Volume 18 Winter 2015

Hoof Print

The Small Ruminant Magazine

ISSUE HIGHLIGHTS

- Livestock Guardians
- Tanning Goat Hides
- Composting - Carcass or Manure

Health Management

Recommendations For "Drying" Up Your Doe or Ewe

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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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KADF KENTUCKY AGRICULTURAL DEVELOPMENT FUND

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The Small Ruminant Magazine

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Roca © 2014


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In Every Issue


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President's Letter

Hello Fellow Goat Producers,

What a fantastic time to be a goat producer in Kentucky. Producers enjoyed record breaking prices at our graded sales during 2014 without the traditional price drop in the summer.

New and experienced producers have the unprecedented ability to learn how to successfully raise goats by enrolling in the Small Ruminant Profit School, attending the Kentucky State University's Third Thursday events and The Small Ruminant Grazing Conference, as well as educational seminars and webinars offered through the Cooperative Extension Service.

We are the only state that is blessed by having a Sheep and Goat Development Office. Kelley Yates works on promoting goats and sheep all year long. Her office manager, Sharon Koontz, gets your questions to the right people for the answers you need.

The Kentucky Goat Producers Association works to expose more people to goat meat at taste events throughout the year. The biggest and most popular is during the opening day Commissioner in Agriculture Commodity Breakfast at the Kentucky State Fair. We also promote our youth, nurture and encourage them in their goat projects. One example of our support is the collection of donations for the Sale of Champions.

We need to reach out to people that are raising goats but do not know about any of these opportunities. I encourage every member, as you meet new goat people, to encourage them to go online to see what the Kentucky Sheep and Goat Development Office is about and discover the KGPA.

I would like to take a moment to welcome three new directors seated on the board. Mr. Brent Ballinger is a Kiko goat producer from Nelson County, Mrs. Sheila Duncan is a dairy goat producer from Hart County and Mr. Vince Thompson is a meat goat producer from Hardin County. Their contact information is listed on these pages.

Hope that all of you enjoy a safe winter and your goats prosper!

Denise Martin,
President - Kentucky Goat Producers Association

KGPA - UPCOMING EVENTS

Calendar of event items can be sent to kyates@kysheepandgoat.org with date, location and time.

Northern Kentucky Goat Producers Association Meeting – First Tuesday of every month 6:00pm @ the Kenton County Extension Office - 10990 Marshall Road

JANUARY	
Date	**Location / Details**
January 12th	**Goat & Sheep Owners of South Central KY** – Barren Co. Extension Office 6:30 p.m.
FEBRUARY	
Date	**Location / Details**
February 7th	**Small Ruminant Grazing Conference** – Logan County Extension Office, Russellville, KY
APRIL	
Date	**Location / Details**
April 11th	**KY Proud Elite Breeder Sale** – Frankfort, KY

KENTUCKY GOAT PRODUCERS ASSOCIATION

RENEW Your KGPA Membership Today!

Membership Application

DON'T FORGET!

Your $30 membership provides:

- 4 issues of the *Hoof***Print** Magazine plus the newly designed 2015 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
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Name: _____

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

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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.

ASK THE GOAT GURU

Question:

Will a goat grieve itself to death?

Answer: YES! Now to go in more detail. In the animal world many times we don't consider the fact that they develop strong bonds between their counterparts. There are many species that bond for life. Although in the caprine world we don't see this, they can develop a bonding reliance between each other that is inseparable. Many does are very maternal and are extremely vocal when their offspring are removed either for weaning or other reasons. This condition is easily remedied by breeding the does and start the cycle all over again, but what about the bond that develops between counterparts that are or are not siblings.

Just recently, I heard of a couple of doelings that had been raised together and when one of the does was sold it had to be returned due to the grieving that she did when separated. How do they grieve you ask? Most of the time they have a decreased appetitie, lethargic, dull look in their eyes and you can just tell that there is something not right with the animal (what we call "ADR" in the veterinary world – ain't doing right). When they grieve it increases their stress hormones which suppresses the immune system and can make them more susceptible to diseases.

So how do we ease the stress of separation? Most importantly, always have a mate that the separated animal can buddy up with at the new home. When introducing any new animal it is always recommended to isolate the animal for 10 days from the rest of the herd for biosecurity reasons. You can put a buddy with the new animal rather than keeping it completely isolated during this 10 day period. Goats like to be around other goats. It is never a good idea to bring a goat into an environment where it is by itself. Remember there is a reason why they reside in a "Herd". Also, if there is a boss goat do not put the new addition with this goat until it has become used to its surroundings.

Always have fresh water and food, in the form of hay and grain, available to the separated doe or buck to entice it to eat and take its mind off of missing its "herd". Will the goat grieve until it dies, probably not, but if we can ease the stress it can't hurt.

Information provided by Dr. Beth Johnson, DVM,
Kentucky Department of Agriculture Staff Veterinarian.

>> To ask the Goat Guru your question, email kygoatguru@yahoo.com.

Buck Collection Update

Dr. Beth Johnson assisting at the KGPA Buck Collection.

The KGPA sponsored a buck collection October 7th, 2014 hosted 6 members and 10 bucks. There were Kiko and Boer bucks collected. Devins Farm buck, Cash N In, was the highest producer with 122 straws. Brent Ballinger's senior buck had the highest motility and everyone went home with straws of semen. We appreciate the crew from Biogenics for the outstanding job they did and the information they shared with everyone.

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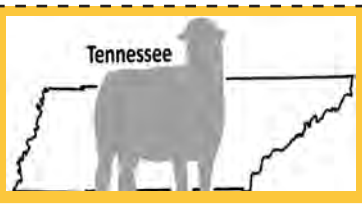
KENTUCKY GOAT PRODUCERS ASSOCIATION

2014 Tennessee Sheep Producers Annual Meeting and Sheep Seminar

(Top Left) Scott Payne, President of the TSPA, addresses the sheep producers attending the 2014 Annual Meeting

(Below) Dwight Loveday (right) presents the Shepherd of the year award to the Mark Shedden family for outstanding service to the Tennessee Sheep Industry.

Over 100 Sheep producers from Tennessee and Kentucky attended the 2014 Tennessee Sheep Producers Annual Meeting and Sheep Seminar in Lebanon at the Ward Ag Center on Friday and Saturday December 5-6, 2014. Participants enjoyed lamb hors d'oeuvre prepared by Sam and Rachel Kennedy, Chris Wilson, and Dwight Loveday. The featured speaker for both days was Dr. G.F. Kennedy of Pipestone Minnesota Veterinary Services. Topics covered included vaccination and deworming protocols, using technology in sheep production, shed lambing vs. pasture lambing, and how the southeastern sheep production model fits into the future of the US sheep industry. The program was partially sponsored by funds from the Tennessee Department of Agriculture Ag Development Program. Refreshments for the breaks were provided by the Tennessee Livestock



If you are interested in a committee please select below:

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

RENEW 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

Dr. Kennedy, guest speaker for the TSPA annual meeting, and his wife (both to the left) prepare to enjoy a grilled lamb lunch following the annual meeting.

Producers Association. Participants enjoyed a lamb luncheon prepared by the University of Tennessee Agricultural Extension Service in Wilson County along with Randal Kimes and Steve Officer who prepared the lamb. Newly elected board members for the Tennessee Sheep Producers Association include: Mark Shedden of Knoxville; Chris Wilson of Jonesborough and Ed Bowman of Gray. New officers were elected during the board meeting and include: Sam Kennedy President and American Sheep Industry Association representative, and Ed Bowman Vice President. The shepherd of the year was presented to the Mark Shedden Family and the Service Award was presented to Snapps Ferry Packing Company of Afton, Tennessee.

2014-2015 TSPA Board. (Standing l-r) Scott Payne, Steve Alsup, Dwight Loveday, Mark Powell – Secretary/Treasurer. (Seated l-r) Ed Bowman – Vice President, Chris Wilson, Mark Shedden, and Sam Kennedy – President and ASI Representative. Not pictured Jessy Shanks and Alan Bruhin.

2015 TSPA Board of Directors

Sam Kennedy, **President & ASI Representative**
Columbia, TN

Ed Bowman, **Vice President**
Gray, TN

Mark Powell, **Secretary/Treasurer**
Watertown, TN

2015 Board Members

Allan Bruhin
Sevierville, TN

Dwight Loveday
Louisville, TN

Chris Wilson
Jonesborough, TN

Jessica Shanks,
Lenoir City, TN

Stevan Alsup
Lascassas, TN

Mark Shedden
Knoxville, TN

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KENTUCKY CLUB LAMB ASSOCIATION

The annual awards and meeting of the Kentucky Club Lamb Association meeting was held September 27th at The Farm at Landworks, Paris. Everyone who attended enjoyed a potluck dinner before the awards presentation. New officers were elected; Wendell Terrell – President; Wanda Isaac– Vice President; Mike Kearns – Secretary/Treasurer; Youth Directors – Ryan Halligan and Kasey Craig; Membership --Dorothy Vale. The KCLA on line auction is scheduled for March 18, 2015. The auction committee is Todd Yazell, Leigh-Ann French, Rick Hagerman and Gavin Perkins. The membership/ fundraising committee is Dorothy Vale, Veda Miracle, Rosemary Mastin, Julie Cantrell, and Shanea Capps. Adding Grant County fair to the KCLA point county fairs. The winner of the KCLA raffle sheep shears that was drawn at the KY state fair was Dakota Blevins of Montgomery County.

Awards for youth are divided into five age groups based on age as of January 1st. - Novice (8 and under), Clover (9 to 11), Junior (12 to 13) Intermediate (14 to 16), and Senior (17 to 21). There is also a TOP TEN, which is based on overall points. Youth accumulate points in five areas with a minimum of 100 points for clover through seniors, and 50 points for Novice. Awards are as follows:

- **KENTUCKY BRED POINTS** – Points are given for promotion of Kentucky Bred Market Lambs.
- **LEADERSHIP & COMMUNITY SERVICE** – Points are given for activities involving sheep and/or lambs and showing at NAILE
- **SHOWMANSHIP POINTS AWARDS** – Points are calculated at the "Point" shows, everyone who does showmanship receives points.
- **SHOWING MARKET LAMBS** – Points are accumulated on the **two- (2) highest** market lambs at each of the "Point" shows (five district or expos, one KCLA county fairs and the state fair). Additional Points are given for Grand and Reserve market lambs

Each Division winner received a KCLA jackets and others receive a KCLA water bucket.

NOVICE DIVISION (UNDER 9)
1. Jayde Cantrell
2. Addison Arnold
3. Clark Coyle
4. Kenleigh French
5. Landon Hack
6. Linda Issacs
7. Ty Jones
8. Addyson Smith
9. Evan Taylor
10. Lilly Terrell

CLOVER DIVISION (9 to 11)
1. Campbell Coyle
2. Conner Yazell
3. Corbin Coyle
4. Emma Taylor
5. Shelby Terrell
6. Campbell Taylor

JUNIOR (12-13)
1. Mason Miracle
2. Landon Kearns
3. Bailey Lippert
4. Tim Isaacs
5. Cameron Dunagan

INTERMEMEDIATE (14-16)
1. T J Yazell
2. Christopher Hinkle
3. Logan Kearns
4. Tori Vaughn
5. Austin Dunagan
6. Shanea Capps

SENIORS (17 to21)
1. Tobee Hagerman
2. Gavin Dunagan
3. Kasey Craig
4. Tamsin Meier
5. Ryan Halligan
6. Tabitha McKee
7. Ashley Cundiff
8. Ryan Corder

The **Top Ten OVEREALL** received KCLA sheep blankets.
1. T J Yazell
2. Mason Miracle
3. Tobee Hagerman
4. Gavin Dunagan
5. Christophe Hinkle
6. Logan Kearns
7. Kasey Craig
8. Campbell Coyle
9. Corner Yazell
10. Tamisn Meier

Top Showman in each division received a KCLA Sheep Blanket. Overall Showmanship was Mason Miracle.

Novice – Addison Arnold
Clover – Campbell Coyle
Junior -- Mason Miracle
Intermediate – Christopher Hinkle
Senior -- Tobee Hagerman

Look for KENTUCKY CLUB LAMB AUCTION on wlivestock.com in March 2015. All KY Market Lambs will be Kentucky Proud Tagged.

For more information and membership information please contact Dorothy Vale at KCLA. Dorothy@aol.com, 859-420-3217. Membership is $10 a year for Kentucky youth or adults. Youth must be member before they can accumulate points.

KY Proud Awards

The Kentucky Proud Points Program was designed to recognize and honor youth exhibitors, their animals in all species, and the top breeders who put forth the maximum effort to excel during the show season. The 2014 Kentucky Proud Points Banquet was held October 11, 2014 in Bardstown. After the luncheon, awards were presented. Points are cumulated on animals that youth show at seven district shows, three Jr. Livestock Expos, Kentucky State Fair and the Breeding Sheep or Goat show.

Two $500 scholarships were award in each species. For more information on the scholarship go to www.ky.agr.com. Special jackets were awarded to the top in each species by Jim Akers.

THE LAMB WINNERS ARE AS FOLLOWS:

COMMERCIAL EWES
T J Yazell
Sydney Warren
Tobee Hagerman

TOP 10 MARKET LAMBS
TJ Yazell
Mason Miracle
Tamsin Meier
Tobee Hagerman
Logan Kearns
Gavin Dunagan
Lauren Malone
Christopher Hinkle
Travis Drumm
McKenize Doyle

LAMB SHOWMANSHIP
TJ Yazell
Tobee Hagerman
Mason Miracel
Tamsin Meier
Sydney Warren
Logan Kearns
Baily Lippert
Christopher Hinkle
Tim Isaacs
Shelby Terrell

LAMB OVERALL EXHIBITORS
T J Yazell
Tobee Hagerman
Mason Miracle
Tamsin Meier
Sydney Warren
Gavin Dunagan
Logan Kearns
Christopher Hinkle
Lauren Malone
McKenzie Doyle

TOP BREEDERS LAMBS
Pleasure Pointe Farms, Yazell Farm
Forsee Southdowns
Miracle V Farm

THE GOAT WINNERS ARE AS FOLLOWS:

COMMERCIAL DOES
Katie Jo Walker
Tobee Hagerman
Casey Simpson

TOP 10 MARKET GOAT
Kelly Smith
Katie Jo Walker
Tobee Hagerman
Madison Kelly
Jordan Wallace
Justin Harvey
Casey Simpson
Ashley Smith
Josie Olrich
Jeremy Harvey

GOAT SHOWMANSHIP
Kelly Smith
Ashley Smith
Madison Kelly
Tobee Hagerman
Katie Walker
Kelly Lynn Smith
Megan Harper
Casey Simpson
Karlee Menefee
Dalton Gates

GOAT OVERALL EXHIBITORS
Kelly Smith
Katie Jo Walker
Tobee Hagerman
Madison Kelly
Casey Simpson
Ashley Smith
Megan Harper
Jordan Wallace
Josie Olrich
Jeremy Harvey

TOP BREEDERS GOATS
Showman Genetics, Alvin Tingle
Triple Threat Show Wethers
Keinan Boer Goats, Jessica & Beth Johnson

Kentucky Sheep & Wool Producers Association

Renew your KSWPA Membership TODAY!
Visit www.kysheepandgoat.org

KSWPA Membership Benefits
- Quarterly issues of HoofPrint Magazine plus the newly designed 2015 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
- 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.

TIME TO RENEW!

2014 KY Make It With Wool

The 2014 Kentucky Make It With Wool Competition was held October 25th in Cave City at the 2014 Annual Producer Conference. The purpose of Make It With Wool is to promote the beauty and versatility of wool fabrics and yarns. It also encourages personal creativity in sewing, knitting and crocheting with wool fabrics and yarns. All contestants must select, construct and model their garments. The garments are judged on construction and modeling in by a panel of three judges. This year's judges were Connie Davis, Mary Coakley and Donna Logsdon. Kristy Sturgill of Kristy's Kreations, felted pumpkins and pumpkins pins for the judges.

There were five competitive divisions and winners in each received a garment bag with KY Make Wool design. All contestants received 2 ½ yards Pendleton Wool and sewing notions. Megan Straus, the Senior winner, and Gillian Mudd, the Junior winner, will represent Kentucky at the National Make It With Wool Competition to be held in Reno, Nevada in January 2015. Marilyn Sharder, the adult winner, will have her garment and video judged in the Adult Division of the National Competition. Thanks to all that helped with contributing for the contestant's food and expenses at the National Competition.

2014 MIWW Participants:

The Pre-teen (12 and under) winner, Mattie Bartley, from Loretto won with a 100% charcoal gray skirt with a gored bottom.

The Junior Division (13 to 16) winner, Gillian Mudd, from Raywick won with a 100% gray wool lined cape. The wool was given to her by her grandmother.

The Senior Division (17 to 24) had three entries. Megan Straus from Butler won with a 100% orange crepe wool lined dress. Megan Lucas from New Hope is the alternate with a 99.20% pale blue wool dress and short cape the wool she used she won at last competition year. Brooke Dosker from Ft. Mitchell made a fitted line brown wool jacket which she added leather trim and angora felted elbow patches.

The Adult Division (over 24) winner was Marilyn Shrader from Upton. Marilyn made a jacket with pink and crème 100% unbalanced plaid wool she won in prior Make With Wool Competition.

The Made for Others Division had two entries. Mary Margaret Krahulec won with her son, Ken, who modeled the 100% wool kilt which he will wear in renaissance exhibits. She wove the 9 ½ yards of yarn to make the kilt. Marion Mulligan was second with a 100% Pendleton wool shirt worn by husband.

It is time to think about sewing to enter the 2015 competition! The categories are Preteens (12 and under) and they can enter one piece such as a skirt, pants, jumper or a dress. Juniors (13 to 16), Seniors (17 to 24), Adults (25 and older) their entries can be a dress, jumper, outerwear lined coat or jacket, two piece outfit or an ensemble. The Made for Others (any age) can be any wool garment and will be modeled by the person the garment is made for. The garment is to be made from 100% wool or wool blend (minimum 60% wool or specialty wool fiber including mohair, cashmere, alpaca, camel, llama and vicuna) for each fashion fabric or yarn uses. **Please send a 5x5 piece of wool to be tested before construction.** The top 4-H wool garment at the 2015 Kentucky State Fair will receive 2 ½ yards of Pendleton Wool. Remember the winner of the Junior and Senior will represent Kentucky in the National Competition and the Adult garment will go on to be judged in the National Adult Competition. Entry forms will be available by contacting Dorothy Vale, State Director; 142 Carolyn Lane, Nicholasville, KY 40356, cell 859-420-3217, e-mail kymiww@aol.com. Entry forms will also by on kysheepandgoat.org web site in the spring.

Dear KSWPA Members:

As the newly elected President of the Kentucky Sheep and Wool Producer's Association (Inc.), I'd like to introduce myself. My name is Jim Mansfield and I live in Salvisa, Kentucky. We farm 240 acres in Mercer and Boyle Counties where we raise hair sheep (mostly the Katahdin breed). All of our lambs are raised to full size, processed and sold as meat to grocery stores, restaurants and to consumers who come to the farm.

I'd like to thank Warren Adcock Jr. the immediate past President of the KSWPA, for his leadership and service to our organization. I also want to recognize the strong, experienced set of officers and board members currently serving on the KSWPA board. We are truly blessed with some great people here in the KY sheep biz! And no thanks is complete with out mentioning Kelley Yates our association's Executive Director, Bob Leer the American Sheep Industry Regional Director, Tess Caudill the KY Dept. of Agriculture Sheep and Goat Marketing Specialist and Dr. Don Ely and Dr. Debra Aaron, University of KY Professor and Extension sheep specialists. These people look out for our industry's interests every day and we owe them a great deal of thanks for making things happen here in our state and nationally. Bottom line: boy are we luck here in KY!!

The KSWPA board met recently to discuss the coming year and set some goals for our efforts in 2015. Some of the bigger events and activities we plan to carry out include the Sheep & Fiber Festival in May, The State Fair Commodity Breakfast and lamb food booth during the fair, the Make it with Wool program, participating in the American Sheep Industry Annual meeting, holding a first ever "lamb jam" event possibly in Louisville, and continuing the lamb cook-off contest in conjunction with the Sullivan University Chef School. Whew! Our association is involved in a lot of things. As a member please join in and participate!

These are exciting times here in the sheep industry. At last count KY had approximately 54,600 head of sheep. That is up from 26,000 just ten years ago. We are one of the few areas of the country where sheep production is on the increase. At one time (1940's) KY had 1.4 million head of sheep. Old timers tell me in Danville KY they had a large sheep auction that would sell sheep all night long and load train cars out the back of the building in order to ship thousands of lambs north to the big city markets. I am guessing that is where "Kentucky Spring Lamb" became famous.

I'll leave it at that for now. I look forward to working with the KSWPA membership and board to make 2015 a great year to be in the sheep business in Kentucky.

Happy Holidays.
Jim Mansfield – *KSWPA President*

KSWPA - UPCOMING EVENTS

Date	Location / Details
JANUARY	
January 20th	**UK Lambing School** – C. Oran Little Research Farm, Midway, KY
January 28th- 31st	**ASI National Convention** – Reno, NV
FEBRUARY	
February 7th	**Small Ruminant Grazing Conference** Logan Co. Ext. Office, Russelllville, KY
MARCH	
March 18th	**KCLA Auction** – www.wlivetock.com
March 24th	**UK Sheep Shearing School** – C. Oran Little Research Farm, Midway, KY
APRIL	
April 7th	**EweProfit III** – C. Oran Little Research Farm, Midway, KY
April 11th	**KY Proud Elite Breeder Sale** – Frankfort, KY

The 2015 Kentucky Sheep & Goat ManagementCalendars are available to order at www.kysheepandgoat.org

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jim@fourhillsfarm.com

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scottvansickle@wheattech.com

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kymiww@aol.com

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Warren Adcock, Campbellsburg, KY
Bob Leer, Paris, KY

Livestock Guardians

Stone Fall Farm Winchester, KY © Desiree Rowe

By Shawn Harper

Livestock guardians can be an integral part of a sheep or goat operation. They can be very effective against the top predators, dogs and coyote, as well as bobcats, fox eagles and buzzard. The main guardians used are donkeys, llamas, and dogs. Each of these can be effective but, there are some important considerations to use in selecting the appropriate one for your situation.

Donkeys

Donkeys are very useful when protecting against dogs or coyotes. Miniatures should not be used because of their size. Jacks can be very aggressive so it is best to use a gelding or jennet. It is important to start with a young donkey or use one that has been raised with sheep and/ or goats. They work best alone because they will bond to the animals they protect better. If there are multiple donkeys they tend to socialize and stay to themselves and may not be where they can protect the sheep and goats.

Donkeys are foragers and are able to eat with the sheep or goats and do not require special feed. If Rumensin is used in the feed, care must be taken to ensure none goes to the donkeys. They are not ruminants and it will kill them.

It would be best if anyone considering donkeys for protection has experience with equine. Hoof care is very important, and donkeys should also be on a proper vaccination and deworming program. Donkeys sleep at night so if your predator problem is at night, they may not be the best option. They also can be very loud and stubborn. Basic halter training is very valuable when using donkeys as it can make things much easier when moving or trimming feet.

Llamas

Llamas are very curious, thus can be very intimidating to other animals.

Llamas by Philippe Roca ©

Because their digestive system is much the same and they are also foragers, they are able to eat with the sheep and goats.

Like the donkeys, llamas sleep at night. If the predators are active at night or are very aggressive they may not be very affective as guardians. They can spit for up to 10 feet, and can kick and paw predators, but if the predators are

very aggressive then they can be very vulnerable, much like sheep or goats.

It is also best to start with a single young llama or an older one that has bonded with sheep or goats. Geldings or females should be used. Intact males can be aggressive. Llamas breed lying on the ground, thus intact males will actually rape sheep and goats after mounting them and knocking them to the ground. Alpacas should not be used as guardians because of their size.

Dogs

For most people guardian dogs are the best choice. They are nocturnal and work at night when many predators are active. They are very independent and normally need little shelter. They work very well in groups. They can be either guarders or patrollers; the guarders tend to stay with the sheep or goats and guard them, while patrollers go out looking for predators in their area. Good fences are important to teaching them their boundaries.

Like any other dogs they will need dog food and regular vaccinations. They can be aggressive when they feel like they or their livestock are threatened. It may be necessary to separate them when working your sheep and goats. If you have several close neighbors with pet dogs, guardian dogs can cause a problem by barking at night.

Guardian dogs are not pets. While it is important to socialize them and get them used to being handled, they have a job. They need to be raised in the barn with their charges and bond with them. It is good to have multiple dogs working together. Younger ones will learn from the older ones and it is always good to keep younger ones learning.

Prices can vary greatly. Normally higher prices are for adult working dogs. Rare breeds and registration may also affect price. Non-registered or grade dogs can be just as effective as registered animals, and at a much lower price. Common breeds for the area, as well as younger dogs, will be priced more economically. "Free" dogs are not normally the best option. Most have not been raised with sheep or goats and do not make good guardians.

There are many different breeds of guardian dogs available. Some of the most common in the United States are: Akbash, Anatolian Shepherd, Great Pyrenees, Kangal, Komondor and Maremma. When selecting a breed one should research each breed to find out which will suit their situation the best. Some important considerations are: guarding characteristics, aggressiveness, hair length, health history of breed, size and the climate most suited for them. Other producers are a good resource for information.

Livestock guardians can be very useful in protecting flocks for sheep and goat producers. Care should be taken in selecting the proper guardian for each situation. Personal preference may be a key part of selection, but there are many factors to consider before making a final selection.

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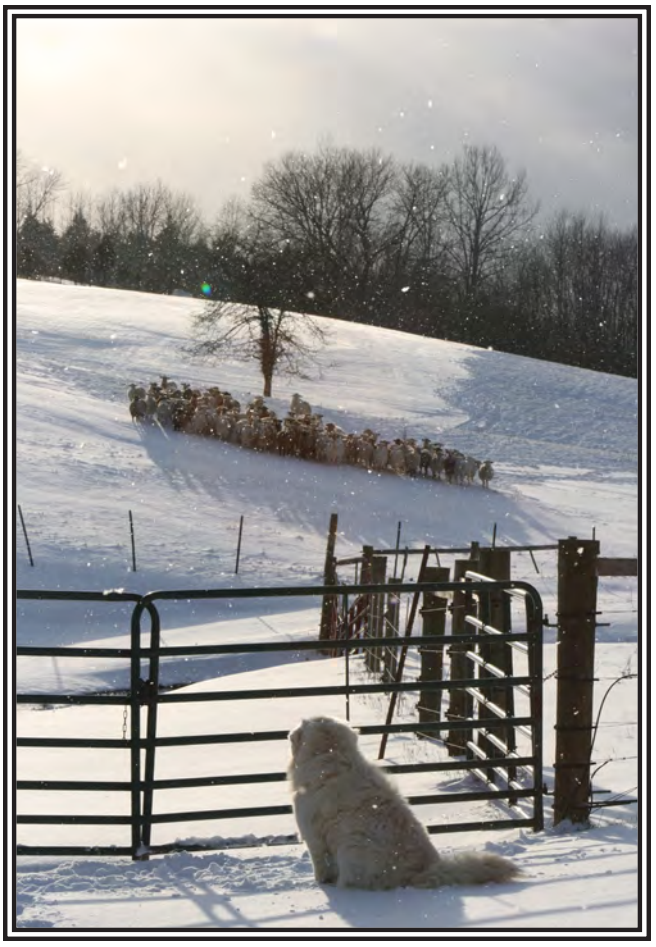

Guard dog. Photo provided by Jim Mansfield

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TANNING GOAT HIDES

Dr. Roger C. Merkel

Introduction

Many people are interested in tanning goat or other hides such as deer. Learning the art of tanning hides can be very rewarding, through acquisition of new skills and the attractive products resulting from the endeavor. The equipment needed to tan hides can be purchased or much of it can be fashioned from items found around households or farms. Tanning chemicals are readily available from many suppliers and kits can be purchased that will tan one or two hides. While tanning is not difficult, it is a learning process and your skills will improve over time. Although home tanning may not match the quality of a professional tannery, good quality, long-lasting products can be made. However, if you do have a special hide, it is best to send it to a professional rather than attempting it yourself. This is particularly true if you are new to the art of tanning.

Tanned goat, deer, and elk hides.

Tanning Methods

Many of the tanning methods suitable for home tanning are used in the taxidermy industry to prepare deer capes and other hides for mounting. Tanning agents are available in powder, liquid, or cream form. The powdered forms, and some liquid forms, require mixing the chemical into a water and salt solution and immersing the prepared hide for a specified length of time. Most liquid and cream tanning agents are designed to be applied directly to the prepared hide using a paint brush or by hand wearing gloves. There are advantages and disadvantages to both paint-on and immersion systems.

Paint-on tans require fewer solutions to make and dispose. All areas of the skin must be covered with the paint-on tanning agent but care is needed around hide edges as the solution may stain the fur or hair. The amount to use may be difficult to gauge. Too heavy an application on thin skins may result in the tanning liquid being absorbed through the skin potentially discoloring hair and leaving it feeling greasy or oily. While the greasiness can sometimes be washed out with detergent or solvent, the stains remain. However, paint-on tans are easy to use, result in a well-tanned hide, and are preferred by many tanners and hobbyists. Examples of paint-on tans sold by various distributors include: Liqua-Tan™, Rittel's Kwiz-n-Eze, McKenzie Tan, Tannit Solution™, Bollman's Mammal Tanning Cream, Rinehart Tanning Cream, Curatan®, and Trapper's Hide Tanning Formula™. Other products are also available.

Immersion tanning methods negate problems with discolored or greasy hair sometimes encountered with paint-on tans. However, solutions must be mixed, pH monitored and spent solutions properly disposed. Through soaking, the tanning agent has access to both sides of the hide, although the hide should be stirred occasionally while in the tanning solution to ensure that there are no folds in the hide preventing adequate chemical penetration. Please note that the hair of deer is hollow and deer hides will float so stirring may need to be more frequent. If tanning is done correctly, weighting a deer hide to keep it submerged in the solution is not necessary. Goat hides do not have this problem. There are many kinds of immersion tanning agents. Two examples are EZ-100 from Rittel's and Lutan® FN.

For initial attempts at tanning, it is beneficial to purchase a kit complete with tanning chemicals, instructions, and a list of the needed supplies. Some kits come with instructional videos. Many distributors sell kits using either the immersion or paint-on tanning methods. Examples of some kits include EZ 1000 Kit that includes EZ-100 powder, Saftee Acid, and tanning oil; Liqua-Tan™ Tanning Kit with Liqua-Tan™, acid, and tanning oil; and McKenzie Tan Tanning Kit with McKenzie Tan, acid, and oil. Kits using other chemicals, e.g., Para Tan, Curatan®, Krowtann 2000, Kwik-Tan, Lutan® FN, etc., are available or one can purchase tanning chemicals individually. Finally, while not covered in this article, chemicals and kits are available for tanning birds and reptiles.

Basic Tanning Steps

Whatever method is chosen to use in tanning a hide - immersion or paint-on, kit, or purchase of separate chemicals - many of the basic steps are the same: skinning the animal; preserving the hide; fleshing the hide; pickling and neutralizing; the actual tanning process; oiling; drying and softening; and finishing. As with any craft there are many variations on the main themes and different texts will provide different tanning recipes, order of steps, chemicals to use and tips on how to successfully follow their method. It is a good idea to read through several methods and speak with someone knowledgeable on tanning hides before selecting a particular one. As each method or tanning recipe is slightly different, it is best to follow the instructions and learn the basics. One can then experiment in the future.

It is not the goal of this article to present all of the tanning variations available. Rather, some pertinent information on each of the basic steps will be given. More detailed information can be found at the end of this article or one of the other information sources previously mentioned. Further, the information presented is designed for the hobbyist tanner and, as such, no use of tanning machinery is required.

Skinning

Most people who want to tan a hide will also use the carcass for meat and will take the animal to a meat locker or abattoir where it will be expertly skinned. If you wish to skin an animal for its hide, be sure the carcass is fresh as putrefaction and decay begin immediately upon death. Bacteria become active breaking down tissue, damaging the hide, and causing hair slippage. Also, ligaments under the skin can shrink as the carcass cools making skinning more difficult. If you do your own butchering ensuring that a carcass is fresh is no problem; however, if an animal is found dead caution is warranted. In addition to possible problems with skinning and hair loss you may be in danger of contracting a disease. *Some animal diseases, such as rabies, tetanus, and anthrax, can be transmitted to humans through contact with infected animals. If an animal is seen to be ill, acting strangely, or found dead for an unknown cause it should be buried or disposed of and not skinned, even wearing gloves (Hobson,1977).*

Caseous lymphadenitis or abscesses is a common disease of goats that can be transmitted to humans. Care must be used when skinning goats as some abscesses not apparent on the live animal will be found when skinning. Abscesses contain greenish, cheesy pus that should be trapped on paper towels and burned or buried. Use gloves when skinning goats suspected of having abscesses. Try to avoid using skins of goats having an abscess.

Many people who hunt or butcher at home have experience skinning and have their own favorite tools and methods. Skinning can be done with the carcass hanging or lying. Initial cuts should be made down the midline of the belly from the anus to neck and from the legs inwards. Cuts on the legs should be done on the side where the hock and knee bend, the rearmost portion of the hind leg and the foremost portion of the front leg. This will result in a more rectangular shaped hide. It is easier to skin a hanging carcass as the skin can be pulled downwards and "fisted" away from the body, thereby lessening the need to use a skinning knife. A skinning knife should be very sharp and used sparingly to decrease the chance of cutting the skin which mars the hide. Hides can also be removed using mechanical means. No matter how the hide is removed, large amounts of fat or meat should not be taken with the skin as this material will have to be removed later and can impede salt penetration when preserving. Any obvious blood spots or dirt should be washed off. A good job in skinning will make tanning easier.

Salting a hide.

Salted hides draining on a slanted board.

Preserving

If the hide is not to be tanned immediately it must be preserved. The goal of preservation is to stop the putrefaction and decay by bacteria immediately upon death. Never leave fresh hides rolled up or stacked. The heat remaining in them will encourage bacterial growth and increase the possibility of hair slippage. If skinning takes place in a different location than preservation, try to cool the hide as quickly as possible by laying it open. While plastic garbage bags may be useful in handling a wet, bloody hide, do not leave hides in a closed bag. This traps the heat allowing decay to start. Begin your preservation technique as quickly as possible.

The main methods of preservation are salting and freezing. Salt removes moisture from the hide and creates an unfavorable climate for bacterial growth. Use only non-iodized salt such as table or pickling and curing salt. Rock salt should never be used as it has impurities. A fine grain salt is preferred and penetrates the skin more easily than large grain products.

To salt a skin, lay it flat and pour a generous amount of salt, between one-half to one pound salt per pound hide, down the middle and rub in thoroughly covering every portion. Fold the hide flesh to flesh, roll it up and place on a slanting board to drain. The following day shake off the wet salt and resalt with new salt. After the second day, continue in the tanning process or, if tanning will take place at a later date, resalt and lay the hide flat to dry. Drying may take several days or longer depending upon the weather. Hides should not be dried in direct sunlight or where temperatures are very high. Dried skins can be stored in a dry place until tanning.

When preserving by freezing, the goal is to reduce hide temperature quickly. Immediately after skinning lay the hide flat in a freezer. When it begins to stiffen, fold it flesh to flesh, roll and place inside a plastic bag. A frozen hide can last for months or even years with no damage to the hide. However, it is best to tan the hide within a reasonable time frame.

To begin the tanning process, the preserved skin must be rehydrated in preparation for fleshing. Frozen hides should be soaked in water to thaw. Soak salted hides in a brine solution of one to two pounds salt for each gallon of water needed to completely cover the hide. Hides should be soaked until they are like a wet dishrag. Relaxing agents are available that can assist in preparing the hide for fleshing and tanning.

Dirty hides need to be washed of obvious blood, manure and other dirt after thawing. A more thorough washing is done after fleshing. If slaughtering one of your own animals, you can minimize hide dirt by care prior to slaughter and during the slaughter process. Angora hides can be a problem if excessively dirty and have hay or grass matted in the mohair.

Fleshing

To flesh a hide means to scrape all fat, meat and membranes from the skin in preparation for the actual tanning process. This can be done before the hide is salted to allow easier salt penetration. Fleshing is most easily accomplished through the use of a fleshing beam and a fleshing knife.

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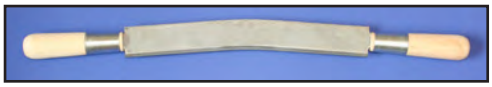
Tanning Goat Hides continued from pg. 13

PVC pipe fleshing beam

A fleshing beam is a piece of wood over which the hide is draped for scraping. A common type of fleshing beam can be fashioned out of a 2" x 6" or 2" x 8" board five or six feet long. One end should be cut to a blunt point and all edges rounded and smoothed. Legs are attached near the pointed end so that the fleshing beam slants upward from the ground to waist



Fleshing knife

level. While this is the most common type of beam, others can be fashioned from rounded logs or large PVC pipes.

A fleshing knife is a blade with a handle on both ends allowing even pressure to be exerted as the blade is pushed down the hide. Blades should be dull as the goal is to push and scrape all fat, meat, and membranes off the hide,

Flesh down the hide; scraping off the unwanted tissue.

leaving only the skin. A blade that is too sharp can cut the hide exposing hair roots leading to subsequent hair loss. Fleshing knives are available from many taxidermy supply stores at a reasonable cost. Alternatively, a dull draw knife or butcher knife driven into a block of wood for a second handle can be used. Churchill (1983) describes methods to make fleshing knives and other knives from used industrial hacksaw blades. Mill planer blades from logging mills can also be fashioned into fleshing knives and these types of knives are available on the Internet.

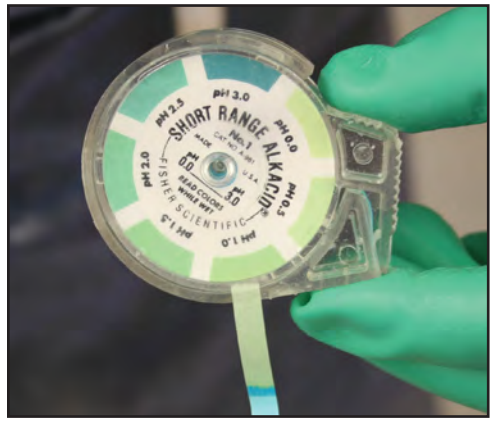
To flesh a hide, pull the hide from the rehydration bath and drape it over the pointed end of the fleshing beam. Push the fleshing knife down the hide scraping off unwanted material. To make fleshing easier and lessen the chance of cutting the hide, flesh with the lay of the hair. The legs should be fleshed towards the belly and the hide from the tail pushing towards the neck (Rittel, 1994b). Fleshing takes practice and initially can be time consuming but must be done properly, removing even the thin membrane held tightly onto the skin. The hide should be like a wet dishrag when fleshing. If it becomes too dry, soak in water before proceeding. After fleshing, plunge the hide up and down in soapy water using laundry or dish detergent to remove remaining dirt and blood and rinse thoroughly to remove all soap. There are commercial products to remove blood and other stains, if desired.

Electric fleshing machines, found in taxidermy supply catalogs, are available for fleshing and shaving hides. The cost is usually prohibitive for the hobbyist tanner as the least expensive handheld models cost approximately $200 and bench models cost over $600. Even with machines, many professionals still do initial fleshing with a traditional fleshing knife and beam. Fleshing machines do have distinct advantages in shaving hides. Shaved hides are thinner, use less tanning chemicals due to reduced weight and result in a softer finished product. This is especially true for hides from thick-skinned species. While shaving can be accomplished using a very sharp knife, it is very difficult to produce a consistent thickness and to avoid cutting through the hide. Generally, goat hides can be tanned and softened without shaving.

Pickling and neutralizing

Pickling, as described by Rittel (1993), is the use of an acid solution to acidify and temporarily preserve a skin while physically and chemically preparing it for tanning. Most tanning recipes will call for an acid pickle, though it may be included in the tanning process itself and not a separate step. Some paint-on tans, such as Tannit solution and Liqua-Tan, are applied directly to the fleshed hide without the skin undergoing a pickle.

Pickling solutions are mixtures of water, salt, and acid made in a plastic barrel. Enough solution should be made to completely submerge the hide while not resulting in overcrowding if several hides are done together. If in doubt about proper quantity, Rittel (1993) suggests making two quarts of pickling solution for every pound of wet, drained hide. The pH must be carefully checked and proper



Monitor the pH of the pickling solutions

precautions, i.e., use of eye protection, a protective apron, and rubber gloves, should be followed when using acids. Monitoring pH can be done using simple pH paper and adjustments made using acids or alkaline substances such as sodium bicarbonate. Acids should be added slowly to the pickle, pouring them along the side of the container so as to run gently into the solution. Use a wooden stick and mix slowly, but well. There are a number of acids and formulas used in pickling and the tanning recipe followed will have specific instructions. For example, the EZ-100 tanning kit recommends 0.5 fluid ounces Saftee Acid (included in the kit) and 1 pound salt per gallon water.

Skins are usually left in the pickling solution and stirred occasionally for a minimum of three days after which time they must be neutralized. Neutralizing raises the pH of the skin through the use of a solution containing an alkaline substance such as sodium acetate, sodium formate, sodium bicarbonate, or other similar compound. Neutralization is generally brief, 15 to 20 minutes,

after which the skins should be rinsed with clean water, drained, and put into the tanning solution (Rittel, 1993). Again, the tanning recipe or kit should have complete instructions on the neutralization method. After draining and prior to tanning, any holes in the hide should be sewn closed. This will prevent further ripping the hide during softening.

Dispose of pickling and neutralizing solutions properly. Acid pickles should be raised to a pH of 6.5 to 7.0 before dumping. Rittel (1993) states that sulfates are considered hazardous materials and if an acid is used in which sulfates are formed local health authorities should be contacted concerning proper disposal. Do not dump or dispose of solutions where they can contaminate streams or ground water. If no other disposal means is available, neutralized solutions should be dumped in a driveway or other area where vegetation does not grow. Chemical and salt water solutions should never be put into septic systems as these can kill the microflora needed to break down waste. Contact local authorities about proper disposal methods.

Tanning

To describe the varying tanning recipes and methods is beyond the scope of this article and those can be found in various texts, taxidermy supply, or tanning chemical dealer catalogs and in the instructions included with tanning kits or chemicals. The main tanning process may be as simple as one of the paint-on tans mentioned earlier or more complex entailing the application of chemicals in a tanning soak or bath. If making a tanning solution, the pH needs to be monitored and the solution neutralized prior to safe disposal. Hides should be stirred with the blunt end of an old wooden broom or shovel handle while in the solution to ensure proper tanning. Remove hides after the specified time length and drain and rinse prior to oiling. Do not overtan as this can result in a stiffer hide.

Powdered tanning agents are mixed into a salt:water solution at the recommended rates. The skin is drained and weighed after neutralizing and draining. That weight is used to calculate the amount of tanning agent needed. As an example, Rittel's EZ-100 instructions state that for every pound wet, drained

Apply paint-on tans carefullly using gloves

hide use 4 ounces salt, 0.5 ounces EZ-100, and 2 quarts lukewarm water. The solution pH should be 4.0 and skins tan in 16 to 20 hours. Alternatively, one could mix enough solution to completely submerge the hide, though this wastes chemicals.

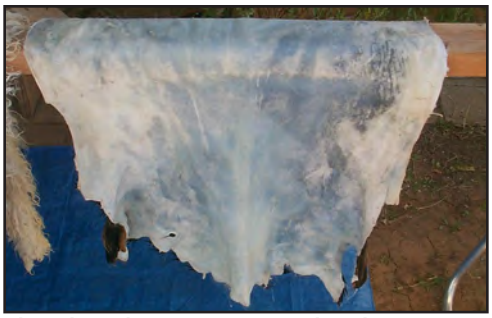
Paint-on tans that call for pickling and neutralizing also require draining before tanning. Others, such as Liqua-Tan that do not require pickling, call for the hide to be washed and drained or wrapped in a towel to remove excess moisture prior to application. The hide is laid flat on plastic tarp and the tanning agent applied. After several hours, the excess is worked into the skin. Oiling may or may not be included in the instructions. Some paint-on tans state that oils are included in the tanning solution; others suggest use of a separate oil for optimum softness. As an example, Knobloch's recommends applying Liqua-Soft tanning oil the day following application of Liqua-Tan if the tanned hide will be used for a flat skin or rug.

Oiling

Oiling is done to increase the softness of the finished product and many oils are available in the marketplace. If a tanning kit is purchased, the recommended oil will be included. To oil the hide, lay it flat with the flesh side up. One part oil is mixed with one to two parts hot water and liberally applied to the skin. The hide is folded in half skin to skin and again hair to hair. The folded hide should then be allowed to "sweat," or absorb oil, for approximately 4 to 6 hours. After that time, the hide is hung to begin drying.

Drying and softening

Drying methods range from simple hanging or laying flat to tacking on wood or tying in a frame. Artificial heat should not be used as it dries the skin too fast making softening difficult. Check the hide as it dries to determine when softening



The white drier areas mean this skin is ready to soften.

should begin. If the hide is stretched and pulled when too wet it can become misshapen. If one waits too long, the hide stiffens and is difficult to soften. As the hide dries, it will become white and less pliable. The thinner edges will dry more quickly than the thicker center line and edges are usually worked first. If a hide starts to become too dry, fold it around damp towels and place overnight in a plastic bag. Plastic bags can be used with partially softened hides to slow down the pace of drying.

Softening involves stretching and bending the hide to break up fibers in the skin. The time and effort spent on this step directly determines the suppleness of your final product. Common methods include staking or cabling. Staking involves use of a staking beam, boards cut and fashioned in the shape of a braced, inverted T with the upright end rounded to a blunt edge. The flesh side of the damp hide is pulled down over the blunt edge to stretch and break up skin

Stake beam

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Tanning Goat Hides continued from pg. 15

Trimming a hide.

fibers. Cabling is a more effective method than staking and involves stretching and pulling the hide around a cable. Regular rope can be used but aircraft cable (wire rope) clamped around a pole works very well and results in an extremely soft hide. Often, both methods are used on the same hide, staking to begin breaking up very stiff areas followed by cabling to finish softening and give a soft, supple hide.

Commercial tanneries use equipment for softening such as large, rotating drums that tumble the hide, generally with sawdust, as it dries. In addition to softening the hide, a solvent may be added to the sawdust to help clean hair or fur. Some texts recommend using an old laundry dryer with the holes plugged for tumbling hides. Whereas this will help clean the hair, it will not help significantly in softening the hide. To do this requires a tumbler with at least a six foot drop along with 100 pounds of hardwood sawdust (P. Helms, McKenzie Taxidermy Supply, personal communication).

Finishing

After the hide is softened, the hair should be cleaned and brushed and rough or uneven edges trimmed. Most goat hides will only need combing or brushing. Should deeper cleaning be necessary it can be done by simply rubbing sawdust or corn cob grit into the hair. Rittel (1994a) recommends that local sawdust not be used as it may contain pitch and be unevenly grained. Taxidermy or tanning chemical supply houses sell sawdust and solvents to be used in cleaning. Hobson (1977) explains how to use cleaning substances such as cornmeal, oatmeal, bran, chalk and plaster of Paris.

Once the hair is clean and brushed, the skin side can be sanded or rasped. This helps to remove rough spots and further soften the hide. Some staking methods can make the hide appear brown and dirty and sanding or rasping will make it look cleaner and more professional. Cabled hides generally will not need rasping or sanding. Hide edges are usually uneven and may be stiffer than inner portions and trimming these results in a more attractive product. Use a box cutter or similar knife and cut from the flesh side making sure not to cut off the hair.

Optional steps

When reading about tanning, additional steps such as dehairing and degreasing will be found. Dehairing is accomplished by soaking the hide in a hydrated lime or caustic lye solution after which the hair is scraped off. The hide is then tanned for leather using the same or similar methods as those described. Leather making tanning kits are available. Degreasing is done on hides with large amounts of fat in the skin, such as raccoon, bear, and the like. For hair-on tanning, it is unlikely that goat hides would need degreasing.

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American Institute for Goat Research Reources

- American Institute for Goat Research at Langston University- http://www2.luresext.edu/index.htm.
- Web-based Training and Certification Program for Meat Goat Producers - http://www2.luresext.edu/goats/training/qa.html. Modules deal with all aspects of meat goat production from breeds and selection through business and legal issues. These are freely available and are in html (web page) format and in pdf format for downloading and printing. If you decide you wish to become certified, register as a new user and continue. There is no cost to take the course. The only fee is $25 if you wish a certificate and your name listed on our website as a Quality Producer.
- Institute has published a Meat Goat Production Handbook- http://www.luresext.edu/goats/mgph.html. Contains all of the material of the web-based certification program plus a chapter on "Selection, Carcass Evaluation and Fabrication" that is not included on the website. The 2nd Edition will be published in 2015.
- Nutrient Calculator - http://www2.luresext.edu/goats/research/nutreqgoats.html. Once there, click on the producer version. It has drop down menus that ask information needed to calculate the nutrient requirements for your goats. Then you can use the ingredient list to formulate a ration or you can enter your own feeds. You will need to have popup windows available to use the calculator. There is a section on using this calculator with some examples in the "Introduction to Goat Nutrition" module of the certification program.
- Free Quarterly Online Newsletter - http://www2.luresext.edu/goats/library/goat_library.htm.
- Mortality Composting of http://www2.luresext.edu/goats/library/fact_sheets/mortality_composting.html
- Body Condition Scoring of Goats- http://www2.luresext.edu/goats/research/bcshowto.html.
- Artificial Insemination of Goats https://www.youtube.com/user/taglu01.

Composting Animal Mortalities

By Dr. Steve Higgins

Composting can provide livestock producers with a convenient method for animal mortality disposal, as it only takes a few weeks to decompose an adult sheep or goat without any foul smells and relatively little effort. Mortality compost can then be used as a valuable soil amendment or can be stockpiled and reused to compost other mortalities.

Composting is a natural decomposition process conducted by microorganisms that reduce the size of the material by transforming organic products, water, and energy into carbon dioxide, vapor, and heat. If composting is done correctly, the pathogens that cause animal mortalities will be destroyed by the high temperatures reached during the composting process. However, if the dead animal exhibits signs of scrapie, then it should be incinerated by a permitted individual such as a veterinarian.

To compost an animal mortality, all the producer needs is a proper site or structure and a bulking agent such as saw dust, wood shavings, or wood-based bedding and manure. A front-end loader makes the composting process easier, but is not necessary. A composting site (bare soil) should be located away from floodplains, roads, and other sensitive areas. Composting structures, which consist of an impermeable floor (concrete, soil cement, etc.), are preferred to composting on bare soil because of the potential leachate that can occur.

To begin composting, place at least two feet of bulking material below, above, and around the carcass. Completely covering the carcass will help control odors and deter scavengers and flies. If signs of vermin are present, add more bulking material. Other mortalities can be added on top of the pile, extending the pile vertically, or placed beside the previous mortality, extending it horizontally. This is a management decision that depends on the space and equipment available.

Although composting is relatively easy in comparison to other methods of mortality disposal, there is some maintenance involved. Effective composting requires specific temperature and moisture conditions. To destroy pathogens, the internal pile temperature must reach 140° to 160°F and be maintained for five days. Temperatures can be determined using a long-stemmed compost thermometer or by visually observing for signs of heat (Figure 1). To estimate moisture level, collect a handful of compost and squeeze it. If moisture drips from your hand, the pile is too wet. If your palm does not get wet, the pile is too dry. When your hand is wet but not dripping, the moisture level is optimum. The compost pile should be periodically checked for temperature, moisture conditions and signs of vermin.

Figure 1. Proper composting will result in an internal pile temperature of 140° to 160°F, causing the pile to steam.

For more detailed information on how to compost animal mortalities, see the University of Kentucky Cooperative Extension Service publication *On-Farm Composting of Animal Mortalities* (ID-166). For information on other dead animal disposal methods, see the University of Kentucky Cooperative Extension Service publication *On-Farm Disposal of Animal Mortalities* (ID-167).

Stephen F. Higgins, Ph.D. *is the Director of Animal and Environmental Compliance for the University of Kentucky's Agricultural Experiment Station. He has expertise in agricultural best management practices, especially those concerning livestock manure and mortalities. By coordinating with various local, state, and federal agencies, Dr. Higgins has provided publications, trainings, and tools for developing and implementing Kentucky Agricultural Water Quality Plans and Nutrient Management Plans.*

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Have I Got a Breed for You?

Sheep Types and Breeds for Commercial Production

by Dr. Debra K. Aaron, Professor

Hampshire, Polypay, Dorper, Merino or Lincoln? Could one of these be the "best" sheep breed for you? Or, is it one of the other 50 or so recognized breeds of sheep in the United States? The fact is no one breed of sheep is "best" for all traits. This may come as a surprise because most of us have our favorite breeds, but all of them have strengths and weaknesses. The goal is to find the breed (or breeds) that best suits a producer's particular marketing objectives and production system. If the sale of high quality, lean lamb is going to provide the majority of the income from your sheep enterprise, your breed choice(s) will be much different than if wool is your primary product to sell. Production resources, such as labor, facilities, land and feed availability, will also influence your breed choice.

The purpose of this article is to describe how sheep breeds are classified according to type and then to describe some of the more common breeds within each type. That way, you can choose the breed that's "best" for your marketing objectives and production system.

Classification of Sheep Breeds

Classification of sheep breeds can be confusing because it is done by several different methods. A common method of classifying sheep breeds is by **primary purpose** (wool, meat, dairy or dual purpose breeds). While most sheep breeds are dual purpose (for example, they produce both wool and meat or both wool and milk for marketing), most excel in the production of just one marketable commodity: wool or meat or milk. Another method of classification is according to **type of fiber** produced: wool breeds versus hair breeds. Wool breeds are then further classified according to fineness of wool (fine, medium and long wool breeds). Even **face color** (typically, white face versus black or dark face breeds) has been used to classify sheep. Black (or dark) face breeds tend to excel in growth and carcass traits while white face breeds tend to have superior maternal

Table 1. Classification of Some Common Sheep Breeds Using Various Methods.

	Method of Classification			
Breed	Primary Purpose	Fiber or Coat Type	Face Color*	Primary Role in Crossbreeding Systems
Border Leicester	Wool	Long Wool	White	Specialized Dam
Cheviot	Meat	Medium Wool	White	General Purpose, Specialized Sire
Columbia	Dual	Medium Wool	White	General Purpose, Specialized Dam
Corriedale	Dual	Medium Wool	White	General Purpose, Specialized Dam
Dorper/White Dorper	Meat	Hair	N/A	General Purpose, Specialized Ram
Dorset	Meat	Medium Wool	White	General Purpose
Finn	Dual	Medium Wool	White	Specialized Dam
Hampshire	Meat	Medium Wool	Black	Specialized Sire
Katahdin	Meat	Hair	N/A	Specialized Dam
Lincoln	Wool	Long Wool	White	Specialized Sire
Merino	Wool	Fine Wool	White	Specialized Dam
Montadale	Meat	Medium Wool	White	General Purpose
Oxford	Meat	Medium Wool	Black	General Purpose
Polypay	Dual	Medium Wool	White	General Purpose, Specialized Dam
Rambouillet	Wool	Fine Wool	White	Specialized Dam
Romanov	Meat	Long Wool	Black and White (Spotted)	Specialized Dam
Romney	Dual	Long Wool	White	Specialized Dam
Shropshire	Meat	Medium Wool	Brown	Specialized Sire
Southdown	Meat	Medium Wool	Gray	Specialized Sire
Suffolk	Meat	Medium Wool	Black	Specialized Sire
Targhee	Dual	Medium Wool	White	Specialized Dam
Texel	Meat	Medium Wool	White	Specialized Sire

*Classification by face color is only used for wool breeds.


Cheviot


Corriedale (Photo from Phillippi Corriedales)


Columbia

and wool traits. Lastly, classification is often based on the breed's **primary role in crossbreeding systems,** that is, as general purpose breeds, specialized dam (or ewe) breeds and specialized sire (or ram) breeds.

Some common breeds are classified according to each of these methods in **Table 1**; however, the remainder of this article is devoted to a discussion of breeds classified according to the latter method, their primary role in crossbreeding systems. This is the most useful means of classifying sheep breeds when the marketing objective is the sale of slaughter lambs.

Primary Roles of Breeds in Crossbreeding Systems

Key characteristics used for classifying breeds according to their primary role in crossbreeding systems (that is, **general purpose, specialized dam,** and **specialized sire** breeds) include seasonality, age at puberty, prolificacy, lambing ease, mothering ability, lamb survival, longevity, hardiness, mature size, growth rate, feed efficiency, muscling and leanness.

Note that some breeds are identified in **Table 1** as serving more than one role in crossbreeding systems. Sometimes this is a result of differences of opinions among breeders as to how breeds are classified. Other times it has more to do with the type of mating system being used by the producer. Thus, in the following discussion, assignment to a particular category should be considered only a general guideline.


Horned Dorset


Polypay


Texel

General Purpose Breeds

General purpose breeds may be thought of as "middle of the road" breeds. These breeds tend to have acceptable, average levels of production for most of the traits listed above but are generally not superior in any one trait. Therefore, they are suitable either as sire or dam breeds in the mating system. Most general purpose breeds provide a balance between meat and wool. Furthermore, they are adaptable to a range of environmental conditions. Examples of general purpose breeds include **Cheviot, Columbia, Corriedale, Dorset, Montadale, Polypay** and **Texel**. These are wool sheep. The **Dorper/White Dorper**, hair sheep, are also classified as general purpose.

General purpose breeds are often the best choice for small flocks where crossbreeding programs are not feasible. Likewise, rotational crossbreeding systems necessitate use of general purpose breeds. For example, the Polypay is classified as both a general purpose and a specialized dam breed (**Table 1**). In a rotational cross, the Polypay would be used as a general purpose breed; that is, as a dam (ewe) breed and a sire (ram) breed, on a rotating basis. In a terminal cross, however, the Polypay would always be used on the ewe side.

Specialized Dam Breeds

In contrast to general purpose breeds, specialized dam breeds excel in fitness characteristics, that is, those traits that influence the ewe's ability to produce offspring in the flock (for example, survival traits, reproductive

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Border Leicester

Lincoln (Photo from Larson Lincoln Longwools)

Hampshire

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traits, such as early puberty, fertility and prolificacy, and maternal traits, such as milk production and mothering ability), reproductive traits. Most dam breeds are white faced. They are adaptable to difficult environments. In addition, specialized dam breeds tend to have above average fleece weight and quality; thus, many of them are classified as dual purpose breeds. These breeds are not as well known for carcass traits and, with regard to mature size, they need only be of adequate size to produce lambs of desired carcass weights. Specialized dam breeds are used predominantly in terminal crossbreeding systems as the breeding flock; they are mated to terminal sires to produce fast-growing slaughter lambs.

Specialized dam breeds include **Merino, Rambouillet** and **Targhee,** which are fine wool breeds; **Columbia, Corriedale** and **Polypay**, which are medium wool breeds; and **Border Leicester, Romney, Finn** and **Romanov,** which are long wool breeds. Because of their excellence in the traits listed above, Merino, Polypay, Rambouillet and Targhee have contributed greatly to commercial flocks in the United States. The Finn and Romanov breeds are used exclusively as dam breeds, primarily due to their young age at puberty and high prolificacy (number of lambs born per ewe lambing). The **Katahdin**, a hair breed, is also classified as a specialized dam breed because of its adaptability, parasite resistance, early puberty, prolificacy and strong mothering ability.

Specialized Sire Breeds

Specialized sire (or ram) breeds excel in early growth, muscularity and carcass quality. They are typically classified as meat-type breeds and most are black (or dark) faced. Selection pressure on growth and carcass traits has resulted in less focus on wool production (in wool breeds); thus, these sheep have lower quality wool and receive lower premiums for their fleeces. Most wooled sire breeds produce wool of medium fineness.

Rams from specialized sire breeds are mated to purebred or crossbred ewes of specialized dam breeds to produce slaughter lambs. They are often referred to as "terminal sires" because all offspring are marketed (terminated), whereas lambs sired by rams from specialized ewe breeds, such as the Polypay, are usually kept in the flock as replacement ewes. Rams of specialized sire breeds should excel in fertility and longevity. In addition, survivability of crossbred lambs is expected to be high.

Specialized sire breeds include heavy weight breeds such as the **Hampshire, Oxford,** and **Suffolk,** medium weight breeds such as the **Shropshire** and **Texel,** and light weight breeds such as the **Cheviot** and **Southdown**. The **Dorper** and **White Dorper,** which are hair sheep, are also used as specialized ram breeds.

Summary

The answer to the question, "What is the best breed?" depends on the producer's specific marketing objectives and production system. No one breed of sheep will satisfy every producer's needs. But, recognizing the different types and breeds of sheep will help you choose the breed that will best meet the demands of your sheep enterprise. Furthermore, understanding the roles of sheep breeds in crossbreeding systems is important for additional reasons. First, it will direct the selection toward traits within breeds that are relevant for both purebred (seedstock) and commercial sheep producers. Second, it will allow the sheep industry to use available breed diversity to improve market lamb production.

Dorper and White Dorper

Suffolk

Southdown

Dr. Debra K. Aaron, PhD, *professor in the UK Dept. of Animal Sciences, teaches animal science and genetics. Her research interests are in sheep breeding and genetics.*

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Nutrient Requirements for Sheep

by Dr. Donald G. Ely

The sheep's requirement for energy, protein, minerals, and vitamins varies with weight, age, stage of production, and level of production. With all characteristics being equal, except weight, heavier animals require greater amounts of nutrients than lighter weight individuals. Immature animals require a greater percentage of their daily diet as energy, protein, minerals, and vitamins than older ones. While the nutrients for maintenance may be similar for the immature and the mature, the immature animal may require extra nutrients for growth. Dry, open ewes may only have minimal requirements whereas the same ewes nursing twins have significantly greater requirements for all nutrients. In addition, when comparing ewes nursing singles vs. those with twins and early-weaned lambs gaining .5 lb/hd/d vs. those gaining 1.0 lb/hd/d, significant differences in daily energy, protein, mineral, and vitamin requirements become obvious to the producer. Although maximum performance of sheep is governed by heredity, the daily supply of dietary nutrients dictate whether an individual will ever reach its genetic potential for performance.

TABLE 1. DAILY NUTRIENT REQUIREMENTS OF DRY, NONBRED MATURE EWES AT MAINTENANCE

		Energy				
Ewe weight[a] (lb)	DM[b] (lb)	TDN[c] (lb)	DE (Mcal)	CP (lb)	Ca (g)	P (g)
110	2.2	1.2	2.4	.21	2.0	1.8
132	2.4	1.3	2.7	.23	2.3	2.1
154	2.6	1.5	2.9	.25	2.5	2.4
176	2.9	1.6	3.2	.27	2.7	2.8
198	3.1	1.7	3.4	.29	2.9	3.1

[a]Values apply to ewes in moderate condition. Feed fat ewes according to next lower weight category and thin ewes to the next higher.
[b]To convert dry matter to an as-fed basis, divide DM values by the percentage DM in a particular feed. Example: 2.2 lb divided by forage DM (30%) = 7.3 lb of as-consumed forage required/d.
[c]1.0 lb TDN (total digestible nutrients) = 2 Mcal DE (digestible energy).

The Ewe

The requirements for energy, protein, minerals, and vitamins by mature ewes are based on weight, stage of production, and level of production (performance). Table 1 shows how the daily requirements for ewes at maintenance vary with weight. Ewes in each weight category are expected to gain only .02 lb/hd/d. All requirements, except phosphorous (P), increase in approximately equal increments for each 22-lb increase in body weight, so the 198-lb ewe requires approximately 40% more of each nutrient daily than the 110-lb ewe. An important principle to remember when evaluating the daily nutrient requirement is: Percentage of the nutrient in the daily ration dry matter (DM) remains the same, even if the amounts of dry matter and nutrients increase or decrease. For example, the crude protein (CP) content of 2.2 lb of dry matter fed to the 110-lb ewe each day is 9.5% (.21 divided by 2.2 times 100). Although the 198-lb ewe consumes 3.1 lb of dry matter, which contains .29 lb CP, the percentage CP in the dry matter remains approximately 9.5. Therefore, percentages remain the same even though absolute weights vary when different amounts of the same ration are fed.

Stages of production include maintenance, flushing/breeding (F/B; 2 weeks prebreeding and first 3 weeks of breeding), first 15 weeks of gestation (EG), last 4 to 6 weeks of gestation (LG), and first 6 to 8 weeks of lactation (L). Daily nutrient requirements for the 154-lb mature ewe as she works through the different production stages of the year are presented in Table 2. All requirements are lowest at maintenance because the ewe is required to simply maintain her weight during this period (weaning to flushing). To flush ewes (have them in a rising body condition at breeding), dry matter and all nutrients offered to the ewe are increased so she gains .2 to .25 lb/d. This rate of gain during F/B may increase the lambing rates of ewes in moderate condition by 15 to 20%. This period extends from 2 weeks before turning in the ram through the first 3 weeks of the breeding season. Daily dry matter intake is increased 50% over maintenance. This dry matter should be composed mainly of energy dense feeds because the energy requirements in F/B are 55% greater than maintenance, whereas CP is only 45% greater. Approximately 2.3 times as much calcium (Ca) is required in F/B, but only 30% more P is needed. After the breeding season (first 15 weeks of gestation; EG), requirements are reduced to almost maintenance levels (daily gain = .07 lb/hd/d). Because of the low requirements, cheap by-product feeds can be used efficiently.

On the contrary, the last 4 to 6 weeks of gestation (LG) are nutritionally critical to the production of large and vigorous lambs at birth. Because two-thirds of the birth weight of lambs occur in this period and to prevent metabolic disorders

TABLE 2. DAILY NUTRIENT REQUIREMENTS FOR 154-LB MATURE EWES IN DIFFERENT STAGES OF PRODUCTION

Production stage[a] (lb)	DM (lb)	Energy TDN[b] (lb)	Energy DE (Mcal)	CP (lb)	Ca (g)	P (g)
M[c]	2.6	1.5	2.9	.25	2.5	2.4
F/B[c]	4.0	2.3	4.7	.36	5.7	3.2
EG[c]	3.1	1.7	3.4	.29	3.5	2.9
LG[c]	4.2	2.8	5.4	.47	7.6	4.5
L[c]	6.2	4.0	8.0	.92	11.0	8.1

[a]Values apply to ewes in moderate condition.
[b]1.0 lb TDN (total digestible nutrients) = 2 Mcal DE (digestible energy).
[c]M = maintenance; F/B = flushing/breeding; EG = early gestation; LG = late gestation (180 to 225% expected lambing rate); L = first 6 to 8 weeks lactation suckling twins.

(ketosis) at lambing, daily nutrient intakes are increased over EG so the ewe gains .50 lb/d. An illustration of the fetus growth during the entire 147-d gestation period is shown in Table 3.

TABLE 3. GROWTH OF THE UNBORN LAMB DURING PREGNANCY

Days of pregnancy	Single (lb)	Twins (lb)
30	ND[a]	.5
60	.5	.8
90	1.0	3.0
120	4.5	8.0
147	12.0	24.0

[a]Nondetectable.

The fact that daily dry matter intake in LG is only one-third more than in EG, whereas TDN, CP, Ca, and P requirements are 165, 160, 220, and 155% of those in EG, points to the necessity of feeding more energy dense rations (increased grain) in LG. The main reason why this type of ration is needed in LG is the competition for space between the fetuses and the digestive tract (rumen) inside the body of the ewe. Since the fetuses grow so much in LG, they reduce the capacity of the rumen. If only roughage is fed, the "fill" of the rumen may be reached before adequate nutrients are consumed. Voluntary feed intake will be reduced and the ewe may not consume enough daily amounts of nutrients (primarily energy) to maximize fetus growth and prevent ketosis.

The greatest demand for daily nutrients occurs during lactation (especially in the first 6 to 8 weeks). Dry matter and energy requirements are 150 to 160% greater than in LG. The daily CP needs are almost doubled. Calcium and P are also increased in lactation. These increases point to the need to feed the highest quality feed in greatest amounts during lactation. To further illustrate how the daily nutrient requirements change with production stage, the daily TDN needs of the 154-lb ewe are presented in Table 4.

TABLE 4. DAILY TDN REQUIREMENTS OF 154-LB MATURE EWES IN DIFFERENT STAGES OF PRODUCTION (365 Days)

Production stage	No. Days	TDN/day(lb)
M	80	1.5
F/B	35	2.3
EG	95	1.7
LG	40	2.8
L (twins)	60	4.0
PW*	10	1.4
M	45	1.5

[a]Post-weaning.

The third factor affecting daily nutrient requirements of the ewe is level of production. Maintenance requirements of moderately conditioned ewes will be the same regardless of how their lactation performance was or what their predicted future performance will be. However, if ewes come out of lactation in above moderate condition, their maintenance requirements should be reduced. Conversely, if they are excessively thin, their maintenance requirements may need to be increased to

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prepare for F/B. The success of flushing is dependent on the ewe's condition – especially over conditioned ewes. Efforts to flush ewes that are excessively fat are useless ventures.

If ewes enter EG in optimum condition, daily requirements will be low (Table 2). Whether they are carrying single or multiple fetuses cannot be accurately determined until 60 to 90 d post-breeding. Therefore, requirements will be the same for all ewes in the same body condition in EG.

When the producer predicts (by pregnancy diagnosis or previous record analysis) equal weight ewes are carrying different numbers of fetuses, they should be fed differently because they have different requirements. The TDN values in Table 5 are used as an example to show how nutrient requirements of 154-lb ewes vary depending on the level of performance. A similar table can be constructed for DM, CP, DE, Ca, and P. All requirements (dry matter, energy, CP, Ca, and P) are higher in LG for ewes with higher predicted lambing rates. Likewise, those nursing twins have higher requirements than those with singles.

TABLE 5. DAILY TDN REQUIREMENTS OF 154-LB MATURE EWES WITH DIFFERENT LEVELS OF PERFORMANCE-MODERATE CONDITION (LB)

Production stage	No. days	Expected LR, %[a]		First 60 d lactation	
		130 to 150	180 to 225	Singles	Twins
M	80	1.5	1.5	1.5	1.5
F/B	35	2.3	2.3	2.3	2.3
EG	95	1.7	1.7	1.7	1.7
LG	**40**	**2.3**	**2.8**	**---**	**---**
L	**60**	**---**	**---**	**3.6**	**4.0**
PW[b]	10	1.4	1.4	1.4	1.4
M	45	1.5	1.5	1.5	1.5

[a]Lambing rate.
[b]Post-weaning.

Replacement Stock

Nutrient requirements of replacement ewe and ram lambs, from weaning until first breeding, are not clear-cut because the amount of research conducted with replacements has been much less than with mature ewes. Requirements for these young animals are based only on weight (Table 6). Daily gains (ADG) are inversely related to actual weight. Consequently, daily dry matter, energy, and CP requirements of ewe lambs weighing 110 to 154 lb remain relatively constant. Daily requirements for Ca are lower for the heavier ewe lambs.

Daily gains of genetically similar ram lambs should decrease as they increase in weight. This is brought about by holding daily CP intake constant (.54 to .58 lb/hd/d) as dry matter and energy requirements increase with weight. Calcium and P requirements are fairly constant.

Ewe lambs expected to lamb first at 12 to 14 mo of gain steadily, according to the requirements in Table 6, through breeding. Daily nutrient requirements in EG are based on body weight (Table 7). Weight gains should be lower for heavier ewes than for lighter weight ones (assuming all ewes are the same frame size, genetically, etc.). These differences are brought about by holding daily CP and Ca requirements constant, while the dry matter, energy, and P requirements increase linearly.

Requirements in LG are dependent on body weight and lambing rate expected (100 to 120% vs. 130 to 175%). Lactation requirements also vary according to body weight and whether suckling singles or twins. The

TABLE 6. DAILY NUTRIENT REQUIREMENTS OF REPLACEMENT EWE AND RAM LAMBS

Body weight (lb)	ADG (lb)	DM (lb)	Energy		CP (lb)	Ca (g)	P (g)
			TDN (lb)	DE (Mcal)			
Ewe lambs[a]							
66	.50	2.6	1.7	3.4	.41	6.4	2.6
88	.40	3.1	2.0	4.0	.39	5.9	2.6
110	.26	3.3	1.9	3.9	.30	4.8	2.4
132	.22	3.3	1.9	3.9	.30	4.5	2.5
154	.22	3.3	1.9	3.9	.29	4.6	2.8
Ram lambs[a]							
88	.73	4.0	2.5	5.0	.54	7.8	3.7
132	.70	5.3	3.4	6.7	.58	8.4	4.2
176	.64	6.2	3.9	7.8	.59	8.5	4.6
220	.55	6.6	4.2	8.4	.58	8.2	4.8

[a]Intended for breeding; thus, maximum weight gains and finish are of secondary importance.

TABLE 7. DAILY NUTRIENT REQUIREMENTS OF EWE LAMBS IN EARLY GESTATION

Body weight (lb)	ADG (lb)	DM (lb)	Energy		CP (lb)	Ca (g)	P (g)
			TDN (lb)	DE (Mcal)			
88	.35	3.1	1.8	3.6	.34	5.5	3.0
110	.30	3.3	1.9	3.9	.35	5.2	3.1
132	.30	3.5	2.0	4.1	.35	5.5	3.4
154	.28	3.7	2.2	4.4	.36	5.5	3.7

TABLE 8. DAILY NUTRIENT REQUIREMENTS OF EARLY-WEANED LAMBS: MODERATE GROWTH POTENTIAL[a]

Body weight (lb)	ADG (lb)	DM (lb)	Energy TDN (lb)	Energy DE (Mcal)	CP (lb)	Ca (g)	P (g)
22	.44	1.1	.9	1.8	.38	4.0	1.9
44	.55	2.2	1.8	3.5	.37	5.4	2.5
66	.66	2.9	2.2	4.4	.42	6.7	3.2
88	.76	3.3	2.6	5.1	.44	7.7	3.9
110	.66	3.3	2.6	5.1	.40	7.0	3.8

[a]Maximum weight gains expected.

TABLE 9. DAILY NUTRIENT REQUIREMENTS OF EARLY-WEANED LAMBS: RAPID GROWTH POTENTIAL[a]

Body weight (lb)	ADG (lb)	DM (lb)	Energy TDN (lb)	Energy DE (Mcal)	CP (lb)	Ca (g)	P (g)
22	.55	1.3	1.1	2.1	.35	4.9	2.2
44	.66	2.6	2.0	4.0	.45	6.5	2.9
66	.72	3.1	2.4	4.8	.48	7.2	3.4
88	.88	3.3	2.5	5.0	.51	8.6	4.3
110	.94	3.7	2.8	5.7	.53	9.4	4.8
132	.77	3.7	2.8	5.7	.53	8.2	4.5

[a]Maximum weight gains expected.

same principle discussed for LG and L requirements of mature ewes (Tables 2, 3, 4) apply to ewe lambs.

A nutritionally critical period for the ewe lamb is immediately after weaning her first set of lambs. Even if fed the highest quality ration possible during L, she will still likely lose up to .25 lb/d of body weight during this period. If she is fed to gain back the weight lost in L, to the point of being in moderate condition when entering the next F/B phase, conception problems may arise, especially if the interval from weaning to F/B is only 2 to 3 months. Although there are no published requirements for this ewe during this interim, experience has taught some producers to feed so she will be in above moderate condition when re-bred to have her second set of lambs at 2 years of age.

Finishing Lambs for Slaughter

Lambs weaned at 60 days of age and finished for the slaughter market at 4 to 7 months are divided into moderate and rapid growth potential categories. Those with moderate growth potential are usually smaller frame, gain at rates of .4 to .7 lb/hd/d, and should be slaughtered at 100 to 120 lb. Rapid growth potential lambs are large frame, gain from .5 to 1.0 lb/hd/d, and can be slaughtered at 120 to 140 lb.

Daily nutrient requirements of both groups of lambs are based on body weight and expected daily gain and are shown in Tables 8 and 9. All nutrient requirements increase as weight increases to 110 (moderate) and 132 lb (rapid). If lambs are kept beyond these weights, do not increase the supply of daily nutrients. The outcomes of an excessive nutrient supply after attainment of these weights, include slow gains, poor feed conversion, and excessively finished lambs.

Summary

The nutrient requirements for sheep consider the class of animal (mature ewe, replacement stock lambs), body weight, stage of production, and level of production. The mature ewe nutrient requirements are greatest during late gestation and lactation. Replacement stock requirements remain relatively high from weaning to first breeding because of the growth requirement. Ewe lambs bred to lamb first at 12 to 14 mo of age require greater amounts of nutrients than mature ewes during early gestation, late gestation, and lactation because of their continual growth plus these productive requirements. Lambs finished for slaughter require increasing amounts of nutrients as weight and gain increase to the point when they can become over-finished. One key to economic efficiency in the sheep business is feeding to meet nutrient requirements. Over or under feeding can result in decreased performance, metabolic disorders, reproductive problems, and reduced net profit.

Dr. Donald G. Ely, *professor in the Department of Animal & Food Sciences at the University of Kentucky*

Recommendations For "Drying" Up Your Doe or Ewe

by Dr. Beth Johnson

You have spent the last 10 months milking your dairy goat/sheep or you are weaning a group of young kids or lambs and wondering how to best dry off their dams without developing mastitis. As with most animals, we have fed the producing doe/ewe to meet her energy demands for lactation. The first step is to reduce the nutrient intake of your animals so the milk production is reduced. Management practices used to stop milk production is different depending on the stage and level of milk production of an animal.

Picture of a goats udder that is full of milk but not showing evidence of mastitis.

Dairy Goats/Sheep: Most dairy goats are milked until 2 months prior to kidding. Their level of production has usually decreased to a level that the animal can be dried up relatively easy. But, what about those girls that are still milking a gallon when it is time for them to be dried up? Heavy milk producers are the ones that pose a concern for the prevention of mastitis during and immediately after drying off.

1) Reduce the animals nutrient intake by at least ½ of what she was receiving for production, i.e. animal was being fed 4 lbs of an 18% grain ration and at least 4lbs of alfalfa hay.

2) Reduce the amount and quality of grain/hay being fed. I would reduce to 2 lbs of a 16% ration and grass hay.

3) If you continue to milk the doe/ewe she will continue to produce milk. Therefore, start reducing her milkings to once daily for one week. Then for the following week, milk every other day for 3-4 milkings. Then stop milking completely.

4) Once you have completed Step 3, wait one week and then milk her out. As aseptically as possible, infuse each udder half with one tube of "dry cow" mastitis prevention antibiotics. There are several commercially available mastitis prevention tubes available both over the counter (OTC) and through your veterinarian. If you have had an animal with mastitis, consult with your veterinarian in choosing the appropriate antibiotic to use in the dry period.

Picture of goat with severe gangrenous mastitis, udder feels very cold, severe hardness when udder felt.

Weaning Time

You have raised some beautiful kids/lambs on your doe/ewe and it is 2-4 months after they delivered their offspring. Now it is time to wean the offspring. This is one of the most stressful times for both the young and the old. We usually wean animals in a group instead of individually. This makes it easier for both the offspring, their dams and also the caretakers.

1) If possible, provide just pasture or grass hay to the dams for one week. Just like the dairy animals, it is important to reduce nutrient intake during the weaning period. Although some livestock producers limit the dam's water intake, I do not recommend this practice especially in the warmer climates. The last thing you want is to upset their digestive tract by dehydrating them.

2) Monitor the dam's udder for evidence of mastitis (i.e. hot or cold inflamed udder, hardness &/or discoloration of udder half). Udders may become "strutted" because they are full of milk, but they should still maintain a soft texture to the udder- not hard or hot.

3) If mastitis is detected, treat with systemic antibiotics and treat the affected half with an antibiotic infusion tube. Treat initially with a short acting infusion (lactating) followed by a long term infusion (dry) tube, if an active case of mastitis is present. If a doe/ewe developed mastitis while nursing her offspring then be sure to treat her prophylactically with a "dry" cow mastitis infusion tube at weaning.

Remember, our primary goal is to have a healthy, happy doe/ewe that can contribute to next year's kid/lamb crop. If we don't take care of the udder, then they are usually prematurely culled from the herd/flock because without an udder, they are useless to us for future production!

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

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"The functionality of the improved design makes this system easier to assemble, easier to maintain and easier to clean," added Kozlowski. "With our customers in mind, our goal is to make our product as user-friendly as possible in order for them to be successful."

For more information on the FodderPro Commercial Feed Systems and accessories available at FarmTek, please call 1.800.327.6835 to speak with a fodder specialist or visit www.FodderSystems.com.

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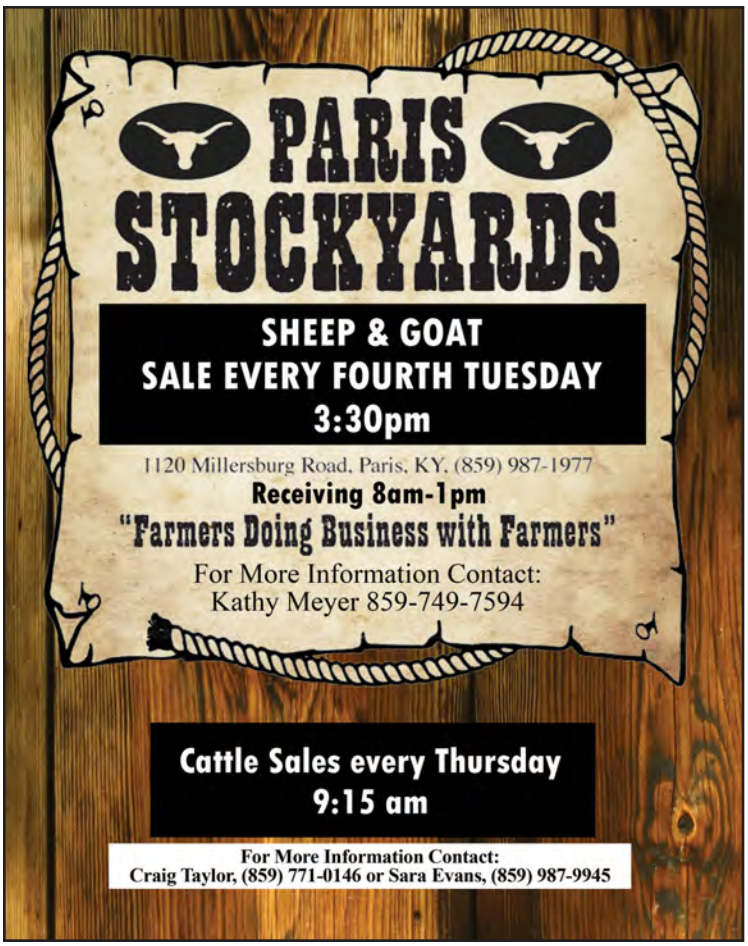
Small Ruminant Profit $chool

By Kelley Yates

Kentucky has seen many changes in its small ruminant industry in the last 15 years. There has been tremendous growth during this time period with sheep numbers increasing from 21,000 head in 1997 to 49,000 head in 2014 and goat numbers increased from 14,000 head in 1997 to 76,500 head today. However, these numbers do not accurately portray the struggles facing Kentucky's small ruminant industry. Kentucky goat numbers peaked in 2007 with 98,000 head and have been steadily declining since, primarily due to the difficulties in raising small ruminants in a warm, humid climate with abundant rainfall. This situation leads to many health challenges, most notably from internal parasites and foot health. Recently, the sheep industry in Kentucky has seen rapid growth (mainly in the hair sheep industry) as producers are looking for low labor and low input animals to raise on their farms. However, professionals within the small ruminant industry are seeing a large number of inferior animals coming through the marketplace and hearing reports of large losses in kids and lambs, indicating that producers are still struggling with the same health and management issues. High death losses and low quality animals being marketed quickly equates to significant monetary losses and some producers who have been in the business for less than a year are already exiting to mitigate overall losses.

To help offset the reduction in quality sheep and goats in the state and provide a more sustainable environment for small ruminant production, the Kentucky Sheep and Goat Development Office is working with the Kentucky Agriculture Development Board (KADB), Kentucky Department of Agriculture (KDA), the University of Kentucky (UK), Kentucky State University (KSU), the Kentucky Sheep and Wool Producers Association (KSWPA), the Kentucky Goat Producers Association (KGPA), National Sheep Industry Improvement Center (NSIIC), American Sheep Industry Association (ASI), and the American Lamb Board (ALB) to assist new small ruminant producers. Hence, the Small Ruminant Profit School (SRPS) was created as a four class course to help increase the profitability of small ruminant producers within Kentucky and surrounding states. Mentors serve as the most critical parts of SRPS. Twenty-one highly experienced mentors have committed the next year and a half to helping the participants in this course get off on the right hoof! These experience producers understand how important it is to be connected with other producers in order to develop a support system.

October 4, 2014 marked the kickoff of the Small Ruminant Profit School (SRPS) program. Over 55 sheep and goat producers from Kentucky, West Virginia, and Illinois participated. The classes are held in four locations throughout Kentucky- Warren, Trimble, Hardin and Montgomery counties. Participants received notebooks, mini health kits and most importantly, personal mentors. The participants in SRPS range in experience from 0-25 years and are evenly broken



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Dr. Don Ely (left) and Tess Caudill (right) showing participants how to determine Body Condition Scores.

SRPS participants learning about Nutrition 101(above) and how to examine hay samples (below).

down between goats and sheep. Most have indicated they need help to determine the best focus needed in their operations to help them reach production goals.

The first class in SRPS was designed to help participants better understand what the sheep and goat industries look like not only in Kentucky, but nationally. We also focused on breeds, facilities & equipment, and record keeping. Last but not least, we discussed marketing options based on different intensities of operations- minimally, intermediate and highly intensive management.

The second class was held in conjunction with the 2014 Annual Producer Conference held in Cave City, KY on October 25, 2014. The whole conference was dedicated to nutrition. Workshops were held on body condition scoring, fencing, and nutrition 101. Participants tested their knowledge of feedstuffs and learned how to read hay forage test. That knowledge was then moved into understanding and calculating nutrient requirements at different stages of production. At the end of the day, many people participated in a FAMACHA training as well.

The last class will be held in March 2015 and will help participants combine the knowledge gained from the previous classes and develop a production plan for their specific operations, based on intensity level of production and marketing goals.

SRPS will be offered again in the fall of 2015. Dates and locations will be determined soon. To find out more details on the program, visit www.kysheepandgoat.org/SRPS. Or you can call or email Kelley Yates at 502-682-7780 or kyates@kysheepandgoat.org.

Kelley Yates *serves as the Executive Directory of the Kentucky Sheep and Goat Development Office and the Editor for HoofPrint Magazine.*

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Application Deadline is April 1st for 2015

HOW to APPLY

Applicants must be 20 years of age or older. A group of 26 individuals will be selected. Once accepted, a $200 per person registration fee is required to secure placement. Applications must be received in the NLFA office by e-mail or fax not later than Wednesday, April 1, 2015. Complete an application form found at http://www.nlfa-sheep.org/ For more information, call the NLFA office at 503-364-5462 or e-mail: info@nlfa-sheep.org.

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3. Supported efforts to educate the public about sheep and goat production at the 2013 Kentucky Sheep and Fiber Festival.
4. Supported the printing of the 2014 Kentucky Sheep & Goat Management Calendar.
5. Working to promote sheep and goat production at various industry meetings and events.
6. Compiled a Kentucky Sheep & Goat Breeder Directory on our website at www.kysheepandgoat.org.
7. Supported efforts to promote and market local producers of sheep and goat products throughout the state.

Learn more about the New Farmer Recruitment Program & Special Projects Grant Programs by visiting www.kysheepandgoat.org.

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