm (CT)
18th **Fort Harrod Goat and Sheep Assoc. Meeting;** Mercer Co. Ext. Office; 6:30 pm potluck & 7:00 pm meeting
20th **Graded Sale** - Springfield, KY
23rd **Graded Sale** - Paris, KY
25th **Graded Sale** - Bowling Green, KY
27th **Kentucky Annual Producer Conference,** Frankfort, KY

Kentucky SHEEP & WOOL PRODUCERS ASSOCIATION

WE ARE BETTER TOGETHER!

The Kentucky Sheep and Wool Producers is looking for dedicated producers who are interested in making our state's sheep industry better. Consider becoming part of our Board of Directors so that you can share your great ideas and help us continue to move our industry forward!
For more information on becoming a board member, visit

kysheepandgoat.org/board-member

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 2016 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

Greetings Sheep Producers,

First, I congratulate all KSWPA members and staff who worked to ensure the success of the recently concluded KY Sheep and Fiber Festival. This annual event is designed to celebrate all things wool, and an amazing amount of wool related products are sold each year.

I worked at the Festival for the past few years and observed how certain merchandise sells briskly throughout the event. After careful observation, I have concluded that the most successful vendors at the Festival appear to have executed a strategic plan that included choosing exactly what they wanted to produce and then determining how they could best market their merchandise.

As President of the KSWPA, I encourage each member of our association to consider developing similar strategies for ensuring business success. For example, if you haven't already done so, wont you spend time thinking about why you chose to raise sheep and whether that was a good decision? I began my farming life as a cattleman, but after considering my situation relative to land, labor, capital markets, and potential costs, I switched my entire operation to one ONLY involved with sheep.

Before doing so, however, I investigated who might buy sheep products, and I learned that there are two marketing options available other than taking lambs to the stockyards.

The first is an ethnic market that looks for lambs weighing less than 79 pounds for resale to consumers who often want to fit the entire product into a stardard-sized oven. The second is the more traditional market of grocery stores and restaurants that buy lambs weighing over 100 pounds and then they sell cuts that will fit on individual plates.

I have observed that prices in the ethnic market are excellent between December and April and then again around special ethnic holidays. Learning which holidays cause prices to rise requires some work, however.

If you decide instead to sell your lambs in the traditional market, I suggest you buy your own scales and that you focus on finishing your lambs, so that they look well feed, solid, and ready to provide good size chops and racks of lamb.

In either case you can expect to receive a price-per-pound quote that should be good for at least a four or five day period. For this reason alone, in my opinion, this type of sale is superior to a stockyard auction. At the stockyard, auctioned lambs often sell in 30 seconds. Sellers have no recourse if they believe the auction was too fast or the price was too low. There are various buyers in both the ethnic and the supermarket/restaurant markets, and can meet them through networking with fellow lamb producers.

I am convinced that the marketing of my sheep is just as important to my bottom line as my breeding practices, my vetting, and my feeding techniques. If you want help selling your sheep, go to the KSWPA website at https://www.kysheepandgoat.org and choose "Find a Mentor."

As I have stated in the past, I hope 2018 will be a prosperous year for all our KSWPA association members. To ensure our success, I hope you all will join me in seeking new ways to increase the consumption and popularity of lamb in Kentuckians diets and to grow the membership of the Kentucky Sheep and Wool Producers Association (KSWPA). Let's ask all of your friends and family who are sheep producers, but not members of the KSWPA, to join our association. Let other sheep producers know that, as members of the KSWPA, they will have access to HoofPrint, our informational magazine; our breeder's directory; our mentoring program; and a variety of educational programs. Please direct them to the following link where they can see all the offerings available to KSWPA members: https://www.kysheepandgoat.org/kswpa

Best wishes,
Bill Decker, President

2018 June Wool Pool Successes

Kentucky Sheep and Wool Producers partnered with the Tennessee Sheep Producer Association to offer 3 wool pools in June 2018.

A wool pool is a way of marketing like grades of wool together for a set price. The purpose of the Wool Pool is to cut out the "middle man" and provide a wool buyer a volume of wool that has been graded and bundled in bales. The buyer, in turn, offers the producers a higher per pound price because the Pool did the grading and baling for them. This year, the wool buyer was Keese International. 2018 prices were:

- **$0.50/lb Black Face**
- **$0.50/lb White Face**
- **$0.43/lb Burry**
- **$0.40/lb Short (lamb)**
- **$0.10/lb Black**

KSWPA and TSPA want to say thank you to all the volunteers who gave many hours of hard work to make the wool pools successful!

KSWPA was able to purchase a new ICS Dominator Wool Press using grant funds from the Kentucky State University Small Farmer Grant.

2017 - 2018 KSWPA Board of Directors

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- Hannah Nilsson *Windsor, KY*
  windsorwoolfarm@yahoo.com

Kentucky SHEEP & WOOL PRODUCERS ASSOCIATION

Letter from the President

Greetings from Western Kentucky!

After a winter that would not leave it seems we went from the 120th day of January straight to June! I hope each of you had a successful kidding season and are ready for summer.

KGPA is teaming up with South Central Goat & Sheep Producers for a Field Day on July 14th at Metcalfe County Fairgrounds in Edmonton. Educational speakers, demonstrations, a swap meet, with goat related items, as well as plenty of goat folks will make a great day! Don't miss out!

Be sure to save October 27 on your calendar. We are planning our annual meeting held jointly with the Kentucky Sheep and Wool Producers. The meeting is to be held at the Kentucky State University farm outside of Frankfort. Reid Redden, Texas A&M Sheep and Goat Specialist, will be the keynote speaker. Watch for more details as the date approaches.

As you turn your goats out to pasture and the youth head to the summer shows, I wish you a great year and hope to see you down the road!

Best Wishes and Good Goating,

Shawn Harper, President
Kentucky Goat Producers Association

WE ARE BETTER TOGETHER!

The Kentucky Goat Producers Association is looking for dedicated producers who are interested in making our state's goat industry better. Consider becoming part of our Board of Directors so that you can share your great ideas and help us continue to move our industry forward! For more information on becoming a board member, visit

WWW.KYSHEEPANDGOAT.ORG/BOARD-MEMBER

2017-18 KGPA Board of Directors

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- *Kenny Fenwick,* New Haven, KY
- *Donna Puckett,* Munfordville, KY donnagpuckett@gmail.com
- *Emily Robinson,* Louisville, KY – emilycat6699@gmail.com
- *Vicki Watson,* Auburn, KY – dvwatson@logantele.com

JOIN or RENEW TODAY!

KGPA Membership Application

Your $30 membership provides:

- 4 issues of the *Hoof***Print** Magazine plus the newly designed 2017 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.

KGPA - UPCOMING EVENTS

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17th **South Central Goat & Sheep Producers Meeting,** Barren Co. Ext Office, 6:30pm (CT)
21st **Graded Sale** - Springfield, KY
24th **Graded Sale** - Paris, KY
26th **Graded Sale** - Bowling Green, KY
28th **Harrison Co. 4H Dairy Goat Club** Combined ADGA Senior Doe Show, Check in by 5:30pm Save money by pre entering by June 20th. Open to any youth owned ADGA registered Nubian, Saanen, Recorded Grade, Nigerian Dwarf & AOP Contact: Constance Wheeler, constancewheeler85@gmail.com

AUGUST

9th **Graded Sale** - Bowling Green, KY
9th **Jessamine County Goat and Sheep Association,** Jessamine Co. Fairgrounds; 7pm
13th **Graded Sale** - Richmond, KY
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16-26th **Kentucky State Fair**
23rd **Graded Sale** - Bowling Green, KY
28th **Graded Sale** - Paris, KY

SEPTEMBER

8th **KY Dairy Goat Association,** 2 Ring ADGA Senior & Junior Doe Shows, Judges: Jake Bradford & Jackson Noble, Frankfort
9-11th **Rosh Hashanah**
10th **Graded Sale** - Richmond, KY
11-12th **Islamic New Year**
11th **Central KY Sheep and Goat Association,** Marion Co. Ext. 7pm
13th **Graded Sale** - Bowling Green, KY

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16th **Graded Sale in West Kentucky Auction Barn**
16th **South Central Goat & Sheep Producers Meeting,** Barren Co. Ext Office, 6:30pm (CT)
18th **KSU Goat Third Thursday**
18th **Fort Harrod Goat & Sheep Association Meeting,** Mercer Co. Ext. Office, 6:30pm potluck & 7pm meeting
20th **Graded Sale** - Springfield, KY
23rd **Graded Sale** - Paris, KY
25th **Graded Sale** - Bowling Green, KY
27th **Kentucky Annual Producer Conference,** Frankfort, KY

KENTUCKY GOAT PRODUCERS ASSOCIATION

To list your goat event among the Upcoming Events please send information to kyates@kysheepandgoat.org. Please be sure to include date, location, and time.

Attention Goat & Sheep Producers

Field Day & Swap Meet

Goat and Sheep related Tools & Equipment to Buy, Sell or Trade
(no animals other than guard dog puppies)
Food and Drinks
Workshops
Goat Yoga
Hand-On Demonstrations
Questions Answered by Industry Experts
Everyone Welcome!

July 14, 2018

Metcalfe County Fair Grounds, Edmonton, KY

Sponsored by the Kentucky Goat Producers Association and South Central Goat & Sheep Producers

For additional information contact:
Dr. Beth C. Johnson, DVM
BethC.Johnson@ky.gov
or 859-583-5655

Varsey Humphrey
rashashea@yahoo.com
or 270-670-7457

Erik Brown
erik.brown743@topper.wku.edu
or 502-226-0281

www.kysheepandgoat.org/kgpa

Artificial Insemination in Sheep and Goats

by Jerusha Lay, DVM,
Kentucky State University

Have you been thinking about using Artificial Insemination (AI) in your sheep or goat herd? AI has been widely used in other livestock species, but it is a relatively new technology for sheep and goats. Many factors must be considered before deciding whether it is right for your herd. We will start with a brief overview of the anatomy of the female reproductive tract and the importance it plays in conception. Then, we will discuss the two techniques available and the differences between them, including positive and negative aspects of each. Finally, we will describe the options for semen (sperm) and the impacts different storage options have on conception rates and herd dynamics. This will assist you determine whether using AI is appropriate AI for your herd.

The reproductive tract of the ewe/doe

Starting externally, the female reproductive tract begins with the vulva followed by the vagina. The vagina is where semen is deposited naturally by the sire. Following the vagina is the cervix, which is the muscular section of the uterus. The cervix is has multiple folds and acts as a natural barrier through which the sperm must move to reach the ovum (egg). The cervix releases mucus, which traps bacteria and prevents infections during breeding. Once the sperm makes its way through the cervix, it must travel through the uterine body and horns. The ova (eggs) are fertilized in the oviduct (also known as the fallopian tube) that connects the uterus to the ovaries.

AI techniques

There are two commonly used AI techniques: cervical and laparoscopic insemination. Each of these has its advantages and disadvantages, including the impacts on conception rates. The cervical insemination technique is the easier and less invasive of the two AI techniques used for goats. Using a speculum, an AI rod is inserted through the vagina and the three rings of the cervix. This allows the AI technician to deposit the semen at the cranial end of the cervix. If the AI rod cannot penetrate all of the rings, then the semen is deposited within the cervix (this reduces the conception rate). Producers can receive training in the cervical AI technique and be able to perform this themselves. Contact your semen sales representative, local Extension agent or Sheep and Goat Development Office for additional information.

Laparoscopic (intrauterine) insemination uses surgical techniques to insert the semen into the uterus close to the oviduct, which is the site of fertilization. By placing semen close to site of conception and bypassing the cervical barrier, this technique will yield better conception rates. One disadvantage to laparoscopic insemination is that the animal must be sedated for the procedure. This means the procedure has additional risks associated with anesthesia and the potential for scar tissue formation in the reproductive tract. In addition, the AI technician needs to be a skilled professional to perform the procedure. This means the laparoscopic technique has a higher cost due to the equipment, anesthesia, and necessary skilled professional. One advantage is that the conception rates are higher than cervical insemination although they are less than natural service. This technique is more commonly used in sheep than in goats.

Semen sources for AI

For either procedure, the semen used may be purchased fresh or frozen from commercial companies or private producers. Fresh semen is collected from the desired sire and evaluated for either use immediately or frozen storage. For frozen semen, it is processed, and placed into plastic straws that are stored in liquid nitrogen. Advantages of frozen semen are that lower quantities of semen may be used, and it may be stored for long periods of time (however, conception rates may be affected).

In herds that decide to strictly use AI in their breeding programs, one benefit is not having to manage a buck or ram. This means not having to deal with the smell or aggressive behavior. It also means the producer does not have to maintain separate pens for the males. However, because conception rates with AI are not 100%, most producers choose to keep a sire or ensure they have access to one, for "clean up" purposes to breed any females that did not conceive via AI. Another option after AI is to ultrasound the animals for openness. Any females that did not conceive could be taken to a sire for natural service or undergo another attempt at artificial breeding.

Buying semen from bucks or rams with superior genetics can produce higher quality kids or lambs. This can quickly improve genetics within your herd. In addition, semen can be purchased from multiple bucks to enhance genetic variation of the offspring. Semen prices will vary widely and range anywhere from $25-$500 (or more in some cases). Because the physical presence of the male is not required, proven sires that are deceased or owned in partnerships may be used for AI.

Advantages of using AI

In addition to eliminating the need to maintain and manage rams or bucks, another advantage of AI is the risk of exposure to diseases from outside your farm is reduced. Any time new sires are

brought into a location or animals leave the farm to be bred, biosecurity may be at risk. By not introducing new animals to your farm and not taking animals to other farms for natural service, diseases and parasites that may be transmissible are avoided.

Disadvantages of AI techniques

Artificial insemination comes with some disadvantages as well. You will want to consider the following before making a decision as to whether AI is right for your animals: lowered conception rates, expense of supplies and skilled personnel, and the health risks associated with the laparoscopic procedure (if chosen).

Heat detection may be difficult in the absence of a sire or teaser animal. Many times, producers will use synchronization techniques to manipulate hormone cycles. Heat synchronization may allow for AI to be timed, but does add to the costs of AI. With heat synchronization, hormone cycles are manipulated and allow AI to be done at a specific time. Timing allows convenience of multiple animals being in heat at the same time.

Conception rates vary considerably and depends on the techniques used and the individuals who perform the insemination. Neither technique is as effective as natural breeding. Since the cervix acts as a barrier and is still located at a relatively far distance from the site of fertilization, the cervical technique will naturally yield lower conception rates than laparoscopic insemination. As noted, if the intrauterine/laparoscopic technique is used, animals need to be sedated or put under anesthesia. Reactions or complications due to the drugs used may even cause death. Infections are also a risk with any surgical procedure.

Expense is also a major drawback. This is the biggest limiting factor for most producers. The expense consists of the cost of semen as well as the cost of having the procedure performed. As you would expect, having someone surgically inseminate your animals is much more expensive than the cervical technique. Finding someone skilled to perform, or to train you to perform, the technique will also likely involve travel expenses. As noted, training programs are available to teach producers how to AI their own animals, but this will require fees for the training and/or materials. In addition, if frozen semen will be purchased, an appropriate semen storage tank and a source of liquid nitrogen will be needed as well. This means the producer must pay not only the initial cost for the tank, but also maintenance costs to have nitrogen refilled on a regular basis.

Summary

The decision to utilize AI depends on the overall goals for your herd. If your goal is showing or improving herd genetics quickly, AI may be beneficial for you. Additionally, if you have a few animals as pets and would like them bred, but do not want a buck or ram, then AI may even be a cost-effective option. While AI is great for genetic diversification and herd improvement, it can often be cost-prohibitive and comes with a lower conception rate than natural breeding.

Dr. Jerusha Lay, DVM, *Kentucky State University Dr. Jerusha Lay, DVM recently joined the faculty of Animal Science at Kentucky State University. She earned her Bachelor of Science in Agriculture from Eastern Kentucky University. She followed with her Doctor of Veterinary Medicine, from Auburn University.*

KY Sheep & Goat
CHECK-OFF

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
- $25,000 given for special projects to help producers increase marketing efforts throughout the state since 2012
- $13,800 spent in promotion of sheep and goat products in 2017

KY Sheep & Goat Check-Off Sponsors the Tim Farmer's Country Kitchen Cooking Show
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 details about the Kentucky Sheep and Goat Check-off Program
visit **www.kysheepandgoat.org/Check_Off.html**

Artificial Insemination in Goats

by Terry Gipson, Ph.D.
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Introduction

Genetic improvement in livestock entails the selection of the animals with the "best" set of genes and allowing only them to reproduce. However, the "best" animals may not be available locally within the goat producer's herd or may be deceased. Artificial insemination using frozen semen can overcome these two obstacles. The use of either frozen or fresh semen can preserve biosecurity measures so that disease transmission from animal-to-animal or farm-to-farm is minimized. Artificial insemination is a relatively simple tool to employ but requires some technical knowledge.

Heat or Estrus

The average length of the estrous cycle in goats is 21 days, with a normal range from 19 to 23 days. Estrus or heat is the period of time in which the doe (female) is sexually receptive to the buck (male). Does are in estrus for approximately 24 hours and ovulate at the end of estrus.

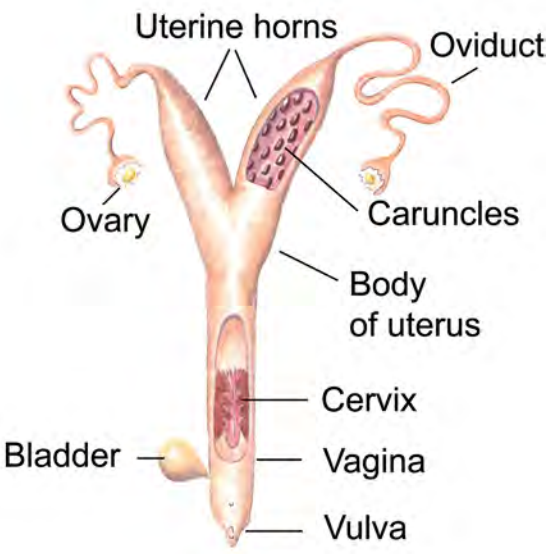
Estrous Cycle of Goat-Terminology

Estrus, or heat, is the period when the female is most sexually receptive, due to high levels of estrogen, and lasts 24 to 36 hours. Increased estrogen levels bring about a surge of LH, which triggers ovulation toward end of estrus.

Metestrus is the period when the corpus luteum forms and begins to produce progesterone. Metestrus lasts 2 to 3 days.

Diestrus is the period when the corpus luteum is highly active in its production of progesterone. If pregnancy occurs, the corpus luteum is maintained and further estrus is inhibited. If pregnancy does not occur, prostaglandin from the uterine wall causes regression of the corpus luteum. Diestrus lasts 15 to 19 days.

Proestrus is the period between the regression of the corpus luteum and estrus, when follicular development is occurring, and estrogen production is increasing. Proestrus lasts 2 to 3 days.



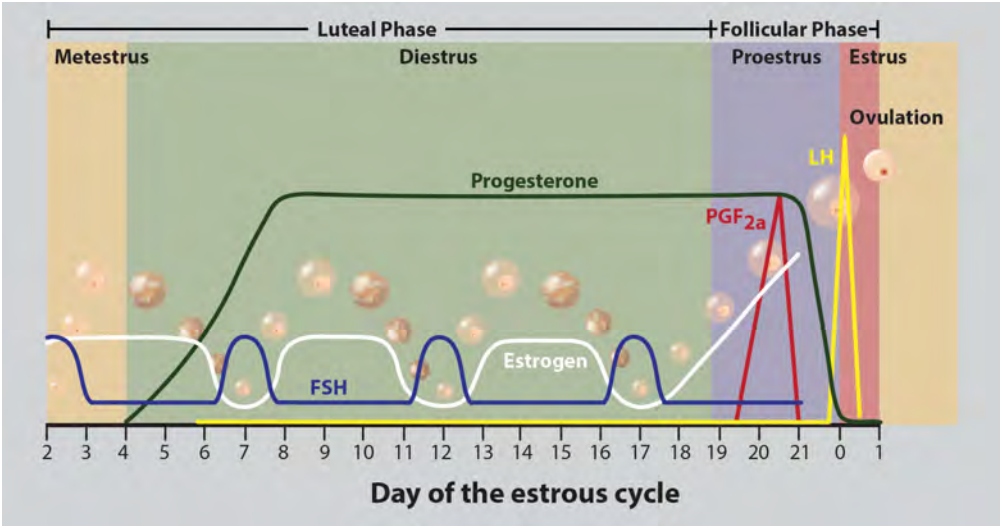
Signs of estrus

Most does exhibit easily recognized signs of estrus such as:

- fence walking
- tail wagging or flagging
- swollen vulva
- homosexual activity (mounting or allowing pen mates to mount)
- increased urination
- increased vocalization
- increased restlessness and head butting with other females
- increased vaginal mucus discharge
- decreased appetite
- decreased milk yield
- other personality changes

For artificial insemination, possibly the most important sign is the change in consistency, elasticity, and color of the vaginal mucus and is assessed by examining the mucus located in the anterior portion of the vagina, also called the fornix. A speculum and light source are required for this assessment. For optimum fertilization, the mucus should be thick, highly elastic, and cloudy. Mucus that is thin, water-like, and clear is an indication that the doe is too early in estrus for a properly timed insemination. Mucus that is thick, pasty, and white or pale yellow is an indication that the doe is past her proper time.

If possible, the inseminator should keep records on each doe to determine her regular cycle. Good records are a key element in good herd management and are important in the accurate determination



of standing heat and also the entire length of her estrous cycle. Does remain in estrus for approximately 24 hours, although this can vary from breed to breed and from doe to doe within breed. Generally, an individual doe will likely repeat the length of her estrus and the length of her estrous cycle on a regular basis.

Timing

The timing of insemination is the most-important factor in determining the success of artificial insemination, and timing is dependent upon successful detection of estrus. Under natural mating, the buck is the best indictor of the receptiveness of the doe. The buck will commonly exhibit a Flehmen reaction when assessing the mating receptiveness of the doe. The Flehmen reaction is when the buck curls his upper lip and inserts his muzzle into the urine stream of a female. The inseminator does not possess these advantages and must rely upon other signs/indications of estrus and for the determination of proper timing of insemination.

Technique

Artificial insemination is a simple technique that, when performed with skill properly founded on knowledge, offers ease of use and a good level of success. However, results can be discouraging for an inseminator lacking knowledge and the necessary attention to details needed for a successful outcome.

It is good to keep in mind that the success of any artificial insemination program is largely dependent on three primary factors:

- The use of live/viable fresh cooled or frozen semen.
- The appropriate timing of insemination in relation to estrus and ovulation.
- The proper deposition of semen in the doe.

Not every doe is a good AI candidate. Does who do not cycle normally every 17 to 24 days with regularity or who are difficult to determine when and if they are in estrus should be lesser candidates in an AI program.

Success Rate of AI by % Pregnancy Rate (PR)

Method	*PR (%)*
Vaginal	< 15-25
Cervical (CAI)	<40-45
Transcervical (TAI)	55-65
Intrauterine (LAI)	80-90

Under natural service (using a buck), the buck deposits the semen in the fornix of the vagina and the success (pregnancy) rate is generally near 95%. If the inseminator deposits semen in the same location, the pregnancy rate is generally less than 25%. If the inseminator is unable to traverse the cervical rings and deposits the semen within the cervix, then the pregnancy will nearly double to 45%. If the inseminator is successful in traversing all the cervical rings and is able to deposit the semen in the body of the uterus, then pregnancy rate can rise to near 65 to 70%.

Proper semen deposition

Many inseminators will check heat once in the early morning and once in the late afternoon with a teaser buck or an intact buck outfitted with a mating apron. Those does found to be in standing heat in the morning are scheduled to be inseminated in the afternoon and does found in standing heat in the afternoon are scheduled to be inseminated the next morning. If a doe is still in standing heat at the next heat check, then a second, or even a third, insemination can be scheduled. This decision is contingent upon the price of the semen and the availability of the inseminator. The mucus consistency, elasticity, and color should be verified on the does scheduled for insemination. If the mucus has the proper properties, then insemination can continue. If not, the doe should be returned to the herd and heat check procedure continued.

Determining the proper time to inseminate is not only critical with regard to the condition of the spermatozoa and ovum (egg) when they come in contact with one another, but also is critical to facilitate proper placement of semen in the reproductive tract. It is necessary that proper timing be achieved to allow the artificial insemination gun to penetrate and traverse the cervix prior to semen deposition. A properly timed procedure should allow for relative ease in manipulating through the cervical rings. However, young or maiden does will prove markedly more difficult and are not advised for the beginning inseminator. Even mature does, if stressed or made uncomfortable due to rough handling, poorly designed or ill-used equipment, can become so tense as to constrict

the muscular canal of the cervix rendering its penetration past the os (opening of cervix) nearly, if not totally, impossible. It cannot be overstressed that artificial insemination should be performed with a slow, determined, but gentle approach with adequate time allowed to follow proper protocols.

Semen should be deposited within an approximation of like timing to the occurrence of ovulation. Ovulation occurs just before or shortly following the end of the doe's standing heat. Once the semen is properly deposited, it is believed that fresh semen can remain viable for over 12 to 24 hours in the doe's reproductive tract. Processed and frozen semen is compromised to some degree and can be expected to have a somewhat shorter time of viability.

Artificial insemination equipment and supplies

Some basic equipment is required for the inseminator to perform cervical and/or transcervical insemination effectively. Ultimately the doe's comfort should be in the forefront of the inseminator's mind in the selection of tools to use.

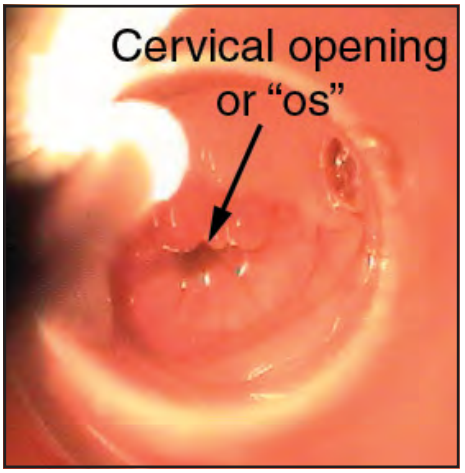
Basic equipment necessary for artificial insemination includes:

1. Carrying case.
   - A compact metal or plastic case for the safe and clean storage of equipment.
2. Artificial insemination (AI) gun.
   - A goat length (usually 30 cm) device used for the depositing of semen via a ¼ or ½ cc straw; available in a variety of styles.
3. AI gun sheaths.
   - Disposable, sterile, individually wrapped outer plastic shells which fit over the gun providing a secure seat for the straw. Each AI gun requires a specific style of sheath to accommodate the gun's specific design.
4. AI light.
   - A compact light source which should attach securely to the vaginal speculum. The most easily used light sources are independent of a battery pack, generate little to no heat, and are unobtrusive in design.
5. Vaginal speculum.
   - When used in conjunction with a light source, enables the clear view of the cervical os (opening of cervix).
6. Speculum brush (bottle brush).
   - A soft brush, sized to provide thorough cleaning of the vaginal speculum.
7. Straw cutter or scissors.
   - For proper seating in the AI gun sheath, this device delivers the critical square cut to the end of the semen straw. Scissors will work well as a cutter. However, scissors tend to flatten the end of the straw and the end of the straw needs to be rounded with a gentle roll of the fingers before it is inserted into the gun.
8. Non-spermicidal, sterile lubricant.
   - Used for the lubrication of the vaginal speculum prior to its insertion.
9. Semen thaw unit.
   - A device designed for the proper control of the semen straw's thawing process. The unit should be compact in design, providing optimal thermal protection, complete with a thermometer, as well as both water and dry bath compartments.
10. Straw tweezers.
    - Used for the retrieval of straws from the liquid nitrogen tank and from thaw unit. Available in both 0.25 and 0.5 cc sizes
11. Other items needed:
    - Fresh cooled or frozen semen. Packaged in ¼ or ½ cc straws.
    - If using frozen semen, additional required equipment includes:
      - Liquid nitrogen storage tank.
        - Available in a variety of sizes, storage capacities, and duration of hold times; an over-sized thermos of a sort, to be filled with liquid nitrogen, for the long term cryogenic storage of semen.
      - Liquid nitrogen tank measure stick.
        - For the measuring and accurate monitoring of the volume of liquid nitrogen contained within the storage tank.
12. Optional equipment includes:
    - Microscope.
      i. Of mid-grade or better quality with a tungsten or halogen light source and capable of examining specimens at a minimum of 100× and 400× magnifications; used for basic thawed semen observations and analysis.
    - Microscope slides.
      i. The platform on which the thawed semen sample is dispensed for viewing with the microscope.
    - Microscope cover slips.
      i. A small piece of plastic or glass used to cover the semen sample, allowing its proper viewing.

Goat AI Procedure

1. Assemble equipment.
2. Restrain doe.

3. Wipe dirt from around vulva – no soap is used as this is spermicidal.
4. Put lubricant on the speculum.
5. Insert speculum into vagina and attach light source.
6. Locate os of cervix (opening of cervix).



7. Evaluate os (opening of cervix)– does it appear open or closed.
8. Evaluate mucus – is it clear (early heat) or somewhat cloudy (later heat, more appropriate for insemination).
9. If doe is ready for insemination remove speculum.
10. Thaw semen.
11. Remove from semen tank and put in thaw jar within 3 seconds.
12. Thaw jar temperature should be 95°F (35°C).
13. Thaw semen for approximately 15 – 30 seconds, can be longer.
14. Remove straw from water, wipe off water.
15. Cut the crimped end with straw cutter, do not cut end with plug.
16. Load into insemination gun.
17. Put on appropriate sheath.
18. Keep gun warm until needed.
19. Reinsert speculum as described previously.
20. Locate os (opening of cervix)of cervix.
21. Insert insemination gun into os and try to penetrate into cervix.
22. Generally there will be 5 cervical rings, count the rings as they are passed.
23. Do not deposit semen into a uterine horn, deposit inside cervix.
24. Deposit semen slowly over at least 5 seconds, watch the cervical opening to see if any semen "backs up" out of the cervix.
25. Slowly remove the insemination gun to avoid creating a vacuum effect pulling semen out of the cervix.
26. Remove the speculum and record time of mating, buck number, doe number, mucous characteristics, inseminator's name, comments on heat characteristics, any further comments.
27. Place the speculum in a bucket of water to wash.
28. Speculums can later be sterilized by boiling or baking, dried and individually wrapped in paper towels until next use.

Conclusions

Artificial insemination in goats is a simple non-invasive procedure but takes skill to master, especially in judging the correct time to inseminate.

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tales from
The Kentucky Fiber Trail
Summer 2018

9th Annual Kentucky Sheep & Fiber Festival

by Sarabeth Parido

Rain or shine, or as we usually have here in our Kentucky springtime, rain AND shine, our 9th annual Kentucky Sheep and Fiber Festival was a success! With over 4000 patrons in attendance, nearly 200 workshop students, and 80 vendors a 'fibery fun' time was had by all, no matter what the weather provided.

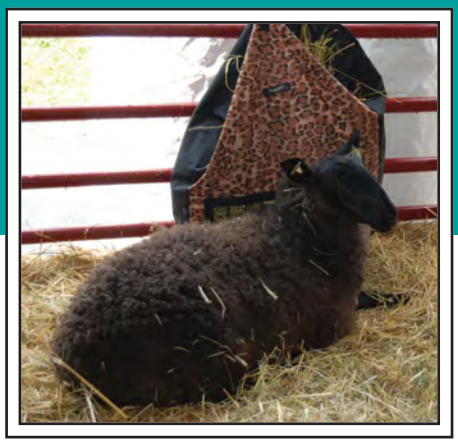
With a sponsorship from the Kentucky Department of Agriculture, we expanded our Livestock Tent this year and gave our producers center stage at the front gate to welcome our guests as they arrived. We also moved our popular Fleece Sale into our Livestock Tent to create more room for our sale and to help promote the producers who have brought in such beautiful fleeces.

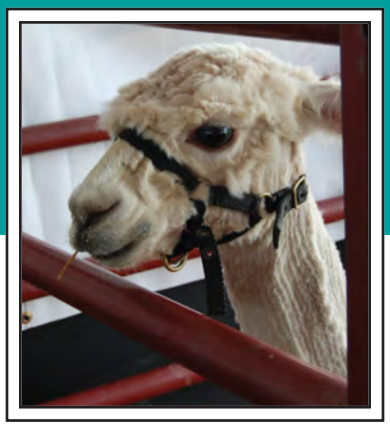
In partnership with the Kentucky Fiber Trail and our friends at The Woolery, we offered 26 workshops, ranging from color theory lectures to hands on introductions to fiber arts, entrepreneurial courses, and even goat yoga. We truly covered the spectrum of interests this year. Several of our classes sold out ahead of the festival, and many of our classes saw walk in students join their classes.

Many of our vendors, with over half coming locally from Kentucky, boasted record sales this year. We welcomed back many returning vendors who have become regulars with KSFF, as well as debuted several new vendors giving even more diversity to our festival. We showcased many yarn and fiber artists, feltmakers, weavers and potters.

Our shearing demonstration was again a huge hit, with patrons filing the tent and available seats throughout the whole day. Some of our livestock producers walked their animals around the festival grounds to the delight of all. We welcomed a new favorite photo opportunity with our Kids Hugging Kids booth at the front gate. Kids Hugging Kids promoted the Kentucky Goat Association and the youth goat program. Our guests were able to cuddle up with some very sweet goats for a small donation to the program. It was a wonderful addition to our festival and one that we hope to continue to promote in the future.

Our festival committee is already looking ahead to next year as we celebrate the 10th festival! We are always looking for ways to grow and enhance the festival for all involved. Rain or shine, we will be celebrating ten years of fiber festivals and looking ahead to the next ten at Masterson Station Park with the Kentucky Sheep and Fiber Festival.





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U.S. Wool Prices Hit Record High

by Julie Stepanek Shiflett, PhD

U.S. wool prices hit record highs in April. Wool prices in fleece states representing midwestern and eastern wools--were 35 percent higher year-on-year and 41 percent higher from two years ago. The industry hasn't seen prices this high since mid-2011. Market fundamentals of tight global supplies and strong demand suggest that wool prices will remain strong in the foreseeable future. A producer's knowledge of the average fiber diameter of his or her flock can be the most important factor in securing high returns from wool.

U.S. prices reflect Australian wool market trends. During the week of May 7, the AWEX (Australian Wool Exchange) EMI (Eastern Market Indicator) hit a record high of 1891 ac/clean kg, 23 percent higher year-on-year. This all-time high is equivalent to 1410 U.S. cents per kg, $6.40 per lb. clean, or $3.20 per lb. greasy assuming a clean yield of 50 percent.

A first step toward maximizing wool returns is objectively defining the quality of wool. A second step is on-farm wool preparation. Being able to describe the quality of wool with internationally-shared objective descriptors can improve the bargaining position of any grower. Wool sales can be a significant portion of any sheep growers' business with sales accounting for 10 to 50 percent of a sheep's annual revenue (ASI, 2015:1152).

A systematic, objective measurement of wool quality is unbiased, irrefutable and clearly communicates to any buyer wool's characteristics. Objective measurement of wool's fiber diameter is one such way to add an unbiased characterization to growers' wool, and maximize returns. According to Wool Innovation, Ltd.: "Fibre diameter is responsible for 70-80 percent of the greasy wool price over the long term," (Australian Wool Innovation Ltd., no date).

Defining Micron

The U.S. system of standardizing wool quality characteristics has evolved over time to better communicate wool's value to domestic and international buyers, and processors. The average fiber diameter of wool refers to wool thickness and is the most important fiber property determining wool's end use and value (American Sheep Industry Association, 2015:1113).

The first wool grading system in the U.S. was the "American Blood System." When native coarse-wool sheep were crossed with fine-wool imported Merinos, the percentage of Merino in the cross defined the amount of fine wool.

The "American Blood System" was broad and replaced by the more precise English Worsted Yarn Count System (Spinning Count System). In this standard, grades referred to the number of hanks (each 560 yards) of yarn that could be spun from 1 lb. of wool top. The count system split wool into 14 grades, ranging from 80s (finer wool) to 36s (coarser wool). Historically, it was possible to produce 64 hanks of yarn from grade 64s wool, but increased wool processing productivity has rendered this parallel outdated (American Sheep Industry Association, 2015:1113).

Many U.S. wool growers today still use the grading system, and, in fact, the U.S. Department of Agriculture (USDA) still reports grades, but wool grades and standards have since evolved into the internationally-accepted micron system. The micron system splits all wool into categories defined by the scientifically-measured average fiber diameter called a micrometer, or micron, for short. A micron is equal to 1/25,400 of an inch.

There are no strict standards to what defines fine, medium and coarse wool, but the lower the micron number, the finer the wool. Wool microns range from 17 (finest) to 40 (coarsest). In general, and with some overlap, fine wools produce a micron of 17 to 24, medium wools range from 30 to 21 micron, and coarse wool produces a micron reading of 36 and higher.

USDA Wool Prices

In general, wools out of Oregon, Washington, and some Californian wools are called fleece states wool by USDA and are used to proxy midwestern and eastern wools. These wools are typically a little heavier, and a little shorter relative to other western wools, called territory states wools. In Kentucky and neighboring states, wool ranges widely in micron, but perhaps most wool produces 25 to 30 microns.

The USDA, Agricultural Marketing Service (AMS) does not report wool prices out of eastern and midwestern U.S. due to confidentially concerns. As the U.S. wool industry contracts, and wool warehouses consolidate, it is challenging for AMS to

protect the identity of those entities reporting wool prices. As a consequence, fewer wool prices are reported by AMS to wool growers, exacerbating marketing risk for some.

The "National Wool Review" reported weekly by AMS can be accessed online at https://www.ams.usda.gov/mnreports/gl_ls850.txt.

Inverse Relationship between Micron and Price

There is an inverse relationship between micron and price. The finer the wool, the lower the micron reading and the higher the price. On average, one lower micron reading (moving from 26 to 25 micron, for example) brought a 6 percent price premium from 2015-2017 in the fleece states. In general, the price premium increases even more per micron for the finer 18 and 19 micron wools.

In April, the micron-price spread was more pronounced in the fleece states. For example, 22 micron averaged $5.70 per lb. clean, a 9 percent price premium to 23 micron which averaged $5.21 per lb. clean. Twenty-five micron saw $4.26 per lb. clean, an 11 percent price premium to 26 micron averaging $3.85 per lb. clean.

Sheep Breeds by Micron

Selecting sheep genetics is the most important factor in determining wool fiber diameter, and thus returns. The finer the wool, the higher price premium.

Sheep breeds can be classified by micron into three general categories of fine-wool, medium-wool, and coarse-wool breeds. The type of wool produced defines its end use and thus its value. Knitwear and underwear use the finest wools (about 19-21 microns) while men's and women's outerwear can use fine to medium-micron wools (up to about 26 micron). Sock manufacturing can use 21-26 microns.

According to the American Sheep Industry Association, fine-wool breeds include Merino and Rambouillet. In general, the heat and humidity of the Midwest and East may not be suited to fine-wool production, so the largest fine-wool flocks are typically found in the West. However, there are some fine-wool flocks east of the Mississippi. These flocks might be geared specifically to the niche, hand weaving industry, and not marketed to the national and international commercial markets.

In Kentucky and neighboring states, many sheep producers run medium-wool breeds including Polypay, Shropshire, Dorset, and Hampshire. Micron production of wool can range from 25 to 33 micron. Many medium-wool breeds were originally cross bred for meat production, but profiting from wool doesn't mean sacrificing meat production goals.

Border Leicester, Lincoln, and Romney are examples of coarse-wool breeds. Micron production can be 34 micron and coarser.

Testing Micron

Almost all wool sold on a greasy and clean basis in the U.S. today is subject to some level of objective measurement as it passes through marketing channels (ASI, 2015:1117). For less than $10 per head, wool growers can send wool samples to the Yocom-McColl Testing Laboratory to receive a fiber diameter analysis.

Knowing wool micron can help set breeding and selection goals and monitor progress. The Yocom-McColl laboratory website states: "When utilized properly, objective fiber testing can be a powerful marketing and genetic selection tool. Objective measurement is an assessment made without the influence of personal feelings or prejudice," (Yocom-McColl Testing Laboratory, No date).

Knowing Micron Facilitates Marketing

Defining the average micron of a flock can give a grower an advantage in marketing. There is a market for every wool clip, but efficient marketing is paramount to achieving top dollar. "Presale objective measurements are beneficial to both producers and buyers in assuring that wool is appropriately priced," (ASI, 2015: 1117). The Yocom lab website added: "The determination of average fiber diameter (micron) helps identify the best end use for fiber and is information that wool mills require before making purchasing decisions."

The midwestern and eastern wool marketing system in the U.S. is challenged to combine like wools from different growers in order to build significant volume to attract buyers. Many wool pools and warehouses incur a significant expense sorting wools into uniform bales. If a wool producer can defend the quality of his or her wool, its value can be recognized in a marketing chain that rewards high-quality wools.

In the end, the Yocom-McColl lab summarized wool testing: "Information is power in the marketing world."

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Selection of Ewe Lamb Replacements for Commercial Sheep Enterprises

By Debra K. Aaron and Endre Fink

The goal in selection of ewe lamb replacements is to complement or improve the genetics of your current ewe flock.

I. Selection Goal

The first and most important step in designing a selection program is formulation of a goal. This step is crucial to the success of a long-term program for flock improvement. Your selection goal should provide a clear picture for the desired direction of genetic change in your flock. It should also provide a basis for day-to-day selection decisions and be realistically based on your accessible resources (labor, management, facilities, and available feed) and primary markets.

II. Genetic Improvement Principles

Selection of sheep for most economically important traits requires phenotypic measurement to identify the best-performing animals to become parents of the next generation. We hope selected animals will be genetically superior, but the genes that contribute to differences between high performing and low performing animals cannot actually be observed. For example, some of the best performing animals may have below average genetics but be exposed to superior environmental effects. In contrast, some of the worst performing animals may have superior genetics but be exposed to below average environmental effects.

The genetic merit of animals based on phenotype are estimated with partial knowledge.

Therefore, we must do all we can to ensure estimates of genetic merit are the truest and fairest possible. Some practical and conceptual aspects include:

A. Animal Identification

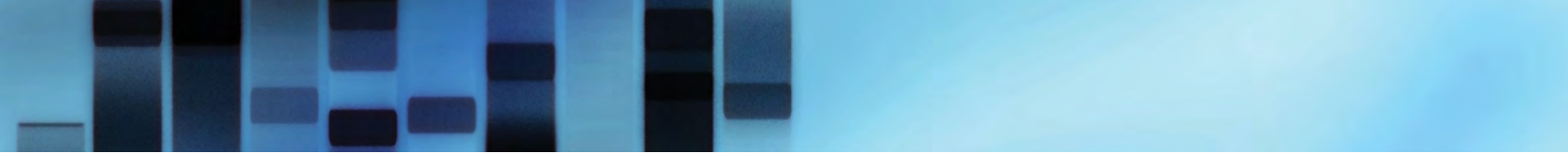
Accurate estimation of genetic merit requires identification of every animal in your flock as well as written records of measurements taken on traits deemed to be economically important. Animal identification must be:

1. Permanent
2. Unique
3. Computer-friendly

B. Production Records

An efficient selection program does not involve measurement of every possible trait for every animal in the flock. Your selection goal will determine the kind of production records required for selection of potential ewe lamb replacements. Production records include:

1. Parentage
   a. Sire
   b. Dam
2. Performance
   a. Date of birth
   b. Birth weight
   c. Type of birth and rearing
   d. Weights and actual dates weight measurements



are taken. Specific weights are determined by your selection goal and production system but may include:

i. 30-day weight
ii. Weaning weight (60 days)
iii. Postweaning weights (90, 120, 240 days)
iv. Market (harvest) weight

e. Other traits (wool, carcass) depending on your primary market

3. Adjustment for known environmental (nongenetic) effects

An initial step in the process of genetic evaluation is to adjust performance records for known environmental effects (called fixed effects). If these fixed effects are not taken into account, selection decisions will be biased in favor of individual lambs having the most favorable environmental conditions, but these animals are no more likely to be superior than any other animals. For fair comparisons, these effects must be definable from the records you collect and be accounted for in the genetic evaluation process.

a. Correction for age at measurement

Example: Weaning weight (WW, 60 days) corrected for age:

$$\text{Age-Corrected WW} = \frac{(\text{Actual WW} - \text{BW}) \times 60}{\text{Weaning Age}} + \text{BW}$$

BW = Birth weight.

b. Adjustment for fixed effects using multiplicative adjustment factors

Individual's age-corrected weight is multiplied by the appropriate adjustment factor (**Table 1**) for:

i. Ewe age
ii. Sex
iii. Type of birth and rearing

Table 1. NSIP Lamb Preweaning and Weaning Weight Adjustment Factors (*From SID Sheep Production Handbook, 2015 Ed., Vol 8*).

Item	Class	Generic Adjustment
Ewe Age	1	1.14
	2	1.08
	3-5	1.00
	>6	1.05
Sex	Ram	0.91
	Wether	0.97
	Ewe	1.00
Type of Birth and Rearing	S/S	1.00
	S/Tw	1.17
	Tw/S	1.11
	Tw/Tw	1.21
	Tr/S	1.19
	Tr/Tw	1.29
	Tr/Tr	1.36

C. Estimates of Genetic Merit

1. Contemporary groups

The environmental component of an animal's phenotype is not passed from parent to progeny and, therefore, needs to be separated from its genotype. Some of these environmental effects are known and can be accounted for by using adjustment factors (as described above). However, other factors, such as management or weather, may affect performance but cannot be accounted for very easily. These are referred to as unknown sources of environmental variation. The best method to account for unknown environmental effects is to compare animals within a contemporary group.

A contemporary group is a uniformly managed group of individuals of similar birth date, breed composition, age, and sex.

2. Trait ratios

By comparing performance of each individual to the average of its contemporaries, a more precise estimate of genetic merit can be attained than by using individual performance. Comparisons are easily made by trait ratios.

To calculate a trait ratio, divide the individual's own performance by the average performance of its contemporaries and multiply that result by 100. The average ratio is always 100.

Ratios should only be used to compare animals within a contemporary group.

3. Estimated Breeding Values (EBVs, **Figure 1)**
   Predictions of genetic merit are known as Estimated Breeding Values (EBVs) and result from application of genetic theory and statistics to performance records.
   a. Calculation by National Sheep Improvement Program (NSIP).
   b. Provide U.S. sheep industry with access to state-of-the-art, genetic evaluation methodology.
   c. Accept on-farm, performance records from participating flocks and return EBVs for reported traits.
   d. Enable breed-wide, across-flock genetic evaluations for those flocks and breeds that have an adequate system of genetic linkages among participating flocks.
   e. Part of LambPlan, the national sheep performance program of Australia.
   f. Assume average EBV in base population is zero; values expressed as deviation (+ or -) from the average.
   g. EBVs are comparable between two individuals within the same contemporary group or in different contemporary groups linked together by relative information.
   h. Traits:
      i. **Birth Weight** (BWT, kg) estimates direct genetic effects on weight at birth.
      ii. **Weaning Weight** (WWT, kg) provides an estimate of preweaning growth potential.
      iii. **Maternal Weaning Weight** (MWWT, kg) estimates genetic merit for mothering ability. This EBV mainly reflects genetic differences in ewe milk production, but other aspects of maternal behavior may also be involved.
      iv. **Postweaning Weight** (PWWT, kg) combines information on preweaning and postweaning growth to predict genetic merit for postweaning weight at 120 days.
      v. **Number of Lambs Born** (NLB, %) evaluates genetic potential for prolificacy. This EPD is expressed as numbers of lambs born per 100 ewes lambing. An EBV of +5.0 for Number of Lambs Born indicates that an animal is expected to produce daughters who will have an average of .05 more lambs at each lambing, or 5.0 more lambs per 100 lambings, than an average ewe.
      vi. **Number of Lambs Weaned** (NLW) evaluates combined ewe effects on prolificacy and lamb survival to weaning. The NLW EBV is expressed as numbers of lambs weaned per 100 ewes lambing. An EBV of +5.0 for Number of Lambs Weaned indicates that an animal is expected to produce daughters who will wean an average of .05 more lambs at each lambing, or 5.0 more lambs per 100 lambings, than an average ewe.
   i. Other traits:
      i. Body composition (carcass)
      ii. Wool
      iii. Parasite resistance
   j. Performance records adjusted for known nongenetic effects prior to using them in calculations of EBVs.

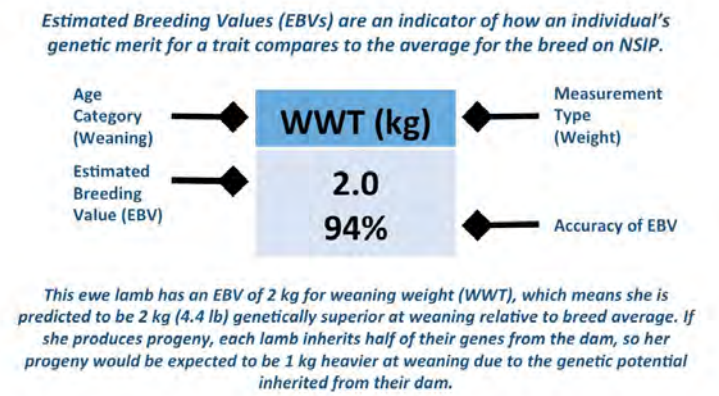


Figure 1. Anatomy of an EBV (*From NSIP Ram Buying Guide*).

4. Expected Progeny Differences (EPDs)
   An individual only transmits a sample half of its genes to each of its progeny. Therefore, it only transmits a sample half of its breeding value to its progeny. The concept of an EPD is very easy to understand, because it is truly the expected progeny difference in performance. An EPD = ½ EBV.
5. Accuracy (**Figure 1**)
   Accuracy values are associated with EBVs and EPDs and give an idea of reliability of an estimate. Accuracy values range from zero to one, with higher values indicating greater accuracy of selection.

D. Methods of Performance Evaluation

Selection can be practiced by sheep breeders using several methods of performance evaluation (**Figure 2**). These include:

1. Pedigree
2. Individual
3. Progeny (not applicable to ewe lambs)
4. EBVs

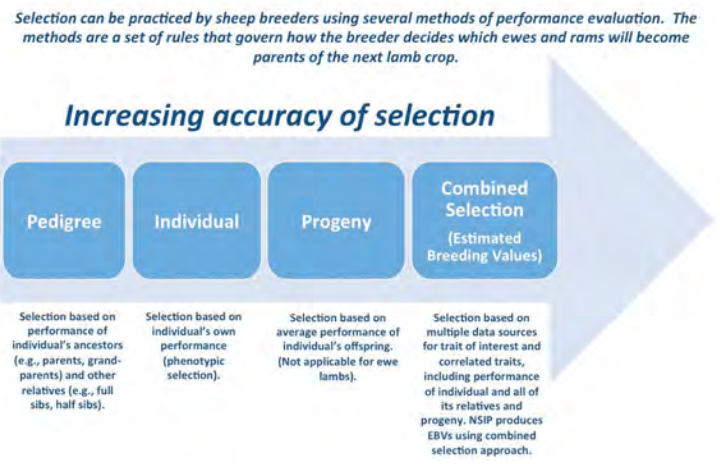


Figure 2. Methods of Performance Evaluation.

E. DNA Tests (Genotyping)

Molecular genetic technology has allowed us to identify animals as carriers or non-carriers of specific genes resulting in genetic defects (for example, spider lamb syndrome) and some genes with major effects on performance. In the future, it is expected the sheep industry will have access to genomic-enhanced breeding values for performance traits based on the specific DNA of the animal to be used alone or in combination with performance records. This will allow genetically superior animals to be selected with greater accuracy. However, there will always be a need to accurately measure performance in animals as an aid to effective selection.

III. Visual Appraisal

Visual appraisal is important but mainly from an evaluation of structural soundness standpoint. Generally, in commercial flocks, your primary focus will be on anything that might limit maternal productivity or longevity in the flock.

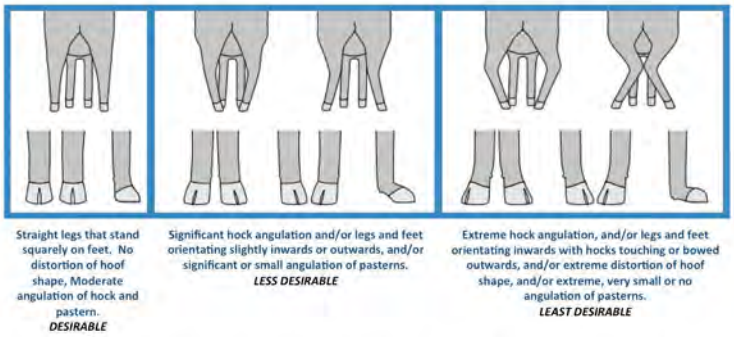


Figure 3. Feet and Legs (*From Visual Sheep Scores, Version 2, 2013, Australian Wool Innovation Limited*).

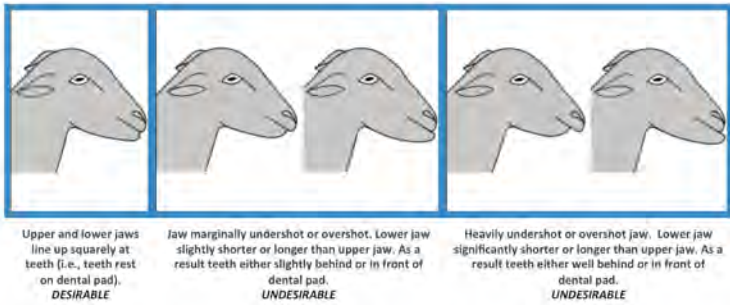


Figure 4. Jaws, Bite, and Teeth (*From Visual Sheep Scores, Version 2, 2013, Australian Wool Innovation Limited*).

A. Structural Soundness

1. Feet and Legs (**Figure 3**)
2. Jaws, Bite, and Teeth (**Figure 4**)

B. Reproductive soundness (teats, udder)

C. Conformation or shape (frame, volume, thickness, bone)

D. Coat, Fiber, Color (specialty flocks)

E. Breed Character (purebred flocks)

IV. Replacement Ewe Lamb Selection

A. Number of Ewe Lambs Needed

Calculation of the number of replacements needed is shown in **Table 2** for two levels of flock reproductive performance (average lamb crops of 140 *versus* 170). Other considerations include:

Table 2. Scheme for Replacement Ewe Selection (*From SID Sheep Production Handbook, 2015 Ed., Vol 8).*[a]

Item	Average Lamb Crop[b] 140	170
No. of ewes	100	100
No. of ewe lambs	70	85
No. of twin-born ewe lambs[c]	40	70
No. of twin-born ewe lambs that are above average in weaning weight	20	35
No. of ewe lambs exposed to rams	20	35
No. of selected lambs that are pregnant[d]	12	21

[a] Assumes 20% replacement rate (i.e., 20 ewe lambs needed each year to maintain flock size).
[b] Lambs raised per ewe exposed.
[c] Average lamb crop = 140: 40% of ewes have twins; average lamb crop = 170: 70% of ewes have twins.
[d] Final replacements (assumes 60% conception rate).

1. Ewe culling rate
   Customary to cull approximately 15 to 20% of ewes each year (USDA APHIS Animal Health Monitoring Service, 2014).
2. Ewe lamb conception rate (number ewes lambing/number ewes exposed)
   Conception rates (1-year-old ewe lambs) across breeds as reported by Cases and coworkers (Journal of Animal Science 83:2743-2751):
   a. 40% in August
   b. 67% in October
   c. 75% in December
   d. 60% overall

B. Source of Replacements

1. Homegrown ewe lambs
   These ewe lambs come from ewes that have survived and produced within your home environment. They share some of the same genes that made their dams successful. In addition, raising your own replacements removes the disease risk associated with bringing outside sheep into your flock.
2. Purchased ewe lambs
   These ewe lambs may allow you to make faster genetic change in your flock and may provide you with more choices. However, you should only purchase replacements from reputable breeders.

C. Age at First Lambing (Yearlings *versus* 2-Year-Olds)

1. Advantages
   It is well-documented that ewes that lamb first as yearlings and are well-managed will produce more total pounds of lamb throughout their lifetimes than ewes that lamb first as 2-year-olds. The key to success centers around two words: well-managed. *See "News to Ewes."* A second reason for lambing ewes first as yearlings is that your lambs should be the best genetic material that you have. The sooner you get them into production, the better in terms of genetic improvement.

2. Breed differences
   Ewe lambs of earlier maturing breeds (for example, white-faced, maternal breeds) typically reach puberty earlier and are better suited to lambing first as yearlings that are ewe lambs of later maturing breeds (for example, fast-growing, heavy sire breeds).
3. Management considerations
   Yearlings require greater levels of management (for example, time, labor, and housing) than 2-year-olds. They will have higher nutritional requirements at breeding and throughout gestation and lactation. They may be more prone to lambing problems and may be more at risk to mastitis and parasite infection. As noted earlier, good management is the key to success.

D. Target Weight at Breeding

To optimize conception rates, ewe lambs should be at least 2/3 of their mature body weight at breeding (**Table 3**). This should be calculated based on average mature weight of dry, open ewes in your flock because there is variation in mature body weight both across and within breeds.

Table 3. Minimum Weight to Breed Ewe Lambs.

Average Mature Weight of Ewes in Flock (lb)	Minimum Weight to Breed Ewe Lambs (lb)[a]
100	67
120	80
140	94
160	109
180	121
200	134
220	150
240	161

[a] Minimum of 2/3 of ewe mature weight. Mature weights are based on dry, open ewes.

E. General Strategy

1. Keep accurate records on all animals for economically important traits.
2. Use adjusted weights and trait ratios to fairly compare contemporaries.
3. Enroll in NSIP and use EBVs for genetic comparisons if flock is purebred.
4. Select replacements from multiple births that are early-born.
5. Select from multiple births from young ewes.
6. Keep triplet ewe lambs. They are more likely to have twins.
7. Keep ewe lambs that grow fastest (top 2/3 in ADG).
8. Do not retain any ewe lamb that has severe structural problems.
9. Do not retain any ewe lamb that has exhibited a rectal or vaginal prolapse.
10. Only breed ewe lambs having met a minimum target weight.

Presented at University of Kentucky Sheeprofit Day, May 24, 2018.

Debra K. Aaron, *Professor, and* **Endre Fink**, *Sheep Unit Manager, Department of Animal and Food Sciences, University of Kentucky*

Ovine Progressive Pneumonia (OPP)

By Michelle Arnold, DVM

What is it?

Ovine progressive pneumonia (OPP) is one of the most relevant, chronic health problems in sheep production worldwide. The cause of OPP is a retrovirus of the genus *Lentivirus* known as Maedi-Visna virus (MVV), which together with caprine arthritis–encephalitis virus (CAEV), form the "Small Ruminant Lentivirus" (SRLV) group. These viruses are closely related to immunosuppressive lentiviruses such as feline immunodeficiency virus (FIV) and human immunodeficiency virus (HIV). Before OPP was recognized by scientists, the local shepherds referred to this form of respiratory disease as Maedi-Visna, so named because 'maedi' means "breathlessness" and 'visna' means "wasting". Some strains of Maedi-Visna virus and CAE virus are known to infect both sheep and goats. Small ruminant lentiviruses consist of many strains with different ability to cause disease, which likely accounts for the variation in symptoms among infected animals. The prevalence of OPP-infected flocks was estimated to be 32.6% in the west-central region of the United States and 36.4% in the entire United States in the NAHMS 2001 sheep study.

Transmission

The primary route of transmission for the OPP virus is through the air (by aerosol) or direct contact with virus-contaminated nasal secretions from infected to susceptible animals (known as 'horizontal' transmission), and viral transmission is most efficient when animals are in close proximity to each other. The virus may also be transmitted from infected ewes to lambs (known as 'vertical' transmission) by infection either during pregnancy or through milk or colostrum. Accidental transmission of SRLV by people during milking or by using one needle on multiple animals is also possible. Sexual transmission may also occur since small ruminant lentiviruses have been found in the male genital system and viral shedding in semen has been demonstrated. Although young animals are most susceptible to becoming infected with the virus, the number of animals infected increases with age owing to an increased chance of exposure to the virus over time. There is also a strong inherited genetic component of resistance or susceptibility to the lentiviruses.

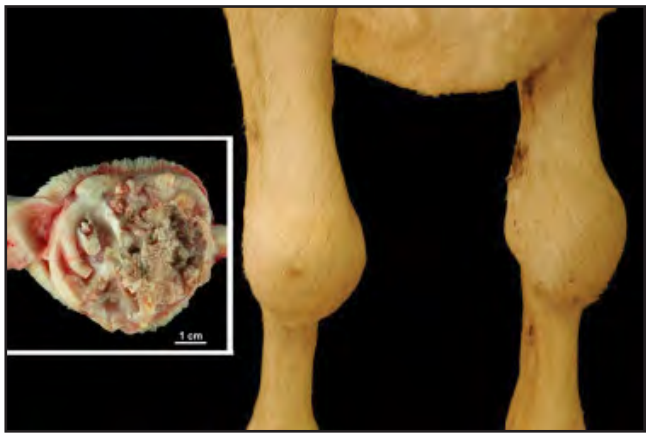


Figure 1: Enlargement of the carpal joints in an advanced case of OPP; inset: arthritis in the carpal joint. From E. Minguijón et al. / Veterinary Microbiology 181 (2015) 75–89

Symptoms

Animals infected with OPP or CAE are infected for life, but because of the long incubation period typical of these viruses, it generally takes years for clinical signs of disease to develop. Small ruminant lentiviruses induce a systemic infection in sheep and goats that may affect an array of target organs, most importantly the lungs, central nervous system (brain and spinal cord), mammary gland and joints. The clinical disease that results depends on the viral strain, the species of animal affected (sheep or goat) and the genetic background of each breed or animal. In general, only one of the target organs is mainly affected, but it is not unusual to find several organs affected in the same animal, with varying degrees of severity. In both sheep and goats, only the respiratory and neurologic syndromes lead the animal to extreme weight loss and death, either by damaging lung function or by some alteration of the nervous system. Localization of the virus to the joints or the udder does not generally result in weight loss or death, although they can cause varying degrees of lameness (mostly in goats) or decreased milk production leading to undernourished lambs or kids. Therefore, animals with joint and/or udder involvement are often prematurely culled due to poor production.

In sheep, the onset of clinical signs of OPP is variable and most are underlying, subclinical infections. Typically, clinical signs are observed in sheep over 2 years old and consist of progressive weight loss despite a normal appetite ("wasting") and difficult breathing. Initially, the labored breathing is detected only after physical exertion and is easily noticed when a flock is driven. Affected animals often have a rhythmic jerk of the head with each breath inhaled and lag behind the rest of the flock. As the severity of lung disease progresses, affected sheep (commonly referred to as 'lungers') may show open mouth breathing, coughing, flaring of nostrils, an increased respiratory rate, and forced expirations but usually do not have a fever. These sheep frequently develop secondary bacterial infections and fever, which makes the breathing difficulty worse. Over time, infected sheep may develop labored breathing at rest and spend most of their time lying down. Sheep with OPP-associated pneumonia may look similar to sheep with other forms of chronic respiratory disease such as caseous lymphadenitis abscesses, lung tumors, mycoplasma pneumonia, parasitic pneumonia, pulmonary adenomatosis, ovine adenovirus, and respiratory syncytial virus infections. If a necropsy is performed after death, the chronically affected lungs show a grey discoloration, are much larger and heavier than normal,

OPP continues on pg. 26

OPP continued from pg. 25

and have tiny grey spots in a diffuse pattern on the lung surface. Besides the weight loss and labored breathing with the respiratory form of disease, other clinical signs associated with SRLV infection are possible depending on the target organ involved. The syndrome involving the joints occurs in both small ruminant species but it is much more commonly seen in goats. This form involves development of arthritis, joint swelling, pain and lameness, potentially affecting multiple joints although the carpal joints (front knees) are the ones most frequently affected (see Figure 1 page 25). Some strains of the virus may prefer to attack the mammary gland causing a mastitis, (often called 'hard bag'), resulting in an enlarged, symmetrically firm udder and marked reduction of milk production although the milk looks normal. Other viral strains may invade the central nervous system (brain and/or spinal cord) causing meningitis and encephalitis. This form results in various neurological signs, such as progressive staggering, hind limb weakness with stumbling gait, progressive incoordination, which can lead to total paralysis and a downer animal while remaining alert. OPP can be widely spread in a flock or area before clinical cases are observed. Usually, symptoms of the disease have a hidden onset and a slow progression. Since the main target organs of small ruminant lentiviruses are joints, lungs, central nervous system and mammary gland, these systems should be carefully checked in order to detect the problems described. Unfortunately, by the time clinical signs are observed, the organ system or systems are often severely affected and death is imminent. Nevertheless, the economic losses associated with OPP are primarily due to infected animals with impaired production rather than those with obvious clinical signs. Compared with uninfected flocks, OPP-infected flocks have decreased milk production, lower conception rates, lambs with lower birth weights, retarded growth and lower weaning weights, and a higher proportion of animals culled prematurely. Many of those production losses go unnoticed, so the overall severity of OPP in a flock is often difficult to determine.

Diagnosis

Diagnosis of OPP or CAE is most often accomplished with a simple blood test to detect specific antibodies in infected animals. The lentiviruses usually produce persistent infections that can be detected after the first 2-3 weeks. Published data show nearly a 95% accuracy rate for antibody detection in today's commercial test kits. Very young animals with circulating maternal antibodies in the bloodstream from colostrum may yield an inaccurate test result so testing should either be delayed or another test method used for virus detection such as a PCR assay.

Prevention

Although there are currently no vaccines available for OPP, a variety of management practices can be implemented to prevent the introduction or reduce the presence of the disease within a flock. The best way for an OPP-infected flock to eradicate the disease is to test all animals and cull those with positive test results. For flocks not infected with OPP, the best way to prevent introduction of the disease is to quarantine and test all potential flock additions before allowing them to commingle with the flock. Isolation of sheep flocks from known positive animals is important for preventing virus transmission. This includes keeping sheep away from goats infected with the CAE virus because the CAE virus is genetically similar to the virus that causes OPP, and some strains of CAE virus can infect sheep and vice versa. Additionally, OPP-infected ewes can shed the virus in colostrum and milk; therefore, in OPP-infected flocks,

lambs should be removed from infected dams at birth and fed colostrum and milk from OPP test-negative ewes. Replacement lambs should then be segregated from any infected animals to prevent transmission through the air or contact.

Before any of the control practices are implemented, the number of animals with OPP and the goals (control vs eradication of OPP) of the producer should be carefully considered. Results of the NAHMS 2011 sheep study indicate that 46.5% of sheep producers in the United States do not know the OPP status of their flocks. Flocks with a high number of OPP-infected animals could consider depopulation, but that option is frequently not possible economically and may result in the loss of rare genetics. This radical approach may not be necessary since testing and removing test-positive animals can be effective. However, test-and-removal programs in flocks with a high number of infected animals can also be expensive and time-consuming. Simply culling animals with clinical signs of OPP is not effective in reducing disease within the flock because OPP has a long incubation period during which animals with an underlying infection can transmit the virus to susceptible flock mates. If immediate culling is not possible, separation of positive and negative ewes into two different flocks will stop horizontal spread but is labor intensive. One of the most effective control programs focuses on elimination of both infected animals and their offspring. This reduces the presence of the virus progressively by selectively culling positive sheep and replacing them with offspring from negative ewes. This strategy has two important advantages, namely, avoiding virus transfer through milk or colostrum from dam to offspring, and there is good evidence the offspring of negative ewes are more resistant to infection over the course of their lifetimes. Ultimately, the decision about which management strategies to implement for the control and prevention of OPP should be made on a flock-by-flock basis, taking into account market prices and the prevalence of infected animals in the flock. For safety, only certified small ruminant lentivirus-free males should be used as semen donors for artificial insemination in genetic selection programs to avoid transmission of the virus.

Conclusion

OPP is an underdiagnosed and sometimes fatal disease of sheep that causes devastating economic losses. The infection has a profound impact on sheep health and production and negatively affects many relevant economic parameters including ewe fertility, lamb weight at weaning and adult culling age. Having OPP antibodies (and a positive diagnosis on a blood test) implies chronic, lifelong infection and may restrict animal access and trade in fairs, shows and exports. However, OPP-free flocks may have added value as breeding and replacement stock. Detection of infection is performed by an inexpensive, highly accurate blood test. Testing sheep for antibodies against SRLV allows producers to know the OPP status of their flocks and will help them make informed decisions regarding the implementation of management practices to prevent or minimize virus transmission and the associated economic losses. The future of OPP control is genetic selection for sheep that are resistant to SRLVs, making it much easier to maintain OPP-free flocks and prevent disease.

Michelle Arnold, DVM *is an Associate Professor at the University of Kentucky in the Clinical Title Series. She is housed in the UK Veterinary Diagnostic Laboratory in Lexington, KY and has served as the Ruminant Extension Veterinarian since 2010. Previous to returning to her roots in KY, she was in private veterinary practice for 20 years and was a partner in a Holstein dairy then a commercial cow/calf and stocker operation in TN. She has two sons, Briscoe and Brody, both of whom attend the University of KY.*

NEWS TO EWES

Management of Ewe Lambs Born in April to Lamb First at Twelve Months of Age

(Based on the University of Kentucky Management System)

by Donald G. Ely and Frank Berry

Introduction

The following is a description of the management of ewe lambs born in April at the University of Kentucky Sheep Unit and destined to lamb first at 12 months of age (the next April). Breeds are Polypay and White Dorper. Ewe lambs not selected as replacements and wethers go to market at 100 to 120 lb in October/November. Ewes that produce these ewe lambs begin lambing on April 3 and end on May 2 from a November 15 to December 7 breeding season. This puts the average lambing date at about April 15.

Creep Feeding Period

Pregnant ewes are brought to the barn for lambing on April 2 so they can lamb in a dry, clean environment and out of the variable weather that occurs in April. Ewes and newborns work through lambing jugs and mixing pens. When lambs are a week old, they are transported, with their mothers, to a barn located in a pasture. A panel across the barn door confines ewes and lambs in the barn for the night, but removal of the panel allows entrance and exit anytime during the day. Lambs are creep-fed a complete grain mix (GM) of 80% ground/cracked shelled corn and 20% UK sheep concentrate pellets. Ingredient composition of this diet is shown in Table 1. All lambs are individually weighed and given the first of three enterotoxemia vaccinations by five weeks of age. Selection of potential replacement ram lambs, based on weight, type of birth/way raised (single, twin, triplet), and visual appraisal is made at this time. Other ram lambs are castrated at this time.

Table 1. University of Kentucky Complete Grain Mix

Ingredient	% of Mix
Ground/cracked shelled corn[a]	80.00
UK sheep concentrate pellet[b]	20.00

[a]Processed through a hammer mill without a screen.
[b]Composition: Soybean meal (48% CP) = 63.33%, distillers dried grains = 21.25%, ground limestone = 4.38%, salt = 3.13%, dicalcium phosphate = 3.13%, ammonium chloride = 2.50%, sheep complete mineral = 1.50%, vitamin E (20,000 IU/lb) = 0.50%, vitamin A (10,000 IU/lb) = 0.25%, and vitamin D_3 (15,000 IU/lb) = 0.25%.

Post-Weaning (PW)

All lambs are individually weighed and given a second enterotoxemia vaccination at 60 to 70 days of age (weaning date between June 15 and 25). Weaning weights are adjusted for lamb age, ewe age, lamb sex, and type of birth/way raised. Ewe lambs are ranked from heaviest to lightest for adjusted weaning weight. Actual, unadjusted, weaning weights can be submitted to the National

Sheep Improvement Program (NSIP) for more extensive computations if desired.

Lambs remain in the pre-weaning pasture for seven days after ewes leave. The pre-weaning creep diet continues to be fed. In the afternoon of day seven, feed and water are removed. Lambs are confined in a barn overnight in preparation for de-worming early the next morning. They remain in the facility for three hours after de-worming and before turning back to their original pasture for two more days. Selected ram lambs remain in the barn to be managed differently from ewe and wether lambs.

After two days back on the original parasite-infected pasture, ewe and wether lambs are moved to the highest quality pasture on the farm. As they graze this pasture, they are supplemented, once daily, with the grain mix (GM) shown in Table 1. To begin, the GM is fed at the same level (lb/head/day) as was consumed during the creep feeding phase. Offerings are gradually increased over a two-to three-week period until the daily consumption equals 2% of the actual average weight of all ewe and wether lambs at weaning. The third entertoxemia vaccine is administered at 11 weeks of age (two to three weeks after weaning). After the 2% level of intake is reached, it is maintained for an additional two weeks. By this time it is about August 1. All lambs are weighed again and daily supplement amounts are adjusted to reach 2% of the new average body weight over the next two to three weeks. Again, once the daily supplement intake reaches 2% of average weight, it is held at this level until September 15.

The goal of this management scheme is to market non-replacement ewe and wether lambs for slaughter in October and November when average weights are 100 to 120 lb. This means they need to gain at least 0.55 lb/head/day from birth to market. Ewe lambs that are eventually selected as replacements gain at least at this rate. Can Polypay and White Dorper ewe lambs gain this fast? Absolutely! Some gain faster. To do so, however, they need to graze the highest quality pasture on the farm and stomach worms must be controlled.

High-quality pastures that can be grazed by lambs from weaning (June 15 to 25) until September 15 include bluegrass/white clover, orchardgrass/white clover, and orchardgrass/alfalfa combinations. All have to be supplemented with a GM like the one in Table 1 or an equivalent. Pure stands of alfalfa, supplemented at 2% of body weight daily with the GM in Table 1, produce the highest daily gains. However, to prevent winter kill of alfalfa, it must not be grazed from September 15 until the first hard freeze in November or December. Substitution of pure strands of bluegrass or orchardgrass will provide excellent pasture after September 15.

Lambs are rotated to fresh alfalfa pastures at least every two weeks and sometimes more frequently. Dry, open ewes "mob graze" the pasture vacated by lambs. The remaining alfalfa stems are bush-hogged to simulate hay harvesting and initiate rapid regrowth.

Lambs are de-wormed as symptoms of internal parasites occur. Close daily observation is essential because lambs born in April and raised on pasture through summer and fall will have stomach and tape worms regardless of management. **Live with the worms, but try to keep to a minimum**.

In 2017, selected and non-selected replacements were weighed again on October 16. Table 2 shows the post-weaning (PW) growth performance of Polypay and White Dorper ewe lambs from weaning (June 21) until October 16, 2017. These data illustrate the emphasis placed on type of birth/way raised, adjusted weaning weight, and post-weaning (PW) gain when selecting replacement ewe lambs.

Post-Selection (PS)

All lambs are weighed on September 15. Enough ewe lambs are selected on this date to replace 16 to 20% of the April-lambing ewes that were culled by July 1. Selection is based on adjusted weaning weights and visual appraisals. All lambs are de-wormed. Selected replacement ewe lambs graze orchardgrass pasture and are supplemented with the GM (Table 1) at 1.5 lb/head/day until November 15. Non-selected replacement ewe lambs and wethers also graze orchardgrass pasture and are supplemented with the GM (Table 1) at 2% of body weight daily until marketing in October/November at 100 to 120 lb.

Minimum weights of replacement ewe lambs on November 14 must be "**at least two-thirds of their projected mature weights**." For example, if mature weights of Polypay and White Dorper ewes are 150 lb when dry and open, replacement ewe lambs need to weigh at least 100 lb at the time of first breeding. All the replacements selected on September 15 are weighed and de-wormed on November 14. The selection pressure applied on September 15 assures all will weigh at least two-thirds of their projected mature weights on November 14.

Breeding (BR) and Early Gestation (EG)

Fertile rams are introduced to ewe lambs in orchardgrass pastures on No-

Table 2. Growth Performance of Polypay and White Dorper Ewe Lambs from Weaning (6/21/17) until 10/16/17

Genetic Type	Polypay		White Dorper	
Selected Replacements	Yes	No	Yes	No
Number of Lambs	17	19	15	25
Birth date	Apr 13	Apr 14	Apr 10	Apr 16
Type birth/way raised, number				
Single/single	1	9	3	3
Twin/twin	6	1	9	18
Twin/single	1	0	0	3
Triplet/twin	5	5	3	1
Quad/twin	4	4	0	0
Weaning weight, 6/21, lb	48.1	48.5	50.5	42.2
Adjusted weaning wt, lb[a]	54.1	52.3	52.6	46.3
10/16 weight, lb	103.1	101.7	97.3	82.9
Total gain, 6/21 to 10/16, lb	55.0	53.2	46.8	40.7

[a] Adjusted for lamb age, lamb sex, and type of birth/way raised.

News to Ewes continues on pg. 28

News to Ewes continued from pg. 27

Table 3. Total Feed Costs/Year/Ewe Lamb Born in April and Destined to Lamb First at 12 Months of Age

Period[a]	No. days	Total lb	Lb/day	Cost/day, $	Total cost, $
Creep (4/15 - 6/20)					
Pasture	66	-	-	0.02	1.32
GM[b]	66	30	0.45	0.05	3.30
PW (6/20 - 9/15)					
Pasture	87	-	-	0.03	2.61
GM[b]	87	131	1.50	0.15	13.10
PS (9/15 - 11/15)					
Pasture	61	-	-	0.03	1.83
GM[b]	61	92	1.50	0.15	9.20
BR (11/15 - 12/7)					
Pasture	22	-	-	0.03	0.66
GM[b]	22	33	1.50	0.15	3.30
EG[a] (12/7 - 3/15)					
Pasture	98	-	-	0.03	2.94
Hay[c]	98	196	2.00	0.14	13.72
GM[b]	98	147	1.50	0.15	14.70
LG (3/15 - 4/15)					
Pasture	18	-	-	0.03	0.54
Hay[d]	31	93	3.00	0.24	7.44
GM[b]	31	47	1.50	0.15	4.70
				Total	**$79.36**

[a]Creep = pre-weaning; PW = post-weaning; PS = post-selection; BR = breeding; EG = early gestation; LG = late gestation.
[b]GM = grain mix (80% ground/cracked shelled corn 20% UK sheep concentrate pellet) @$200.00/ton.
[c]Orchardgrass hay (vegetative) @$140.00/ton.
[d]Alfalfa hay (mid-bloom)@$160.00/ton.

vember 15. They continue together until the 3-week breeding season ends on December 7. The ewe lambs continue to be fed 1.5 lb GM (Table 1)/head/day plus any available grass pasture and/or hay during the breeding season. After ram removal, ewe lambs remain on pasture all winter and have ad libitum access to the highest quality grass hay (harvested in vegetative stage) until mid-March. They consume, on average, 2 lb of hay/head/day and are concurrently supplemented once daily with 1.5 lb/head of the GM shown in Table 1.

Late Gestation (LG)

Feeding the late gestation ration begins on March 15 and continues until all have lambed. This ration, fed once daily, contains 3.0 lb alfalfa hay (mid-bloom) plus 1.5 lb of the GM per head. It is fed while still on pasture and after moving into the barn (April 2). All ewes are de-wormed after lambing and are transported back to the barn and pasture where they were raised the year before. They are rotated through orchardgrass/fescue pasture with 1.0 lb GM/head/day. De-worming is done as necessary while managed with mature ewes during lactation. Lambing rates in 2018 for 2017-born Polypay and White Dorper ewe lambs (Table 2) were 1.8 and 1.3, respectively.

Table 3 shows the feed cost/ewe lamb for each management period beginning with the creep feeding, progressing through post-weaning (PW), post-selection (PS), breeding (BR), early gestation (EG), and ending through late gestation (LG). Even though lambs were on pasture for essentially the entire year (except for late gestation), this cost is calculated to be only about 12% of the total $79.36. In contrast, the GM makes up approximately 61% of the total feed costs for each lamb for the year from birth to lambing at 12 months of age. Winter feeding hay accounts for 27% of the total.

After First Lambing

Lambs are weaned at 60 to 70 days of age (June 15 to 25). All ewes (yearlings and mature) are de-wormed and moved to a low-quality and quantity pasture so milk production will cease. Cull ewes will be marketed for slaughter. The first-lambing ewes, now 14 months old, will be relatively thin (1.3 to 1.7 body condition score) when lambs are weaned. These are separated from higher body condition score yearlings, graze higher quality grass pasture and are supplemented with 1.0 lb GM (Table 1) per head daily until they reach body condition scores from 2.0 to 2.5. They are managed to remain in this score until nutritional flushing begins on November 1.

Feet are trimmed two times per year (spring and fall). A complete, loose sheep mineral is available ad libitum every day of the year as is fresh, clean, and cool water (50-55°F). Shade is always available during spring, summer, and fall.

Summary

Sixteen to twenty percent of the ewes in a commercial flock that lamb in April each year are culled annually. If ewe numbers are to remain constant from year to year, enough ewe lambs must be selected to replace the culled ewes. Management of ewe lambs born in April and destined to lamb first at 12 months of age (the next April) must be precise if success is expected. These replacement lambs use pasture forage as a base of nutrient supply throughout their first year of life (creep, post-weaning, post-selection, breeding, early gestation, late gestation). However, they must also be supplemented with a concentrate feed source (shelled corn or grain mix). The amount provided each day depends on the production period within the year (i.e., creep, post-weaning, etc.). Even though supplementation may seem expensive, it becomes economical because it allows these lambs to reach two-thirds of their mature weights by the time of first breeding. In turn, an acceptable lambing rate at 12 months of age can be attained.

Presented at University of Kentucky Sheeprofit Day, May 24, 2018.

Dr. Donald G. Ely, *Professor and* **Mr. Frank Berry**, *Sheep Research Coordinator in the Department of Animal and Food Sciences at the University of Kentucky.*

KEYNOTE SPEAKER

Reid Redden,
AgriLife Extension Sheep and Goat Specialist &
Associate Professor,
Texas A&M

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