Kansas 4-H Sheep Leader Notebook

Level IV

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Advancing by Setting Long-Term Goals
Sheep, Level IV

What Members Will Learn. . .

ABOUT THE PROJECT:
• Setting goals

ABOUT THEMSELVES:
• The importance of setting goals

Materials Needed:
• Sheep Member Guide and Annual Report (MG 37)
• Activity Sheet 1, Preparing Long-Term Goals

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Because of your involvement and achievements in past sheep projects, you will now be helping other project members by sharing the information and knowledge that you’ve gained about sheep.

As a junior leader, you also will be reviewing your own goals.

Your progress throughout Level IV is an important part of this project. Sometimes, setting long-term goals is difficult and, therefore, we don’t do it. But in Level IV, we have made several places for you to look at your progress.

Setting long-term goals does not need to be intense or elaborate. Rather, it should be simple and to the point. If you take time to review your long-term goals, you will have a better chance of reaching those goals.

Goals can be long-term or short-term. When using the Sheep Member Guide and Annual Report for Level IV, let’s make both goals long-term—something you plan to do in two to five years.

Many of the things you have been learning in your sheep projects are skills that are transferable to long term goals, such as obtaining more education, getting a job, winning a scholarship, or even pursuing a career.

Now that you’ve completed the activity sheet, let’s fill out the Sheep Member Guide and Annual Report using these two long-term goals.

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**Leader Notes**

**ACTIVITY**

**DIALOGUE FOR CRITICAL THINKING:**
Share:
1. What were your two goals?

2. What did you like most about this activity?

Process:
3. Why is it important to review your long-term goals?

4. What skills do you have that you can use in other projects, activities or situations?

Generalize:
5. What did you learn about yourself from this activity?

Apply:
6. How will you apply what you’ve learned to other situations?

**GOING FURTHER:**
- Develop a job resume.
- Discuss developing a personal portfolio of your skills with a school counselor.

**REFERENCES:**
**Author:**
Gwen Bailey, Consultant
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
ADVANCING BY SETTING LONG-TERM GOALS
SHEEP, LEVEL IV
Activity Sheet 1, Preparing Long-Term Goals

Long-term goals define your future. Select two of the following long-term goals that you might work on in Level IV.

CHECK TWO (of your choice)

☐ acquire more education       ☐ get a job
☐ win a scholarship           ☐ select a career path
☐ other_________________________  ☐ other_________________________

Now take one of these long-term goals and answer the following questions.

One of my long-term goals is to:
________________________________________________________________________
________________________________________________________________________
I hope to eventually use this long-term goal. I plan to reach this goal by:
________________________________________________________________________
________________________________________________________________________
To reach this long-term goal, I will use my abilities of:
________________________________________________________________________
________________________________________________________________________
To reach this long-term goal, I will need to improve on:
________________________________________________________________________
________________________________________________________________________
When I reach my goal in the future, I will know it’s been met by:
________________________________________________________________________
________________________________________________________________________
ADVANCING BY SETTING LONG-TERM GOALS
History of Sheep in the United States

**Sheep, Level IV**

**What Members Will Learn . . .**

**ABOUT THE PROJECT:**
- Sheep populations by country and state
- Lamb market trends
- Sheep industry organizations

**ABOUT THEMSELVES:**
- Their role in the sheep industry
- The importance of producer participation in an organization

**Materials Needed:**
- Activity Sheet #2, Projecting Future of Sheep Industry
- World map or globe

**ACTIVITY TIME NEEDED:** 30 MINUTES

**ACTIVITY**

The sheep is thought to be one of the first animals domesticated by man, about 12,000 years ago. The first domestic sheep were brought to North America in 1493 on the second voyage of Columbus. These sheep were brought into Southwestern United States by the conquistadors. Later, the colonies brought in sheep of mostly English origin. None of these sheep had very high quality fleeces. When Napoleon defeated Spain in 1809, the prized Merino sheep became available to the rest of the world. Approximately 20,000 of these fine woolled sheep were imported into the United States forming the base of the American wool industry. Through genetic selection, today’s sheep has evolved into one that is more efficient, larger, produces more lambs, yields heavier fleeces and is more muscular than its ancestors.

The rest of this lesson will discuss trends and bits of information to help the member understand how the US sheep industry works. First, let’s see how the US compares to the rest of the world in terms of total sheep numbers. There are over one billion sheep in the world, over seven million of those are in the US (1.5%). China and Australia are the leading sheep producing countries with over 120 million hd. Australia also ranks first in wool production and wool exports. New Zealand, India and countries of the former Soviet Union are in the second tier of countries regarding sheep production numbers. New Zealand ranks second in wool production. Australia and New Zealand account for about 90% of the worlds wool exports. Argentina, Uruguay and South Africa are the next .

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three largest countries in wool production. In addition to wool, the US also imports large numbers of market lambs from Australia and New Zealand.

We know which countries have the most sheep, but which states have the most sheep? Of the seven million US sheep, about 1.35 million are in Texas. California and Wyoming have about 800,000 and 660,000 respectively. Colorado, South Dakota and Montana each have around 400,000 hd. These states are all noted for having range sheep operations. Iowa ranks tenth in sheep numbers at just over 250,000 hd, and is the highest ranking farm flock state. Kansas ranks 15th with about 100,000 sheep. Those same six states (although 2-6 are in a different order) are the top wool producing states. Texas produces 9.2 million pounds of wool annually, Wyoming is second with 5.5 million pounds, down to South Dakota with three million pounds. Kansas produces about .67 million pounds of wool annually. Due to the predominance of fine-wooled, Rambouillet-type sheep, the higher production range states lead in wool value. Colorado has the most feed lot lambs, although Texas, California, Wyoming and South Dakota have large lamb feed lots as well.

In a previous lesson on economics, we talked about supply and demand and how they affected lamb prices. Due to the seasonal nature of sheep reproduction in the US, supply, demand and price follow the same basic trends year after year. The largest sheep processing numbers occur in March because demand and price are high, and September because supply is highest. Lamb prices are highest from March to May because demand is high and supply is low. Prices are lowest in September because supply is high and demand is low. Supply is highest in the fall because the seasonal nature of sheep reproduction dictates that lambs be born in the spring. In some areas, producers are trying to take advantage of the price trends by lambing out of season. States with strong fall lambing programs include: California, Texas, Arizona, Kansas and Oklahoma.

The average US sheep producer owns fewer than one hundred ewes. The sheep industry in the US is relatively small compared to other livestock species, and this creates some problems. A small industry means few research dollars for the development and approval of new medicines, few dollars for legislative lobbying and few slaughter plants which equates to less competition and lower prices for the producer. High transportation costs keep retail prices high even when producers receive less. Lambs are produced in the Western US, fed and processed in Colorado, California, Texas and Iowa, and shipped to the coasts for consumption. Another problem facing the sheep industry is that the average per capita consumption of lamb ( <2 lbs) is far less than that of beef, pork or chicken.

National and state organizations help producers deal with problems facing the sheep industry. American Sheep Industry (ASI) is an organization that benefits the sheep industry in three areas: promotion, education and lobbying. The financial obligations of ASI are covered by dues received.
from state affiliate organizations. ASI is made up of a lamb and wool council which is mostly concerned with promotion, a legislative council for lobbying, and a producer services council which provides educational materials such as the Sheep Industry Development (SID) Sheep Production Handbooks. Other organizations that serve the sheep industry include the National Lamb Feeders Association and two major state organizations in Kansas, the Kansas Sheep Association and the Kansas Sheep Council. In addition, the various breeds have national associations for registered animals.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. Where did most American sheep come from?
2. Where did your particular breed of sheep originate?

**Process:**
3. What are the leading sheep producing countries? States? Why?
4. What determines the lamb market trends in the U.S.?

**Generalize:**
5. Why does the sheep industry seem to be on the decline in the U.S.?
6. What is the significance of sheep organizations?

**Apply:**
7. What do you think will need to happen to increase the viability of the sheep industry in the future?

**GOING FURTHER:**
1. Study some aspect of the sheep industry and present it to several groups.
2. Develop some type of sheep promotional.

**REFERENCES:**
SID Sheep Production Handbook

**Author:**
Jeremey Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
1. In 1994, Congress voted to phase out the wool incentive program. During this time period, NAFTA was approved. These issues had a major impact on the sheep industry. What are some major issues concerning the sheep industry today?

2. Inflation leads to increased costs of production. Feed, veterinary, labor and other costs continue to rise, while prices for wool and lamb remains similar to many years ago. Since this is the case, how can sheep producers continue to be successful in the future?

3. How are sheep today different from sheep 20 years ago? How do you expect they will change in the next 20 years?
Advanced Sheep Judging and Reasons
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• Sheep carcass traits in oral reasons
• Sheep production traits in oral reasons

ABOUT THEMSELVES:
• How to improve communication skills to defend decisions

Materials Needed:
• Livestock oral reasons notebook or pad
• Livestock judging guide for 4-H members, S-92

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

In an earlier lesson, we discussed preparing oral reasons for a class of lambs. When you are first learning to give reasons, you need to develop a structure that allows you to present your reasons in an organized, easily understandable manner. The important thing for young judgers is to spot differences between animals.

With practice, this becomes relatively easy. Once a livestock judge has mastered this, he/she begins to look for ways to further impress the reason’s taker and receive higher scores. In addition to accuracy, honesty and completeness when describing the class, the judge that can relate the qualities of a lamb to its production advantages will receive the highest scores.

Let’s start with market lambs. The purpose of the market lamb is to be processed for food. Therefore we judge lambs on what we believe their carcasses would be like. We give advantages for muscle and discredit excess fat. In your reasons, relate the live animal to its carcass. For example, a thick topped, long bodied lamb should go to the rail yielding a larger portion of rack and loin. An extremely lean lamb may hang up a trimmer carcass with a higher percentage of lean edible product. A small, light muscled, light conditioned lamb might need to spend more time on feed to reach a packer-acceptable weight and finish.

Depending on the breed and type of operation, there are several ways to relate breeding sheep to production. Most breeding classes will be ewe
Review desirable traits for breeding ewes from previous level lessons.

Go over several structural traits and discuss how they affect production.

Set up a judging workout for members to practice what they’ve learned in this lesson.

ACTIVITY

lambs or yearling ewes, so we’ll discuss them first. Think back to the desirable traits we look for in ewes. One important quality is frame size (height and length). Bigger framed ewes tend to produce larger lambs. Structural correctness is also very important. A ewe that is fine boned and incorrect (weak topped, crooked legs etc.) may not be rugged enough to stand up to the rigors of lambing or surviving on the range. On the other hand, a heavy boned, structurally sound ewe would have an advantage in terms of longevity and total lifetime productivity. Ewes with an unsound mouth or feet may have difficulty in a range type operation. Internal volume or capacity is also important. A ewe that is wider over her top, has more spring of rib and is deeper sided has more room inside to take in feed to support herself and her lambs. There is also more room for the developing fetus during gestation. Narrow made, shallow ewes are often less efficient and less productive than bold, broody ewes. Sheep that are narrow or pinched through the chest have less room for their heart and lungs, which may reduce life expectancy. Ewes that are narrow through the hip or pelvis region may have difficulty lambing. Long bodied, muscular ewes tend to produce longer sided, heavier muscled market lambs. In some cases, you may notice abnormalities in the external reproductive organs which may impair the reproducing ability (and value) of the breeding ewe. In many judging contests, judgers will be instructed to consider the mouths and feet of the sheep to be sound. If you notice any of the sheep have problems in these areas it should be mentioned in your reasons even though it won’t affect your placing.

Fleece traits are highly heritable. When judging wool breeds, you need to discuss differences in fleece quality. Using and keeping replacements out of a poor fleeced ram can reduce yearly income generated by wool sales.

When judging rams, we are looking for many of the same qualities as we did with ewes. Structurally sound rams have a longevity advantage and can cover more ground in the breeding pasture. Big framed, big bodied, heavy muscular rams should sire those fast gaining, thick muscled market lambs desired by the lamb feeder and packer. High volume rams should sire broody, productive females. Scrotal circumference is highly related to semen output. Rams with small scrotums may have difficulty settling a large number of ewes. Rams with large heads and big, bulky shoulders could cause lambing difficulty, especially for young ewes.

In some judging contests you may receive additional information about the classes, such as performance information (weights, ages, gains, etc.) or a scenario in which the lambs will be used. Carefully read this information and use it as a tool for placing the class. Do not forget to use your skills for visual evaluation as well. Many judgers make the mistake of going totally by the information on paper and ignoring what is in the ring. Others do the opposite. Be sure to evaluate the sheep both on paper and on the hoof, and utilize both in your reasons.
DIALOGUE FOR CRITICAL THINKING:

Share:
1. How did you incorporate carcass and production terms in oral reasons?
2. Which terms were most difficult? Easiest? Why?

Process:
3. Why is it important to relate carcass and production to live animals?
4. What are some breeding sheep traits that should be avoided due to production problems?

Generalize:
5. How does this expansion of terms for oral reasons enhance your presentation?
6. How will this process help you analyze and defend other decisions?

Apply:
7. How will oral reason speaking skills help you in the future?

GOING FURTHER:
1. Participate in Sheep Judging Contests
2. Participate in State Livestock Judging Contest

REFERENCES:

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
Breed Associations
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• How to fill out an application for registration
• Importance of pedigrees
• Importance of accurate information

ABOUT THEMSELVES:
• Importance of forms of identification
• Impact of computers on identification methods

Materials Needed:
• Sample registration papers from breed associations (Addresses are attached)
• Pencils
• Chalkboard or flip chart
• Member Handout #1, Breed Associations
• Activity Sheet #3, Breed Information Worksheet

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

If your lamb is a purebred (both its parents are from the same breed) it may be eligible for registration with the national breed association. This has some advantages as breed associations can provide you with pedigree information on all registered sheep. This can be helpful if you’ve identified certain blood lines you’d like to add or keep out of your flock. Also, many shows and sales require you to have registration papers for your sheep.

There are some requirements that must be met before you can register your lamb. First, both sire and dam must be registered. Breed associations require other information such as birth date, lamb ID, sex of lamb, and rearing type (single, twin, triplet). Many associations have places to mark if the lamb was born through artificial insemination or embryo transfer. They may also provide a space for permanent ID (tattoo).

Some breed associations will also keep track of performance records (such as weight gains) for you. Be sure that the information you send to the breed association is correct. It does no good to lie about your animals when the goal is genetic improvement of the flock. After you fill out the

Leader Notes
Ask members to list registration requirements on chalkboard. List additional requirements they forgot.

Pass out sample registration application forms.
**Leader Notes**

Look at your lamb’s registration papers. How many generations were listed? Compare different breeds if possible.

Have members select a breed from Member Handout #1, “Breed Associations.” Write to a Breed Association for information and report at the next meeting about their breed. Use Breed Information Activity Sheet to collect basic information.

**ACTIVITY**

application form and send in the required payment, your breed association will send you a registration certificate with your lamb’s pedigree information and registration number on it.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. What information do you need to register a sheep?

**Process:**
2. What are the advantages of registering sheep? Disadvantages?

**Generalize:**
3. What other times must you register something?
4. What other forms of identification do you use? Why?

**Apply:**
5. How will your use of identification methods be different in the future? Why?
6. What is the significance of computer applications in registering purebred sheep?

**GOING FURTHER:**
1. Visit a breed association headquarters.
2. Invite a breed association fieldman to speak to the group.

**REFERENCES:**
Kansas 4-H Beef Curriculum  
SID Sheep Production Handbook

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University  
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team

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# BREED ASSOCIATIONS

## SHEEP, LEVEL IV

**Member Handout #1, Breed Associations**

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<tr>
<th>Breed</th>
<th>Organization</th>
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<tr>
<td>American Cormo</td>
<td>American Cormo Association</td>
<td>RT 59 Broadus, MT 59317</td>
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<tr>
<td>Black Welsh Mountain</td>
<td>Black Welsh Mountain Sheep Registry</td>
<td>13469 S. Trueblood Place Terre Haute, IN 47802</td>
</tr>
<tr>
<td>Border Leicester</td>
<td>American Border Leicester Association</td>
<td>Rt. 1, Box 429 A Amenia, NY 12501</td>
</tr>
<tr>
<td></td>
<td>North American Border Leicester</td>
<td>1699 H H Hwy Willow Springs, MO 65793-92204</td>
</tr>
<tr>
<td>California Reds</td>
<td>California Reds Sheep Registry/Altomare Wool</td>
<td>1850 E. Reilly Road Merced, CA 95340-8958</td>
</tr>
<tr>
<td>California Variegated</td>
<td>California Variegated Mutant Registry</td>
<td>31439 W, Commercial Box 630 Carnation, WA 98014</td>
</tr>
<tr>
<td>Cheviot</td>
<td>American North Cheviot Sheep Association</td>
<td>8708 S. Cty Road 500 W Reelsville, IN 46171</td>
</tr>
<tr>
<td></td>
<td>American Cheviot Sheep Society</td>
<td>Rt. 1, Box 100 Clarks Hill, IN 47930-0981</td>
</tr>
<tr>
<td>Clun Forest</td>
<td>North American Clun Forest Association</td>
<td>RT 1, Box 4173 Houston, MN 55943-9801</td>
</tr>
<tr>
<td>Columbia</td>
<td>Columbia Sheep Breeders</td>
<td>PO Box 272 Upper Sandusky, OH 43351</td>
</tr>
<tr>
<td>Coopworth</td>
<td>Coopworth Sheep Society of North America</td>
<td>25101 Chris Lane NE Kingston, WA 98346</td>
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<td>BREED ASSOCIATIONS</td>
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</tr>
</tbody>
</table>
| Corrieldale       | American Corriedale Association  
|                   | PO Box 391                       
|                   | Clay City, IL 62824             |
| Cotswold          | Cotswold Breeders Association   
|                   | 21092 478th Avenue              
|                   | Bushnell, SD 57276-6504         |
|                   | Black Cotswold Society          
|                   | PO Box 542                      
|                   | Goffstown, NH 03045             |
|                   | American Cotswold Record Association  
|                   | 18 Elm Street, Box 59           
|                   | Plympton, MA 02367-0059         |
| Debouillet        | Debouillet Sheep Breeders Association  
|                   | PO Box 67                       
|                   | Picacho, NM 88343               |
| Delaine-Merino    | American & Delaine Merino Record Association  
|                   | 1026 County Road 1175           
|                   | Ashland, OH 44805-9523          |
| Dorper            | North American Dorper Sheep Association  
|                   | 4105 W. Jefferson Blvd.         
|                   | Los Angeles, CA 90016           |
|                   | American Dorper Sheep Breeders Society  
|                   | 18202 120th Street              
|                   | Westgate, IA 50681              |
| Dorset            | Continental Dorset Club         
|                   | 8345 Eldora Road, PO Box 506    
|                   | Hudson, IA 50643-0506           |
| Finnsheep         | National Finnsheep Breeders Association  
|                   | PO Box 260                      
|                   | Dousman, WI 53118               |
| Gulf Coast Native | Gulf Coast Sheep Breeders Association  
|                   | Rt 2                            
|                   | Snyder, OK 73566                |
| Hampshire         | American Hampshire Sheep Association  
|                   | 1557 173rd Avenue               
|                   | Milo, IA 50166-9667             |
| Icelandic         | Icelandic Sheep Society of North America  
|                   | HC40 Broadus Stage              
|                   | Miles City, MT 59301            |

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<table>
<thead>
<tr>
<th>Breed</th>
<th>Association</th>
<th>Address 1</th>
<th>City, State Zip Code</th>
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<tbody>
<tr>
<td>Jacob</td>
<td>Jacob Sheep Breeders Association</td>
<td>6350 ECR 56</td>
<td>Fort Collins, CO 80524</td>
</tr>
<tr>
<td>Karakul</td>
<td>American Karakul Sheep Registry</td>
<td>3026 Thomas Road</td>
<td>Rice, WA 99167</td>
</tr>
<tr>
<td>Katahdin</td>
<td>Katahdin Hair Sheep International</td>
<td>PO Box 115</td>
<td>Fairview, KS 66425</td>
</tr>
<tr>
<td>Lincoln</td>
<td>National Lincoln Sheep Breeders Association</td>
<td>1557 173rd Avenue</td>
<td>Milo, IA 50166</td>
</tr>
<tr>
<td>Montadale</td>
<td>Montadale Sheep Breeders Association</td>
<td>PO Box 603</td>
<td>Plainfield, IN 46168</td>
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<tr>
<td>Navajo-Churro</td>
<td>Navajo Churro Sheep Association</td>
<td>Box 94</td>
<td>Ojo Caliente, NM 87549-0094</td>
</tr>
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<td>Oxford</td>
<td>American Oxford Sheep Association</td>
<td>1960 E 2100 N</td>
<td>Stonington, IL 62567-5338</td>
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<tr>
<td>Perendale</td>
<td>Perendale Breeders Association</td>
<td>18811 New Hampshire Avenue</td>
<td>Ashton, MD 20861</td>
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<td>Polypay</td>
<td>American Polypay Sheep Association</td>
<td>609 S Central Ste. 9</td>
<td>Sidney, MT 59270</td>
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<tr>
<td>Rambouillet</td>
<td>American Rambouillet Breeders Association</td>
<td>2709 Sherwood Way</td>
<td>San Angelo, TX 76901</td>
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<td>Romney</td>
<td>American Romney Breeders Association</td>
<td>PO Box 247</td>
<td>Corvallis, OR 97339</td>
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<td>Shetland</td>
<td>North American Shetland Sheep Breeders</td>
<td>265 Truway Road</td>
<td>Luxemburg, WI 54217-9559</td>
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<tr>
<th>Breed</th>
<th>Association Name</th>
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<th>City, State, Zip</th>
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<tr>
<td>Shropshire</td>
<td>American Shropshire Registered Association</td>
<td>PO Box 635</td>
<td>Harvard, IL 60033-0635</td>
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<tr>
<td>Southdown</td>
<td>American Southdown Breeders Association</td>
<td>1125 Danielson Pike</td>
<td>North Scituate, RI 02857</td>
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<tr>
<td>St. Croix</td>
<td>St. Croix Sheep Breeders Association</td>
<td>Utah State U, UMC 4815</td>
<td>Logan, UT 84322-4815</td>
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<td></td>
<td>Northwest St. Croix Association</td>
<td>16140 NW Gillihan Road</td>
<td>Portland, OR 97231</td>
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<tr>
<td>Suffolk</td>
<td>National Suffolk Sheep Association</td>
<td>3316 Ponderosa Street</td>
<td>Columbia, MO 65201-7605</td>
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<td></td>
<td>American Suffolk Sheep Association</td>
<td>17 W. Main, PO Box 256</td>
<td>Newton, UT 84327</td>
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<tr>
<td>Targhee</td>
<td>United States Targhee Sheep Association</td>
<td>PO Box 462</td>
<td>Jordon, MT 59337-0462</td>
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<td>Texel</td>
<td>North American Texel Sheep Association</td>
<td>Rt. 1, Box 927, 740 Lower Myrick Road</td>
<td>Laurel, MS 39440</td>
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<td>American Texel Sheep Association</td>
<td>2290 W. South Loop, PO Box 1648</td>
<td>Stephenville, TX 76401</td>
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<tr>
<td>Tunis</td>
<td>National Tunis Sheep Registry</td>
<td>RR 1, Box 192</td>
<td>Gouverneur, NY 13642</td>
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BREED ASSOCIATIONS
SHEEP, LEVEL IV
Activity Sheet #3, Breed Information Worksheet

Directions: Using the breed that was assigned to you, write a letter to the breed association to record the following information.

1. Attach the letter that you wrote to the breed association to the back of this worksheet.

2. What breed did you research? _______________________________________________

3. Where did the breed originate? ____________________________________________

4. Was it developed for a specific purpose? Explain. ____________________________
   _______________________________________________________________________
   _______________________________________________________________________

5. What country was it developed in? _________________________________________

6. How many are in the United States today? __________

7. What does your breed look like? (Briefly describe or attach a picture.) ___________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

8. How does your breed perform in the following traits:

   Level of performance (high, medium, or low)

   Number of lambs ___________________
   Mature size ______________________
   Quality of wool ___________________
   Growth rate ______________________
   Meat production ___________________

9. What do people use this breed for in the United States? _______________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

   21–Sheep, Level IV
Plant Identification

Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
- Plants that may be toxic to sheep
- To identify poisonous plants

ABOUT THEMSELVES:
- The importance of prevention

Materials Needed:
- Copies of page Health 57/58 of SID Handbook (or other range plant book)
- Specimens of toxic plants for members to ID (Approximately 10)
- Flip chart and markers
- Activity Sheet #4, Poison Plant Indentification

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Plant poisoning of sheep can be a significant economic problem for many producers. Eight to ten percent of annual sheep losses are due to poisonous plants. This estimate may be conservative as it is difficult to quantify the effects plant poisoning has on weight gains, abortion, and reproductive failure. Most plant poisoning occurs as the result of other environmental factors. Conditions of drought or frost may increase levels of toxic substances produced by some plants. If a rangeland is overgrazed, sheep may be forced to eat plants they would otherwise pass up.

It is advantageous for sheep producers to recognize range plants that are potentially toxic, and understand the management practices that will reduce the occurrence of plant poisoning. All too frequently, unintentional mismanagement causes severe losses.

The symptoms of plant poisoning are quite varied and often mimic those of common infectious diseases. Frequently, the first and only sign of poisoning is sudden death in sheep. However, not all plant poisonings have this outcome.

Let’s discuss the more common plants that are potentially poisonous to sheep. Several plants, under certain growing conditions (drought, frost) can cause cyanide poisoning which leads to death by asphyxiation. Plants
List potentially dangerous plants due to nitrates. Discuss conditions that may cause the problem.

Virtually all plants are capable of accumulating toxic levels of nitrate (NO₃) when growing in moist, richly organic soils, or when heavily fertilized. The nitrate is converted to nitrite (NO₂) by microorganisms in the rumen. Nitrite interferes with oxygen transport by the blood resulting in death by asphyxiation. Most fertilized crops as well as the following weeds are capable of accumulating toxic levels of nitrate: Russian thistle, kochia, pigweed, lamb’s quarter, sunflower, nightshades and johnson grass. All of these can be found in Kansas.

List plants by the type of toxin they produce.

Other plants can also cause sudden death in sheep. Death camas are similar to wild onions and have succulent leaves which attract sheep. Toxic alkaloids cause respiratory difficulty which leads to death. Water hemlock and spotted hemlock also contain alkaloids which act rapidly on the nervous system and are generally fatal if eaten. Water hemlock tends to grow in marshy areas. Milkweeds are found throughout North America in a variety of habitats. They contain cardenolides which have a toxic effect on the heart. Halogeton is a round, bushy plant with succulent leaves found in arid, mountain regions. It is a useful forage if sheep are adapted to eating it. However, it can cause severe death loss if sheep consume large quantities for the first time. The principle toxic components of halogeton are oxalates. Oxalates combine with calcium. When in sufficient quantity, calcium oxalates cause kidney failure. Other plants which contain oxalates include: greasewood, curly leaf dock, oxalis (shamrock), rhubarb, pigweed and beet tops. Greasewood can be found in Southwestern Kansas.

Some plants, when consumed by livestock, cause a severe skin reaction known as photosensitization. Symptoms are similar to a severe sunburn. It also causes liver disease as the liver can not excrete phyloerythrin, a metabolite of chlorophyll. Plants causing photosensitization include: rape, buckwheat, St. johnswort, spring parsley and bishop’s weed. St. johnswort is found in Eastern Kansas. If the sheep are prevented from eating these plants, they will recover fully from the effects. Another treatment is to keep the sheep out of the sunlight, which causes the reaction. Other plants, if consumed in large quantities, cause liver disease which leads to secondary photosensitization. They include: horsebrush, agave, sacahuiste, lantana and kochia.

List plants producing toxins that affect the nervous system.

Toxins in several plants attack the nervous system of sheep. Many species of lupine (blue bonnet) are poisonous to livestock. The toxin seems to concentrate in the seeds. Symptoms include muscle tremors, nervous excitement, frothing at the mouth and even death in severe cases. Several species of locoweed also cause livestock losses. Sheep may develop bizarre, erratic behavior and may die after prolonged grazing.
## ACTIVITY

become addicted to eating locoweed. Snakeroad, goldenrod, fitweed and paper flowers may also affect the sheep’s nervous system. Goldenrod as well as some species of lupine and locoweed can be found in Kansas.

Some species of locoweed, skunk cabbage and broomweed may cause abortions or fetal deformities in pregnant ewes. Broomweeds can also be found in Kansas. Birdsfoot trefoil contains high levels of estrogen, which may prevent ewes from cycling. The presence of birdsfoot trefoil in your breeding pasture could result in very low conception rates. Birdsfoot trefoil can be found in parts of Kansas. Other plants, such as rape and any of the legumes, could also contain high levels of estrogen.

Plants such as orange sneezeweed, bitterweed and rubberweed affect the digestive system. Symptoms include vomiting and a frothy, green saliva. Bitterweed can be found in parts of Kansas. Many plants belonging to the nightshade family are potentially dangerous to livestock. More common members include black nightshade, deadly nightshade, horse nettle, jimson weed and black henbane.

Since treatment of sheep with plant poisoning is rarely practical or successful, prevention is of primary importance. Local extension agents and plant literature may be helpful in identifying poisonous plants. Many livestock losses can be prevented by adhering to the following practices and principles:

- Learn to ID poisonous plants on your range.
- Inspect all range land for poisonous plants prior to grazing and be sure sufficient desirable forage is available.
- Do not allow hungry or thirsty animals to graze areas infested by poisonous plants, especially in early spring or late summer.
- Supplement animals throughout the year with salt and phosphorus.
- Graze areas with poisonous plants when plants are least toxic.
- Do not allow sheep to go more than two days without water.
- Use herbicides selectively, in small areas to control toxic plants.
- Plowing, digging or mowing prior to seed maturity can help control poisonous plants.

### DIALOGUE FOR CRITICAL THINKING:

**Share:**

1. What plant was most difficult to identify? Why?

2. Which plant is most common in your area? Least common?

**Process:**

3. What are the factors that cause plant poisonings?

4. What are some ways to prevent plant poisonings?

**Generalize:**

5. Why is prevention often the best treatment?
Leader Notes

ACTIVITY

6. What are other areas in your life where prevention is important? Why?

Apply:
7. How and when can you use prevention training in the future?

GOING FURTHER:
1. Ask county noxious weed director to visit your group.
2. Participate in pasture and range judging schools and contests.

REFERENCES:
SID Sheep Production Handbook

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
Identify the following potentially poisonous plants and tell how it affects sheep.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Effect on sheep</th>
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<tbody>
<tr>
<td>1.</td>
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</table>
Range Forage For the Ewe Flock
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
- Types of range plants
- Rangeland factors affecting sheep production
- Types of pastures

ABOUT THEMSELVES:
- How to use cost per use to make purchasing decisions

Materials Needed:
- Activity Sheet #5, Range Plants and Stocking Rates”
- Leader Key, Activity Sheet #5, Range Plants and Stocking Rates
- Plant samples of desirable Kansas range plants
- Flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Many ranchers view livestock as the product raised on rangeland. When in fact, the product is forage (plants) and the livestock merely harvest this crop and convert it to a product useable by humans. It requires a considerable amount of knowledge and experience to produce a good forage crop and harvest it (by livestock) without damaging the range land. The successful production of sheep from a range resource requires a knowledge of both sheep and the plant species found on your range.

The Earth’s total land surface area is composed of about 45% rangeland. About twenty million acres (30%) of Kansas land are classified as rangeland. Rangeland has natural vegetation consisting of grasses, forbes and woody plants. The kind of vegetation present (quality and quantity) will have an impact on your flock. Rangelands are not generally adapted to cultivation and are covered with native grasses and plants best suited for grazing livestock.

There are about 5,000 different plant species growing in Kansas. Grasses have hollow, jointed stems and narrow, flat leaves that grow in two rows along the stem. Leaf veins are parallel. Forbs are broad leaved plants generally referred to as weeds. Forbs have a solid stem and many have colorful flowers. Leaf veins are generally of the net type, but parallel are possible. Woody plants are those with woody stems. They are commonly

Leader Notes

Use local Natural Resource Conservation Service (NRCS) supervisor as a resource for this lesson. Take a field trip to a pasture to find and identify common range plants. If field trip not possible, have members collect samples and bring to meeting.

List or show the differences between grasses, forbes and woody plants. Ask members for characteristics of each before telling.
**Leader Notes**

called browse or brush. Producers should become familiar with the different plant species because each has a unique nutritional value and may require special management procedures.

Unlike cattle, which prefer grasses, sheep tend to select broad leaf plants, but will also graze grasses and browse. Sheep are selective grazers and will eat their favorite plants first. It is your job as a sheep producer and range manager to see that plant growth and grazing are kept in balance.

Specific problems existing on Kansas rangeland which hinder sheep production include: (1) invasion of noxious plants, (2) lack of flexibility in stocking rates to maintain proper forage use, (3) loss of desirable forage species, (4) water loss and (5) soil loss. To improve rangeland we must control undesirable species, such as poisonous plants. The most important factor is stocking rate (number of sheep per acre per unit of time). If we over stock a pasture, there may be permanent damage to the land and its plants. If we under stock, we are not getting efficient utilization of the available forage. The correct stocking rate depends on the plant species involved as well as year to year changes in environment (rainfall etc.).

A sheep producer’s goal should include meeting the ewe’s nutritional needs at the lowest possible cost. During much of the year, and most stages of production ewes can meet all their nutritional requirements by grazing range or pasture.

Let’s look at three types of pastures and the common Kansas range plants found on them. The first pasture type is permanent, where basically the same plants are found year after year. During the warm season (to Dec.) brome grass and tall fescue are common.

Some pastures are temporary. Plant species include alfalfa, sorghum/sudan hybrids or hybrid pearl millet, wheat, oats, barley, turnips and crop residues, such as straws or corn stalks. Take caution when grazing sorghum/sudan grass as you may run into a problem with prussic acid poisoning.

Other pastures have a mixture of permanent grasses and temporary legumes such as alfalfa, birdsfoot trefoil, red clover or crown vetch. The advantages of mixing grasses with legumes include: (1) seasonal distribution of forage, (2) increased gains from equal forage production, (3) the legumes add nitrogen to the soil and (4) a better mixture of vitamins and minerals for the ewe’s diet.

There are some general rules to keep in mind about grazing sheep. Intake is inversely related to plant maturity. As plants mature, they become less digestible. The stems are less digestible than the leaves. Protein is highest during the plant’s early growth stage. The protein level in grasses drops faster than it does in forbes. As far as sheep are concerned, the nutritional value of a plant’s fall regrowth is nearly as good as early spring plant growth.

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**ACTIVITY**

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<th>Leader Notes</th>
<th>ACTIVITY</th>
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*30–Sheep, Level IV*
ACTIVITY

Most producers have a system for grazing their pastures. Rotational grazing (moving from one pasture to another) allows you to increase stocking rates; however, it also increases fencing and labor costs. Continuous grazing (sheep on one pasture the entire grazing season) has less costs but may increase parasite problems, reduce stocking rates and lead to poor grazing distribution. Deferred grazing is where one pasture is allowed to rest so plants can regrow for later grazing.

DIALOGUE FOR CRITICAL THINKING:

Share:
1. How many common range plants do you know?

PROCESS:
2. How valuable are grazing days or animal unit months when figuring stocking rate?
3. What is the significance of the length of grazing seasons?

Generalize:
4. What other resources do you plan for expected use? Why?
5. What is the value of cost per use of an item?

Apply:
6. How will you use this information to make future decisions?

GOING FURTHER:
- Participate in range and pasture judging contest.

REFERENCES:
Kansas 4-H Beef Leader Notebook (LN-1), 2nd ed.
SID Sheep Production Handbook

Author:
Jeremey Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs,
Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry,
Kansas State University
(If available) identify these common Kansas range plants

1. _______________________________ 6. _______________________________
2. _______________________________ 7. _______________________________
3. _______________________________ 8. _______________________________
4. _______________________________ 9. _______________________________
5. _______________________________ 10. _______________________________

When determining stocking rates, cattlemen often use AUMs (animal unit months). One animal unit is equal to a cow/calf pair or five ewes with lambs. Sheep producers prefer to calculate stocking rates based on grazing days per acre. It would be helpful if you could convert one to the other. To get grazing days per acre, simply multiply AUMs by 30 (30 days in a month), then multiply by five (5 ewes per AUM).

Let’s say you had a 30 acre pasture consisting mainly of buffalo grass. For sheep, buffalo grass might provide 300 grazing days per acre.

• how many total grazing days does this pasture provide?_____________
• how many animal unit months per acre for the pasture?_____________
• if you had 90 ewes, how long could they graze the pasture? ____________
• if your grazing season was 5 months long, how many ewes could you keep on the pasture? ____________

**Hints for calculation**

If your pasture provides 500 grazing days per acre, you could graze 500 ewes per acre for one day, 50 ewes per acre for ten days, 5 ewes per acre for 100 days, etc.

Here are the average grazing days per acre provided by common Kansas range plants with adequate moisture:

bluestem = 500 to 800 gd/acre  buffalo grass = 200 to 400 gd/acre
brome grass = 800 to 1000 gd/acre  alfalfa = 1500 to 3000 gd/acre
sorghum/sudan = 900 to 1300 gd/acre  pearl millet = 800 to 1200 gd/acre
crop residues = 100 to 300 gd/acre  turnips = zero to 3000 gd/acre*

*very moisture sensitive

Pick another plant species and re-do the above problem
(If available) identify these common Kansas range plants

1. _______________________________ 6. _________________________________
2. _______________________________ 7. _________________________________
3. _______________________________ 8. _________________________________
4. _______________________________ 9. _________________________________
5. _______________________________ 10. ________________________________

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Let’s say you had a 30 acre pasture consisting mainly of buffalo grass. For sheep, buffalo grass might provide 300 grazing days per acre.

- how many total grazing days does this pasture provide? 9,000 (30 \times 300)
- how many animal unit months per acre for the pasture? 2 (300 / 5 / 30)
- if you had 90 ewes, how long could they graze the pasture? 100 days (9,000 / 90)
- if your grazing season was 5 months long, how many ewes could you keep on the pasture? 60 (9,000 / 150)

**Hints for calculation**

If your pasture provides 500 grazing days per acre, you could graze 500 ewes per acre for one day, 50 ewes per acre for ten days, 5 ewes per acre for 100 days, etc.

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- turnips = zero to 3000 gd/acre *

* very moisture sensitive

Pick another plant species and re-do the above problem
RANGE FORAGE FOR THE EWE FLOCK
Advanced Financial Records
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• The importance of keeping records of income and expenses
• The difference between fixed and variable costs
• The definition of profitability

ABOUT THEMSELVES:
• Importance of records
• Value of budgets
• Importance of being organized

Materials Needed:
• KSU Farm Management Guide, MF-421, Revised October 1997
  Farm Ewe Flocks, Once-a Year Lambing
• Flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

The bottom line for almost all sheep operations is profit or loss. The successful sheep operator has a good handle on the income and expenses of his/her operation. In this lesson, we’ll organize and categorize income and expenses; learn how to calculate several factors involved in profitability and discuss the manner in which various things affect the bottom line of the sheep operation.

First, let’s look at income. The majority of income for sheep producers generally comes from the sale of market lambs and/or wool. Some income is also generated from the sale of cull ewes and rams. Some operators sell breeding stock or feeder lambs. A limited amount of income may also come from fair premiums or various other sources. When completing your yearly flock budget, be sure to include all sheep related income.

The amount of income in any of these areas depends greatly on the current market prices as well as the overall quality of your sheep or wool. However, some other factors may be indirectly involved. Lamb crop percentage can be very important. More lambs born per ewe generally means more lambs for sale which should increase your total income per ewe. Death loss of rams, ewes and lambs reduces the number available for sale and may increase expenses if the breeder must purchase breeding

Leader Notes

Give each member the first page of MF-421 as a reference for this lesson.

List income sources as members give them to you.

List factors affecting income.

35–Sheep, Level IV
stock to maintain his flock size. Health problems will increase veterinary expenses. If a producer is operating at a loss or even a small profit, he/she should consider changes in management and health practices that might increase lambing rate or decrease death loss.

For most operations, income is generated in only a few areas, so it is relatively easy to keep track of. Expenses, on the other hand, are incurred in a wide variety of ways. Expenses are divided into two groups, fixed costs and variable costs.

Fixed costs are those that remain fairly constant from year to year, such as breeding stock depreciation, real estate taxes and interest and depreciation on machinery. While some operations produce their own replacement breeding stock, others must purchase some or all breeding rams and ewes. Although the value of breeding stock varies greatly, each producer has a general price range they tend to stick too. These expenses can be included in fixed costs. Breeding stock depreciation is calculated as follows: Average replacement cost minus average salvage value divided by five (breeding sheep are considered to have an average productive life span of 5 years). Real estate taxes only on the acres utilized by the sheep flock should be included on the flock budget. Interest and depreciation on machinery is more difficult to calculate, especially when machinery is used for other farm enterprises as well. Many sheep operations purchase breeding rams and put this expense under fixed costs. The ram should have a useful life of three to four years.

Several items are included under variable costs. Pasture costs vary depending on the going rate for pasture rent and the length of the grazing season. Even if you own your own pasture, you should figure an opportunity cost. If your sheep weren’t grazing the land, you could be renting it to some one else. It is a cost even if you aren’t paying for it. Feed costs are generally the single largest expense in most sheep operations. It varies with grain and hay prices from year to year. All grain, hay, milk replacer, salt and minerals should be included. Because of the wide variety of feed stuffs available, a producer can reduce cost by balancing his/her own rations using less expensive ingredients. It is essential for the producer to have knowledge in sheep nutrition to make sure all rations are meeting the needs of the sheep for optimum performance.

Other variable costs include veterinary/medical expenses, shearing, tagging or ID, bedding (straw) and utilities such as electricity. The cost of electricity (heat lamps) as well as the building and maintenance of barns or sheds depends greatly on the climate. There are transportation costs to market or to and from shows and sales. There are several supplies such as heat lamps or syringes which need to be included in miscellaneous expenses. They generally range from one to three dollars per ewe. Income taxes as well as interest on borrowed capital need to be included in the budget. There is a labor and supply cost for building and repair of equipment, facilities and fences. If any labor is hired, that should be included.
ACTIVITY

Also, many producers figure an opportunity cost for their own labor. This is not necessary, but it may give you a clearer picture of whether or not your sheep operation is more profitable than working at some other job. If you do figure an opportunity cost for your own labor, use a dollar amount at least equal to minimum wage. Depending on the type of operation, you may also have expenses for such things as organization dues, registration fees, entry fees or advertising costs. When completing the flock budget, be sure to include all sheep related expenses. It is easy to forget some costs, so it is best to record all income and expenses as they happen rather than wait until the end of the year to try to figure them out. If your sheep operation is not as profitable as you think it should be, analyze the variable costs portion of your expense sheet. It may provide clues to where expenses can be cut without reducing income.

Once all income and expenses have been recorded and totaled, we can calculate profitability. This can be done using total values or on a per ewe basis (total divided by number of breeding ewes in the flock). Total income minus variable costs equals gross profit (or loss). Gross profit minus fixed costs equals bottom line position (net profit or loss).

The successful sheep producer always keeps a good set of financial records. Many producers utilize a budget which contains estimates for income and expenses for the upcoming year. If your sheep enterprise operates at a loss, you are out that money. However, if you estimate a budget in advance, it may help you make changes in management or sell the sheep to avoid the loss. If you decide to estimate a budget, remember that it has to be as realistic as possible. If the budget is not very accurate, it won’t help you. Realize that many variables affect the profitability of the sheep operation. Feedstuff costs, changes in lambing rate, price of market lambs, management style and any number of other factors can change the profitability outlook.

The experienced member should be able to keep an accurate and complete set of financial records for their sheep project. At the end of the year, bring your income/expense sheet with your bottom line position to a meeting to discuss with the project leader. Also discuss it with your parents. Try to come up with ways to improve your profitability outlook for next year.

DIALOGUE FOR CRITICAL THINKING:

Share:
1. Have you had to keep records for other projects? What is most difficult about keeping complete and accurate records?

2. Have you or your projects benefited from your record keeping? In what way?

Process:
3. Why is it important to distinguish between fixed and variable costs?
4. When should you make a budget? Why? How will it help you in making decisions?

Generalize:
5. In what other areas of your life is it important to keep records? Why?

6. Most of record keeping is organization. How will keeping records help you become organized?

Apply:
7. Prepare a simple budget for your sheep project. Include everything that you know you will need plus anything that may occur in the future.

8. Prepare a simple budget for one month for your personal items. Include everything that you will purchase or sell (i.e. food, clothing, entertainment, etc.).

GOING FURTHER:
1. Review a computer program that is already set up to handle records.

2. Design a spreadsheet that will make calculations that will be needed when entering records.

REFERENCES:
Author:
Jeremey Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team

38–Sheep, Level IV
Farm Ewe Flocks — Once-a-Year Lambing

Ewe flocks are adapted to all areas of Kansas and range in size from 25 to 1,000 ewes. Small flocks of 25 to 50 ewes can act as “scavengers” on a small farm, utilizing unused labor and supplementing farm and non-farm income. Larger flocks of 250 or more ewes are generally a more efficient enterprise because they can justify investment in labor-saving equipment. Kansas flocks typically lamb during one of two time periods: “fall” (October to December) or “winter” (January to March).

Flock income is derived primarily from wool sales and live lamb sales. Wool income will be greater for breeds of fine wool-type and heavier fleece weights, such as Rambouillet, and less for medium wool-type breeds such as Suffolk. Live lamb sales will be determined by the number of lambs weaned per ewe, the average weight per lamb sold, and the price received.

The flock size, sheep breed, and lambing period that is appropriate will depend on the feed, facility, labor, and management resources available. An excellent source of information concerning ewe flock production in Kansas can be found in C-623, Commercial Ewe Flock Production. Additional information on ewe flock investment needs is available in MF-940, Livestock Building and Equipment Requirements.

Production Level

Costs per unit and net returns in livestock production are highly dependent on production levels. The following estimated budget includes three different production levels. Production levels vary for a number of reasons including livestock quality or genetics, weather, input levels, and management. The three production levels included in this estimated budget reflect production variability due to weather and management as opposed to the quality of livestock since livestock values are held constant. Budgeting at multiple production levels can help producers examine the financial risk of a livestock enterprise that is directly related to production risk.

Table 1. Factors Used in Budget

<table>
<thead>
<tr>
<th>Production Levels</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCTION:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamb crop</td>
<td>120%</td>
<td>140%</td>
<td>160%</td>
</tr>
<tr>
<td>Culling rate</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Retention rate</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>Number of ewes per ram</td>
<td>33.3</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Number of years ram in flock</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Death loss, feeding</td>
<td>1.0%</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>FLOCK SALES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lambs, cwt</td>
<td>1.20</td>
<td>$66.00</td>
<td></td>
</tr>
<tr>
<td>Culls, cwt</td>
<td>1.40</td>
<td>$23.00</td>
<td></td>
</tr>
<tr>
<td>Wool, lbs</td>
<td>8.50</td>
<td>$ 50</td>
<td></td>
</tr>
<tr>
<td>PER EWE INVESTMENT:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>20</td>
<td>$115</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>10</td>
<td>$ 55</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>$170</td>
<td></td>
</tr>
<tr>
<td>Purchase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ewe</td>
<td>$75</td>
<td>XXXX</td>
<td>$ 75.00</td>
</tr>
<tr>
<td>Ram</td>
<td>$200</td>
<td>$45</td>
<td>$ 6.00</td>
</tr>
<tr>
<td>Replacements</td>
<td>$75</td>
<td>XXXX</td>
<td>$ 15.75</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>$96.75</td>
<td></td>
</tr>
<tr>
<td>Total investment</td>
<td></td>
<td>$266.75</td>
<td></td>
</tr>
<tr>
<td>INTEREST RATES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable costs</td>
<td>10.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed costs</td>
<td>10.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAXES AND INSURANCE RATES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxes-buildings-facilities</td>
<td>1.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance-buildings-equipment</td>
<td>0.25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance-flock</td>
<td>1.00%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Flock Rations (140% Lamb Crop—21% Retention Rate)

<table>
<thead>
<tr>
<th>Per Ewe Unit</th>
<th>Native Pasture</th>
<th>Sorghum Silage</th>
<th>Alfalfa Hay</th>
<th>Grain Sorghum</th>
<th>Protein Supl.</th>
<th>Mineral Mix</th>
<th>Vitamin A-D-E</th>
<th>Feed Medic.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ewe feed</td>
<td>171</td>
<td>562</td>
<td>274</td>
<td>153</td>
<td>5.7</td>
<td>9.6</td>
<td>6.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Ram feed</td>
<td>5</td>
<td>27</td>
<td>15</td>
<td>7</td>
<td>0.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Retained/repl. feed</td>
<td>36</td>
<td>141</td>
<td>90</td>
<td>84</td>
<td>3.6</td>
<td>2.7</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Lamb feed</td>
<td>0</td>
<td>0</td>
<td>78</td>
<td>399</td>
<td>32.7</td>
<td>5.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Totals</td>
<td>212</td>
<td>730</td>
<td>457</td>
<td>629</td>
<td>42.0</td>
<td>18.6</td>
<td>0.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

1 Rations provided by Clifford Spaeth, Extension Specialist, Sheep, Kansas State University

Livestock 7 — Revised October 1997
### COST-RETURN PROJECTION — EWE AND LAMB

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>Your Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VARIABLE COSTS PER EWE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pasture (1.34 aum × $12/aum)</td>
<td>$ 17.15</td>
<td>$ 17.15</td>
<td>$ 17.15</td>
<td></td>
</tr>
<tr>
<td>2. Sorghum silage (730 lbs × $0.35)</td>
<td>7.43</td>
<td>7.43</td>
<td>7.43</td>
<td></td>
</tr>
<tr>
<td>3. Alfalfa hay (457 lbs × $91/ton)</td>
<td>20.79</td>
<td>20.79</td>
<td>20.79</td>
<td></td>
</tr>
<tr>
<td>4. Grain sorghum (_____ cwt × $4.52/cwt)</td>
<td>20.58</td>
<td>28.43</td>
<td>31.27</td>
<td></td>
</tr>
<tr>
<td>5. Protein (_____ lbs × $215.30/ton)</td>
<td>4.07</td>
<td>4.52</td>
<td>4.97</td>
<td></td>
</tr>
<tr>
<td>6. Vitamins-minerals (18.6 lbs × $0.20/lb)</td>
<td>3.72</td>
<td>3.72</td>
<td>3.72</td>
<td></td>
</tr>
<tr>
<td>7. Feed processing</td>
<td>2.50</td>
<td>2.80</td>
<td>3.10</td>
<td></td>
</tr>
<tr>
<td>8. Labor (4 hrs × $10.80/hr)</td>
<td>43.20</td>
<td>43.20</td>
<td>43.20</td>
<td></td>
</tr>
<tr>
<td>9. Veterinary, drugs, and supplies</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td>10. Breeding costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Marketing costs</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>12. Shearing</td>
<td>2.50</td>
<td>3.00</td>
<td>3.50</td>
<td></td>
</tr>
<tr>
<td>13. Utilities, fuel, oil</td>
<td>4.00</td>
<td>4.20</td>
<td>4.40</td>
<td></td>
</tr>
<tr>
<td>14. Building and equipment repairs</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>15. Miscellaneous</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>16. Interest on 1/2 variable costs @ 10%</td>
<td>7.05</td>
<td>7.26</td>
<td>7.48</td>
<td></td>
</tr>
<tr>
<td><strong>A. TOTAL VARIABLE COSTS</strong></td>
<td>$ 147.99</td>
<td>$ 152.50</td>
<td>$ 157.01</td>
<td></td>
</tr>
<tr>
<td><strong>FIXED COSTS PER EWE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Depreciation on buildings and equipment</td>
<td>$ 11.25</td>
<td>$ 11.25</td>
<td>$ 11.25</td>
<td></td>
</tr>
<tr>
<td>18. Depreciation on rams</td>
<td>.93</td>
<td>.93</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td>19. Interest on buildings and equipment</td>
<td>7.66</td>
<td>7.66</td>
<td>7.66</td>
<td></td>
</tr>
<tr>
<td>20. Insurance-taxes on buildings and equipment</td>
<td>2.98</td>
<td>2.98</td>
<td>2.98</td>
<td></td>
</tr>
<tr>
<td>21. Interest on breeding flock</td>
<td>9.70</td>
<td>9.70</td>
<td>9.70</td>
<td></td>
</tr>
<tr>
<td>22. Insurance on breeding flock</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td></td>
</tr>
<tr>
<td><strong>B. TOTAL FIXED COSTS</strong></td>
<td>$ 33.60</td>
<td>$ 33.60</td>
<td>$ 33.60</td>
<td></td>
</tr>
<tr>
<td><strong>C. TOTAL COSTS PER EWE (A + B)</strong></td>
<td>$ 181.59</td>
<td>$ 186.10</td>
<td>$ 190.61</td>
<td></td>
</tr>
<tr>
<td><strong>RETURNS PER EWE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Market lambs (120lbs × $84.00/cwt × cwt produced)</td>
<td>$ 98.79</td>
<td>$ 118.75</td>
<td>$ 138.71</td>
<td></td>
</tr>
<tr>
<td>24. Cull ewes (0.2 × 140 lbs × $28 cwt)</td>
<td>7.84</td>
<td>7.84</td>
<td>7.84</td>
<td></td>
</tr>
<tr>
<td>25. Wool (8.5 lbs × $0.50/lb)</td>
<td>4.25</td>
<td>4.25</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td>26. Ewe replacement (retention rate × ewe value)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>D. GROSS RETURNS PER EWE</strong></td>
<td>$ 110.88</td>
<td>$ 130.84</td>
<td>$ 150.80</td>
<td></td>
</tr>
<tr>
<td><strong>E. RETURN OVER VARIABLE COST (D – A)</strong></td>
<td>$ –37.11</td>
<td>$ –21.66</td>
<td>$ –6.71</td>
<td></td>
</tr>
<tr>
<td><strong>F. RETURN OVER TOTAL COSTS (D – C)</strong></td>
<td>$ –70.71</td>
<td>$ –55.26</td>
<td>$ –39.81</td>
<td></td>
</tr>
<tr>
<td><strong>G. AVERAGE SELLING PRICE NEEDED PER HUNDREDWEIGHT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. To cover variable costs (lines A – 24 – 25 + 26) ÷ 29</td>
<td>$ 114.96</td>
<td>$ 98.18</td>
<td>$ 86.78</td>
<td></td>
</tr>
<tr>
<td>28. To cover total costs (lines C – 24 – 25 + 26 ÷ 29)</td>
<td>$ 143.64</td>
<td>$ 121.69</td>
<td>$ 106.90</td>
<td></td>
</tr>
<tr>
<td><strong>H. TOTAL FEED COSTS</strong> (lines 1 through 6)</td>
<td>$ 78.74</td>
<td>$ 82.04</td>
<td>$ 85.33</td>
<td></td>
</tr>
<tr>
<td>29. Hundredweight produced (marketed)</td>
<td>1.18</td>
<td>1.43</td>
<td>1.67</td>
<td></td>
</tr>
<tr>
<td>30. Feed cost per hundredweight lamb marketed (H ÷ 29)</td>
<td>$ 66.72</td>
<td>$ 57.37</td>
<td>$ 51.10</td>
<td></td>
</tr>
<tr>
<td><strong>I. ASSET TURNOVER (D ÷ INVESTMENT)</strong></td>
<td>41.6 %</td>
<td>49.1 %</td>
<td>56.5 %</td>
<td></td>
</tr>
<tr>
<td><strong>J. NET RETURN ON INVESTMENT</strong> ([F + 16 + 19 + 21] ÷ INVESTMENT)</td>
<td>–17.4 %</td>
<td>–11.5 %</td>
<td>–5.6 %</td>
<td></td>
</tr>
</tbody>
</table>

1. Assumes one-half the variable costs at the interest rate shown in Table 1.
2. Depreciating on building and equipment computed as value divided by life, while depreciation on rams equals the difference between value and salvage value divided by life.
3. Total column assumes one-half the original cost in buildings and equipment at the interest rate shown in Table 1.
4. Taxes and insurance on buildings and equipment computed as value times interest rate shown in Table 1.
5. Represents flock value times interest rate shown in Table 1.
6. Market lamb value = ([hundredweight sold × market price per hundredweight × (lamb crop % - retention %) × (1 - death loss %)].
7. Hundredweight produced = ([lamb crop % - retention %] × (1 - death loss %) × hundredweight).
8. Investment equals total value of breeding stock, buildings, and equipment shown in Table 1.

---

40–Sheep, Level IV
Design and Function of the Lambing Shed

Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
- Advantages and disadvantages of a lambing shed
- Lambing shed features

ABOUT THEMSELVES:
- Importance of function versus cost

Materials Needed:
- Member Handout #2, Lambing Sheds for 50 or 100 Ewes
- Flip chart and markers

ACTIVITY TIME NEEDED: 45 MINUTES

ACTIVITY

Shed lambing is popular in most farm flock areas of the midwest, East and Northwest. The benefits of shed lambing are directly related to the severity of the weather and the time of year that lambing occurs. With shed lambing, the producer will save more lambs due to easier access to lambs for treating health problems and other management practices. Thus, the producer will generally wean a higher percent lamb crop. In addition, predator losses may be reduced. Also, since the shed provides protection from the weather, lambing time is not dictated by seasonal differences in temperature.

Shed lambing also has its disadvantages. There is a larger capital investment involved in building and/or maintaining a facility. Water access may be costly and the producer needs to maintain a larger feed inventory. In addition, more and better trained labor is required. When you concentrate sheep into a smaller area, diseases can be spread more easily.

In areas where winter temperatures aren’t that severe, sheds may be open on one side as long as they provide protection from the wind and shelter from falling rain and snow. In harsher climates, sheds are generally closed and may even be insulated or heated.

Many attributes of a lambing shed vary greatly depending on the climate and management factors such as flock size. In many cases, it may not be economically feasible to build new facilities from scratch. It is often necessary to add on to, or adapt existing facilities to fit your needs.
**Leader Notes**

List these lambing shed needs on flip chart and compare them to each member’s facility to see what improvements members should make. Have members do this in pairs.

**ACTIVITY**

However, there are several qualities which all lambing sheds should have in common. The shed should be centrally located with access to several lots. Good drainage is important to avoid sloppy, muddy, unsanitary conditions. The shed should have access to water and electricity. The shed should be flexible in terms of opportunity for expansion if flock size increases. The shelter should provide protection from rain, snow, wind and cold (it may need to be heated in severe climates). It should be dry and draft free. It should provide small lambing jugs for ewes and newborn lambs to bond. It should also provide for a natural flow of sheep from one stage to another.

Let’s expand on some of these qualities. The building should provide 15–25 square ft/hd as well as access to 30–50 square ft/hd of lot space for pregnant ewes. Ewes are generally kept in at night with access to the lot during the day. Ewes are fed and watered outside during the day with some hay and water inside overnight. Portable panels divide the barn into smaller pens (15–25 hd) so it is easier to pair newborn lambs with their mothers. The ewes are penned according to expected lambing date. The ewe’s body heat will generally keep the barn temperature above freezing. As the ewes lamb, they should be put into lambing jugs for one to three days. Lambing jugs are 4’X 4’ or 5’X 5’ pens for individual ewes and their lambs. Unshorn ewes and ewes with larger litters may require larger jugs. It is generally recommended to have at least one lambing jug for every 10% of the flock (ex. 10 jugs for a flock of 100 ewes). Lamb/ewe “pairs” can be bunched into small pens with 5–10 other ewes with lambs about the same age. After another week or so, they can be bunched into larger pens. Do not put ewes into jugs before they lamb. The small space increases the likelihood that the ewe will lay on one lamb while giving birth to another. The shed should allow for a directional flow of ewes. On one side are large holding pens (sectioned off by portable panels) for ewes close to lambing. As they lamb, ewes are moved to lambing jugs at the center of the shed (as the center is likely the most protected from the weather). As lambs get older, they and their mothers are moved to the far side of the shed in bunching pens. The lambs may have access to creep feeders. The shed may have an area for orphan lambs. There may also be an office or supply room to keep medical, handling and identification equipment. There may be a feed storage room. Hay is generally stored in a loft above the main floor.

About a month prior to lambing, the shed should be cleaned, disinfected and well-bedded. A good bedding, such as straw, provides a dry, sanitary environment for the lambs. All portable panels and jugs should be set up, and necessary repairs made prior to lambing. Also, check all supplies (feed, medicine and equipment) to make sure all the necessary items are on hand.

From an economics standpoint, the facilities should be adaptable for other uses, because lambing only occurs during a few months of the year. The Sheep Housing and Equipment handbook gives some examples of designs for sheds.
ACTIVITY

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What do you use for a lambing shed?
2. If shed was not built for sheep, how did you adapt it?

Process:
3. What are the main aspects of a lambing shed?
4. Why should the lambing shed be adaptable for other uses?

Generalize:
5. What other facilities do you have that have simple designs, but are still very functional?
6. What other times is function more important than actual cost?

Apply:
7. What can you do in the future to evaluate usefulness against cost?

GOING FURTHER:
1. Visit and observe lambing sheds of several different sizes.

REFERENCES:
SID Sheep Production Handbook
Sheep Housing and Equipment Handbook

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
DESIGN AND FUNCTION OF THE LAMBING SHED
SHEEP, LEVEL IV
Member Handout #2, Lambing Sheds for 50 or 100 Ewes

FIFTY EWE LAMBING SHED

ONE HUNDRED EWE LAMBING SHED

200-Ewe unit expanded from 100-Ewe unit
Seasonality of Reproduction
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• Factors influencing the sheep breeding season

ABOUT THEMSELVES:
• Their appreciation for the balance of nature
• Effect of technology on their lives

Materials Needed:
• Flip chart and markers

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

The value of the lambs we produce is greatly influenced by supply and demand. Prices are highest when demand is high and supply is low. With that in mind, it would be advantageous to plan your lambing season so your market lambs are ready for market at the time of peak prices. However, sheep producers do not always have that luxury because many sheep will only breed, and thus lamb, at certain times of the year. There is much interest in learning about the seasonal nature of sheep reproduction, as many producers would like to lamb out of season (fall lambing) or implement an accelerated lambing program (more than one lamb crop per ewe per year). Accelerated lambing will be discussed in another lesson.

Some farm animals, such as cattle and swine, exhibit a regularly occurring reproductive cycle year round. They are known as polyestrous. Other livestock, such as sheep and horses, are called seasonally polyestrous as they only “cycle” at certain times of the year. It is hypothesized that seasonal breeding evolved as a measure that insured offspring would be born at the time of year most favorable to survival. This could be a response to severe climates and/or food supply.

The breeding season is the time of sexual activity. The period of sexual inactivity is called anestrus. Most common domestic sheep breeds have breeding seasons of approximately five to seven months. The period of anestrus generally occurs in the spring and summer months.

There are several factors which influence the length of the breeding season. One is age. Ewe lambs tend to have shorter breeding seasons than
mature ewes. Somewhat related to this is the season of birth of the ewe lamb. Ewe lambs born late in the season, or ewe lambs that do not mature rapidly enough to reach puberty at the start of the breeding season may not cycle during part or all of the first breeding season. Subsequent breeding seasons would not be affected unless there is genetic influence.

Genetics also play a role in the length of the breeding season. Some breeds, such as Merino, Rambouillet and Polypay, tend to have longer breeding seasons, making it easier to get fall lambs. Pure Dorsets exhibit very little seasonality in their breeding season, and may lamb at almost any time of the year. There is also variation within a breed. By selecting replacements that were born out of season, or are from lines that have a higher tendency for out of season breeding, the producer can increase the length of the flock’s breeding season.

There is strong evidence to suggest that photoperiod (day length) interacting with hormones has the most influence over the breeding season. Sheep are known as short day breeders as the breeding season typically starts in the early fall as day length (hours of light per 24 hours) is decreasing. The breeding season continues throughout the winter as day length is shortest; and ends in the spring as day length is increasing. The geographic location and its relationship to day length may also be a factor. These fluctuations in daylight affect the reproductive hormones. In order for ovulation to occur, the body must undergo a surge of luteinizing hormone (LH) from the pituitary gland in the brain which causes estrogen release by the ovaries. When the days become longer, even the small amount of estrogen produced by the ovaries is enough to inhibit LH and keep the ewe in anestrus. At some point, the long days are no longer able to allow estrogen to inhibit LH and the breeding season begins. Also, the hours of sunlight per day is not the same when the breeding season starts as when it ends.

Experiments were done to manipulate day length by providing artificial light at times and keeping sheep in a dark barn at other times in hopes of fooling the sheep into breeding out of season. The attempts were not all that successful. It was determined that sheep have some internal method of measuring the passage of time. Melatonin (a product of the pineal gland) is secreted in a daily rhythm. It is believed that sheep can keep track of these daily secretions; thereby keeping track of time so they can cycle at the proper time of year. The thyroid gland also has a role in stopping the breeding season. Ewes that have had their thyroid removed will cycle continuously.

Another factor that may stimulate the onset of the breeding season is known as the ram effect. When rams are introduced to a group of anestrus ewes that have been isolated from male contact, it may stimulate an LH surge causing the end of anestrus. If ewes are exposed to mature rams continually (no isolation period) the rams will not have this effect. This
phenomenon has been utilized for many years. About 17 days before the start of the breeding season, teaser rams (infertile, but sexually active) are introduced into a group of anestrus ewes. The active ram stimulates the ewes to come out of anestrus; therefore, when the fertile rams are turned out, more pregnancies will occur early in the breeding season. Recently, the same procedure (isolating ewes for a period) has been used in an attempt to induce out of season breeding.

The season effect on reproduction tends to limit ewes more than rams. Although fertility rates may vary from time to time, most rams are capable of successful breeding at any time of the year. However, in some breeds that tend to be the most seasonal (down breeds) some rams may not be interested in out of season sexual activity.

Another factor is nutrition. Ewes suffering from poor nutrition tend to have shorter breeding seasons.

Studies using a combination of oral feeding of a progesterone type hormone followed by an intramuscular injection of an estrogen hormone induced out of season breeding in ewes. Now, the studies are trying to determine the proper length of the feeding period, as well as the time between the feeding and the injection that will yield the best results.

The more we as producers understand about the season control of sheep reproduction, the more opportunity we will have to increase the length of the sheep breeding season.

**DIALOGUE FOR CRITICAL THINKING:**

*Share:*
1. What aspect of seasonal breeding is most difficult to understand? Why?
2. What have you done to lengthen the breeding season of your sheep?

*Process:*
3. What problems did you have when trying to lengthen your sheep breeding season?
4. What are the major factors that influence the ewe’s breeding season?
5. Which factor has the most potential for helping to lengthen breeding season? Why?

*Generalize:*
6. What other animals are seasonal breeders?
7. How does seasonal breeding affect the balance of nature in wildlife species?
Leader Notes

ACTIVITY

Apply:
8. What techniques do you plan to use in the future to influence seasonal breeding? Why?

GOING FURTHER:
1. Visit a sheep research facility.
2. Have a game biologist discuss seasonal breeding in wildlife.

REFERENCES:
SID Sheep Production Handbook
Dr. E. Minton, Kansas State University
Wes Limesand, Shepherd, North Dakota State University

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
Accelerated Lambing
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• Advantages and disadvantages of accelerated lambing
• Types of accelerated lambing systems

ABOUT THEMSELVES:
• Importance of planning, coordinating, and timing

Materials Needed:
• Member Handout #3, Star System
• Flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY
Most ewes lamb once per year. The average gestation length of a ewe is less than five months. Most lambs are weaned at three months of age or younger. This leaves about four months when the ewe is not producing anything (except a little wool). Some producers have tried to maximize production and efficiency by eliminating the non-productive period. This is accomplished through some form of accelerated lambing. There are several variations of accelerated lambing; however, the goal of each is to produce more than one lamb crop per ewe per year.

The advantages of accelerated lambing include:

1. more efficient use of facilities (lambing shed/ pens used more than once/yr)
2. more lambs per ewe per year
3. rapid turnover of genetics
4. eliminates the time when a ewe is consuming feed and not producing anything

At first, accelerated lambing may seem like a great idea; however, there are several factors that need to be considered. The biggest hindrance to accelerated lambing is the seasonal nature of sheep reproduction. The producer must select a breed or certain individuals which will lamb out-

Leader Notes
Ask members to share accelerated lambing experiences. Have group analyze problems for possible solutions.

Ask members to list and discuss advantages before sharing these. List all advantages on flip chart for members to record in their records.

List and discuss disadvantages on flip chart for members’ records.
Leader Notes

ACTIVITY

of-season on a regular basis. Dorsets and Rambouillets are popular choices due to their extended lambing seasons. Accelerated lambing requires more intensive labor and management practices throughout the year. Other resources, such as feed, need to be considered. Also, the increased production tends to lower the life expectancy of the ewes. Since you are producing more lambs per ewe per year, a higher replacement rate should allow you to maintain flock size and not hurt your genetic progress from selection.

There are several types of accelerated lambing systems. With a gestation length of five months, it would theoretically be possible to get two lamb crops per ewe per year. Research is being done in this area; however, it is unlikely that it will be realized in practice. It is hoped that these studies will provide insight that will allow producers to approach twice per year lambing.

Several systems incorporate three lamb crops every two years (1.5 lamb crops per ewe per year). Here you have a lambing interval of eight months. If a ewe misses on lambing in two years, she is still having one crop per year. If a more continuous lambing season is desired, divide the flock into four groups and stagger the lambing periods at two month intervals. If a ewe fails to conceive, she has another opportunity two months later with the next group. A ewe that misses only one mating period in three cycles (two years) would average 1.39 lambings per year, and 1.29 lambings per year if she misses two mating periods.

Cornell University developed a system called the Cornell star which attempts to produce five lamb crops per ewe every three years. The calendar year is divided into five segments (73) days. Two fifths of the year is 146 days, which is equal to the average gestation length of the ewe. The ewe flock is divided into three groups, one of which will be lambing at each of the five times per year. The five lambing dates can be rotated to best suit your situation, but must always be 73 days apart. Lambs are weaned at 45 to 60 days of age and the ewes bred back a week later. If you use a circle to represent the year and draw lines connecting the lambing dates, the resulting figure is a star, hence the name. A ewe that did not miss a mating period in three years would lamb at each point of the star and produce 1.67 lamb crops per year. Ewes that miss a mating are moved to the next group. Missing one 73 day cycle still allows the ewe to average 1.5 lambings per year. Even missing three cycles, the ewe produces 1.33 lamb crops per year.

The key to understanding the system is to mark on your calendar the breeding dates as rams in or rams out. That is, on the schedule, the rams go in on January 1 and are taken out on January 30; and go in on March 15 and are taken out on April 14, etc., etc. Once these dates are established and followed, the lambing dates are the same and everything else falls into place.
ACTIVITY

The dates may be adjusted a few days for various reasons. For example, you can hold the rams a few days in August so January lambing starts the 4th or 5th. Many producers on the STAR system may rotate the entire STAR by as much as a month to fit their overall schedule.

Once you understand the sheep grouping on the STAR, you can understand that each of the 3 groups should be managed differently. The breeding-pregnant ewes have fairly low requirements, the lambing-lactating ewes have fairly high requirements as do the growing lambs.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What system of accelerated lambing do you prefer? Why?
2. If you have tried an accelerated lambing program, what happened? Why?

Process:
3. What is the biggest problem in accelerated lambing?
4. What are the most significant advantages of accelerated lambing?
5. What are the demands on the producer to use accelerated lambing?

Generalize:
6. What other areas of your life require careful planning, coordination, and timing?

Apply:
7. How might you use these organizational skills in the future?

GOING FURTHER:
1. Visit an accelerated lambing operation.

REFERENCES:
SID Sheep Production Handbook

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
Artificial Insemination and Embryo Transfer
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• Advantages and limitations to Artificial Insemination
• The proper semen collection procedures
• The equipment needed for A.I.
• The procedures involved when utilizing embryo transfer

ABOUT THEMSELVES:
• The importance of technology in their lives

Materials Needed:

ACTIVITY TIME NEEDED: 30 MINUTES (60 MINUTES OR MORE IF A FIELD TRIP INCLUDED)

ACTIVITY

Artificial insemination (AI) is a management tool that has been popular in the livestock industry for years. There are several reasons for this. First, AI allows the producer to utilize sires he might otherwise not be able to purchase. AI spreads more widely the genetics of top sires. In addition, the use of AI eliminates the cost and risk of maintaining a sire for a small flock. Finally, AI may reduce the risk of transmitting some reproductive diseases.

On a worldwide basis, it is estimated that about 60 million ewes are Aled annually. This is a relatively small portion of the more than nine billion ewes in the world. Sheep AI in the U.S. is less popular than in other species. Reasons for this include: (1) low per head value, (2) low sire maintenance costs and (3) varying success rates.

Although there are many potential advantages to AI, there are also limitations. If preventive measures are not taken, some diseases may be transferred by AI. Depending on the technique, pregnancy rates can be very low. Ram semen has poorer freezing qualities than other species, which may contribute to less fertility. Some methods are very expensive and require extensive training. AI may become more popular if a method is perfected that yields conception rates similar to natural mating, is relatively inexpensive and is easy to perform.
The first step is to collect semen from the ram. Prior to collection the ram should be kept as stress free as possible. Collections should be made into a sterile, dry and warm glass or plastic container. Semen can be collected using an artificial vagina (AV) or an electroejaculator.

The AV method is preferred as it is less stressful to the ram and yields higher quality semen samples. A five to ten inch tube is lined with a rubber liner filled with warm water. This provides both a pressure and temperature stimulus to the ram’s penis. A small amount of non-spermicidal lubricant is applied to the surface of the lining. The opposite side ends in a plastic or glass semen collection tube. The ram is trained to mount a teaser ewe or a dummy. The penis is directed into the AV by the technician. Rams can be collected three to five times per day.

Some rams do not respond to the AV. They can be collected using an electroejaculator. A bipolar electric probe is inserted into the ram’s rectum and positioned towards the floor of the pelvis. The ram is electrically stimulated for three to five seconds at intervals of ten to twenty seconds. After a short period of stimulus, most rams will ejaculate. Lubricant should be applied to the probe. The technician must be ready to catch the semen in the collection tube.

After collection, semen is diluted, energy sources and chemical buffers are added and it is generally frozen. When ready for insemination, semen should be thawed in a water bath at 100 degrees F.

Since it is more practical to AI large numbers of ewes at one time, ewes should be synchronized. Synchronizing ewes or using teaser rams to detect heat is crucial to AI as ewes must be inseminated as close to the time of ovulation as possible for best results. Ewes should be AIed twelve to eighteen hours after the onset of estrus (when heat is detected). Different types of synchronization may yield different time frames for AI.

There are several methods of AI. In natural mating, the ram deposits semen into the vagina. Vaginal AI generally yields poor results and is not recommended for frozen semen. It is often referred to as the “shot in the dark” method. However, it is easy and relatively inexpensive and may be used if you have fresh semen. The laproscopic method is a surgical technique that places semen into the uterus. Although this yields impressive results, it is very expensive in terms of the necessary equipment and training. Also, the surgery places extra stress on the ewe. It is unlikely that this method will become commonplace in the commercial industry.

AI is to becoming more popular because a transcervical method has been perfected that yields satisfactory pregnancy rate. This method is very popular in cattle; however, the reduced physical size of the sheep and the reproductive tract resulted in a slower adaptation for sheep. The ewe is restrained, either upside down in a cradle or “over the rail” with the rear end elevated. A well lubricated speculum with a light source is inserted.

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into the vagina. A forceps is used to open the cervix. A pipette containing the semen is maneuvered through the various cervical folds until it reaches the uterus. A plunger expels the semen into the uterus. Some technicians prefer to expel part of the semen, rotate the pipette a half turn and deposit the rest. This increases the chances that some semen will reach each uterine horn. Getting the pipette through the cervix requires a lot of practice and is next to impossible if the ewe is not in the proper stage of estrus. Time is very important. If there are too many delays from the time the semen is thawed, pregnancy rates will suffer.

We have discussed the potential for superior sires to produce large numbers of offspring, but what about superior ewes? Most ewes do not raise more than one or two lambs per year. In addition, many do not live much more than five years. There is a way to get many offspring out of the ewes. It is called embryo transfer.

Developing embryos are transferred from one ewe (donor) to many other ewes (recipients). The number of eggs a ewe ovulates can be increased using a procedure called super ovulation. A ewe is given two shots of pregnant mare serum gonadotropin (which causes the development of more than one egg) and one injection of chorionic gonadotropin (which causes several eggs to be released). The eggs are fertilized by AI or natural mating. Fertilized ova are flushed from the tract after conception and before implantation. The embryos are transported via a liquid medium to be deposited into the uterus of the recipient. Embryos may be frozen and stored until the host is ready for implantation. The estrous cycle of the recipient ewes must be synchronized with the donor if transfer is to occur without a storage interval. Once again, cost is the major limiting factor. This procedure may only be feasible if the value of the top individuals is very high. Embryo transfer is used when a breed is first imported into the U.S. in order to increase the number of sheep available for breeding.

**DIALOGUE FOR CRITICAL THINKING:**

*Share:*

1. What was the most difficult aspect of artificial insemination?

2. What are some advantages of artificial insemination? Disadvantages?

*Process:*

3. Why is AI in sheep not very common compared to other species?

4. What is a way to utilize a superior ewe’s genetics to produce more superior offspring?

*Generalize:*

5. What other forms of technology are available in the livestock industry?

6. How has technology affected your life as compared to your parents?
**ACTIVITY**

**Apply:**

7. What new technology do you plan to use in the future? Why?

**GOING FURTHER:**

**REFERENCES:**

SID Sheep Production Handbook  
Cupps, P.T., Reproduction in Domestic Animals, 1991  
Acker, D., Animal Science and Industry, 1983

**Author:**

Jeremy Geske, Former Extension Assistant, Kansas State University  
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**

Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University  
Sheep Design Team
Pregnancy Determination

Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• Methods to determine pregnancy
• Benefits of pregnancy checks

ABOUT THEMSELVES:
• Importance of planning
• Their planning comfort level

Materials Needed:
• Activity Sheet #6, Predicting Lambing Dates by Observing “Bagging”
• Marking harness
• Flipchart and markers
• Ultrasound equipment (optional)

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

Knowing if and when your ewes become pregnant can be important for several reasons. (1) Knowing when your ewes become pregnant helps you to know when to prepare your lambing shed. (2) If you are selling bred ewes, a positive diagnosis gives you the ability to guarantee that the ewes are pregnant. Additional benefits include: (3) selection of replacement ewe lambs on their ability to show estrus or conceive as lambs, (4) reduction of costs resulting from the sale or differential management of open ewes, (5) early diagnosis of reproductive failure and (6) more efficient management of feed and buildings according to stage of production.

Many sheepmen do not discover nonpregnant ewes until near the end of the lambing season. The cost to over-winter open ewes depends on the cost of feed and the length of the winter feeding period.

Techniques exist to accurately diagnose pregnancy, as well as to determine which ewes are carrying multiple lambs. However, in most cases it is not economical at this time for producers to pregnancy test all their ewes. It may be a profitable tool for managing ewe lambs and ewes bred to lamb out-of-season.

The gestation length of the ewe is approximately 145 days, or just under five months. By knowing when you turned out the rams to breed, you can count forward on the calendar to determine when lambing could start.

Leader Notes
List on a flip chart and discuss the six reasons why pregnancy determination is important.
**Leader Notes**

Show a marking harness. On a flip chart, record methods to detect pregnancy plus the pros and cons of each.

Encourage members to copy this information to include in their record books.

Check with your veterinarian for possible ultrasound demonstration.

Pass out Activity Sheet #6, “Predicting Lambing Dates by Observing “Bagging.” Purebred breeders may know breeding dates and, thus, projected lambing date which will provide examples.

**ACTIVITY**

This will not be completely accurate as gestation length may vary between ewes; some ewes could lamb premature and ewes may not conceive during the first couple weeks of the breeding season. The breed of ewes and number of fetuses will also affect gestation length.

A simple and relatively inexpensive method of early pregnancy evaluation is the use of breeding marks. The stud ram is equipped with some method of marking ewes that he mounts. A marking harness which holds a colored chalk on the ram’s chest can be used. When the ram attempts to breed a ewe, the chalk leaves a mark on the ewe’s rump. By recording the date a ewe is “marked”, you can calculate the expected lambing date. It may be necessary to catch the ram and clean mud or other debris from the chalk so it leaves a legible mark. If a ewe doesn’t mark, you can assume that she is open. The color of the marking chalk should be changed every 17 days (the average length of the ewe’s reproductive cycle). A mixture of used motor oil and powdered paint can be substituted for the harness and chalk. The mixture needs to be smeared on the ram’s chest every couple days.

If a ewe marks a second time, it indicates that the first mating was not successful. If the chalk color is not changed, it could be difficult to tell which ewes are re-marking. If a ewe continues to mark over and over, it may indicate that the ewe is not reproductively sound. If the majority of the ewes re-mark, it could indicate an infertility problem with the ram.

Remember, a mark does not guarantee a ewe will lamb. A mating does not necessarily mean a conception; if conception occurs, abortion may also occur.

An aggressive ram may mount ewes that aren’t in heat. Thus, putting the harness on the rams one day after turning them in with the ewes may prevent the marking of ewes not in heat.

The most accurate (and somewhat expensive) method for determining not only pregnancy, but also the number of fetuses a ewe is carrying is ultrasound. Ewes are tested in a natural, standing position. A small amount of light weight oil is applied to the transducer to insure good transmission of ultrasonic waves. The transducer is placed on the non-wooled area of the ewe’s right flank, just anterior to the udder. The transducer should be directed 30 degrees forward and 45 degrees upward. Each manufacturer uses a specific device to register a positive pregnancy. It may be sound, or a visual display on a screen. The devices using sound work best from 70 to 120 days after conception. When ultrasound is displayed on a screen, pregnancy and number of fetuses can be accurately determined 40 days after conception. The biggest drawback of this method is the cost.

The most widely used method of pregnancy diagnosis in late gestation is bagging (udder palpation). A ewe’s udder will begin to fill and enlarge about one month before lambing. The udder will be quite full and tight the last 3 to 5 days before lambing. Ewes identified as pregnant by this method will, in most cases, lamb. However, depending on the age of the ewe and the length of the breeding season, some ewes identified as open

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may actually be bred. Some producers use this method to sort their ewes into groups, so that ewes closest to lambing can be managed differently. The disadvantage of this method is that ewes may be fed 2 to 4 months before being found open.

Other methods include taking blood samples to monitor progesterone levels. This method is less accurate than desired. Repeated sampling increases accuracy, but appears impractical from a labor and cost standpoint.

There are several reasons or situations when pregnancy diagnosis or determination of due dates might be important. There are also several methods for evaluating pregnancy. Choose the one that best combines accuracy with cost effectiveness and gives you the results suited to your operation.

**DIALOGUE FOR CRITICAL THINKING:**

Share:
1. What pregnancy check do you use? Why?
2. If you did the “bagging” exercise, what was your accuracy percentage?

Process:
3. What problems do you have with your pregnancy check method? Why?
4. Why is it important to determine pregnancy?

Generalize:
5. Why is it important to plan for major events or activities?
6. How detailed or specific does planning need to be for your comfort level? Why?

Apply:
7. What criteria do you use to determine planning needs?
8. How will you determine the degree of planning needed for future events or activities?

**GOING FURTHER:**
- Observe an ultrasound pregnancy check.
- Develop a planning checksheet for a future event

**REFERENCES:**
SID Sheep Production Handbook

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry,
Kansas State University
Sheep Design Team

59–Sheep, Level IV
PREGNANCY DETERMINATION
SHEEP, LEVEL IV
Activity Sheet #6, Predicting Lambing Dates by Observing “Bagging”

Directions: Observe “bagging” on at least 10 ewes prior to lambing. Predict when you think they will lamb. Record your lambing date prediction so that you can compare it to the actual lambing date. Remember: Practice makes perfect!

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Lambing Time Management
*Sheep, Level IV*

What Members Will Learn . . .

**ABOUT THE PROJECT:**
- Advantages and disadvantages of range lambing
- Advantages and disadvantages of shed lambing
- The steps taken for ewe preparation
- The steps taken for baby lamb management

**ABOUT THEMSELVES:**
- Why planning is important
- Responsibility sometimes dictates profitability

**Materials Needed:**
- Activity Sheet #7, “Lambing Quiz”
- Leader Key—Lambing Quiz
- Flip chart and markers

**ACTIVITY TIME NEEDED:** 45 MINUTES

**ACTIVITY**

Baby lamb survival is the key to profitability for most sheep operations. Lambing time is the most critical time for a sheep operation in terms of labor intensiveness and economics. The first decision is whether to lamb in a shed or out on pasture. Several things need to be considered when making that choice, including:
- climate conditions (weather, topography etc.)
- available feed and water supply
- availability and skill level of labor
- disease and predator situation
- value of animals and type of record keeping system used
- flock size vs. size and condition of available facilities

Let’s look at the advantages and disadvantages of range lambing. Building and maintaining a facility is expensive; therefore, there is less capital investment with range lambing. Feed and labor requirements are also lower. On the other hand, range lambing generally leads to a lower percent lamb crop weaned, as treatment of health problems and control of predators is more difficult. Also, lambing season is strongly dictated by climate and range conditions. Although total investment is less, so are total returns. In many cases (climate permitting) if the facilities and labor are not available, range lambing is a viable option. For example, some

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**Leader Notes**

Lambing Quiz could be used as a pre- and post-test or as a review.

Solicit responses from group and list on flip chart before giving answers.
flocks are too large (ex. 10,000 hd) for feasible facilities. Fine wool breeds are generally better suited to range conditions. Pasture lambing is popular when the relative value of the individual lamb is less important than the total cost of inputs.

Now let’s compare that with the advantages and disadvantages of shed lambing. When shed lambing, health problems are easier to control, and management practices easier to implement; therefore, lamb weaning percent is usually much higher. Also, the shed, and the protection it provides from the weather, allows you to lamb at any time of the year (however, this is still limited by the seasonality of the ewe’s reproductive cycle). But, there is a larger capital investment, feed and water requirements must be considered and more and better trained labor is necessary. Shed lambing is more popular for farm flocks (especially registered sheep) and when lambing in colder climates.

The actual lambing shed, and what it provides will be discussed in another lesson. We’ll just briefly go over the steps for preparing a facility for the lambing season. About a month before lambing starts, the barn should be cleaned and the floor covered with fresh, dry bedding (such as straw). Many operators spread limestone on the floor prior to bedding down, to help disinfect the shed. The bedding helps keep the lambs warm and dry and the improved sanitation may reduce the likelihood of illness. About ten days before lambing starts, set up the lambing jugs and holding pens. Now is also the time to check your equipment and medical supplies. Make sure your tools for docking, castration, vaccination and identification have been located and are in working order. Heat lamps, iodine and medicines should be on hand. If orphan lambs are a possibility, milk replacer should be on hand. As lambing starts, set up bunching pens and creep feeders.

The next phase of lambing time management is ewe preparation. About a month before lambing, ewes should be de-wormed and vaccinated according to your health program. Shearing or crutching (removal of wool around the udder and vulva) should occur as it provides a cleaner, dryer environment for the lambs and will make nursing easier. In addition, shorn ewes take up less barn space, give off more body heat and are more likely to seek shelter when lambing than unshorn ewes. About ten days prior to lambing, ewes should be sorted according to expected lambing date. Begin checking ewes for signs of parturition at least two or three time per day. As ewes lamb, you will need to watch for dystocia problems, make sure ewes have milk (you may need to open teat canals so the lambs can nurse), and make sure the ewes claim (mother up to) their lambs.

Baby lamb management begins immediately after lambs are born and have bonded with their mothers. The ewe and her lamb(s) should be placed in a lambing jug (4’x4’ - 5’x 5’pen). The lambing jug strengthens the ewe/lamb bond and allows you to closely observe the lamb to make
Pass out Activity Sheet #7, “Lambing Quiz,” as a review or to create more discussion. Let members work in pairs.

In addition to dystocia (lambing difficulty) ewes should be monitored for problems with pregnancy toxemia and mastitis.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**

1. Where do you or your neighbors lamb their ewes? Why?

2. What is your most difficult lambing time problem or task? Why?

**Process:**

3. Why is it important to shear or crutch your ewes before lambing?

4. What baby lamb management practices are most important? Why?

5. What is the significance of planning for lambing time?

**Generalize:**

6. What other areas of your life require lots of planning?

7. Who is responsible for most planning? Why?
Leader Notes

ACTIVITY

Apply:
8. How do planning and responsibility usually affect profitability?
   Share examples and discuss.

GOING FURTHER:
1. Visit a veterinarian for flock health management tips associated with lambing.

2. Visit producers at lambing time to observe their management practices.

REFERENCES:
SID Sheep Production Handbook
Dr. Cliff Spaeth, Kansas State University
Recommendations for a Sheep Management Program, North Central Region Ext. Pub. 240

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
1. List 5 reasons a producer may decide to lamb out on pasture rather than in a shed.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2. What type(s) of sheep operations are more likely to practice shed lambing?

_______________________________________________________________________

3. What are 4 advantages to shearing ewes prior to lambing?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

4. Rank the proper sequence for these baby lamb management practices.
   ___ docking             ___ vaccination
   ___ iodine on navel      ___ place in lambing jugs
   ___ Identification/ ear tag ___ recording birth dates (records)
   ___ castration of some or all males

5. Most baby lamb death loss is due to ______________. The producer is simply
   unprepared for lambing to start. Many lambs _________ to death. ______________
   is the major disease cause of baby lamb death.
LAMBING TIME MANAGEMENT
SHEEP, LEVEL IV
Leader Key—Lambing Quiz

1. List 5 reasons a producer may decide to lamb out on pasture rather than in a shed.
   
   Less capital investment

   Shortage of labor

   Facilities not available

   Feed requirements are less strict

   Value of lamb is less important than the total cost of inputs

2. What type(s) of sheep operations are more likely to practice shed lambing?
   
   Farm flocks, Registered herds, regions with cold climates

3. What are 4 advantages to shearing ewes prior to lambing?
   
   Provides a cleaner and drier environment for the lambs

   Makes nursing easier

   Take up less barn space

   Give off more body heat

4. Rank the proper sequence for these baby lamb management practices.
   
   5 docking

   6 vaccination

   2 iodine on navel

   1 place in lambing jugs

   3 Identification/ ear tag

   4 recording birth dates (records)

   7 castration of some or all males

5. Most baby lamb death loss is due to _______ _______. The producer is simply unprepared for lambing to start. Many lambs _______ _______ to death. _______ Pneumonia is the major disease cause of baby lamb death.
Assisting Difficult Births  
*Sheep, Level IV*

**What Members Will Learn . . .**

**ABOUT THE PROJECT:**
- Normal lambing process
- The signs of a difficult birth
- How to assist a ewe in a difficult birth
- Management practices that reduce lambing problems

**ABOUT THEMSELVES:**
- Importance of understanding the birth process
- The value of being prepared for emergencies

**Materials Needed:**
- Activity Sheet #8, Birth Worksheet
- Leader Key—Birth Worksheet
- Member Handout #4, Birth Positions
- Flip chart and markers

**ACTIVITY TIME NEEDED:** 45 MINUTES

**ACTIVITY**

Dystocia (lambing difficulty) is a relatively infrequent problem for most sheep producers. However, it is important to know how to handle assisted births when they are necessary. Dystocia occurs more frequently in 12–14 month old ewes or small ewes bred to large framed rams. Dystocia can be due to the head and shoulder size of the lamb, large birth weight, abnormal presentation of the fetus, small pelvic area of the ewe or failure of the cervix to dilate.

If unassisted, dystocia could lead to injury or death of the lamb and even the ewe. On the other hand, if help is given at the wrong time, or in the wrong way, it could be just as harmful as not helping at all. Determining when and how to give assistance can be a difficult decision.

The member should be able to recognize the normal lambing process before he or she can recognize abnormal lambing. As ewes approach the time of lambing, they normally “bag up” (the udder begins to enlarge as it fills with milk). The vulva becomes enlarged and flabby, and there may be a clear fluid secretion from the vulva. Ewes tend to isolate themselves and may act uneasy. Uterine contractions begin about twelve hours before the birth of the lamb(s). The cervix should dilate and the water sac is

**Leader Notes**

- Have each member relate a dystocia problem they have had in their flock.
- Let members discuss and suggest how the problem could have been prevented.
- List causes for dystocia on flip chart.
- Outline normal lambing procedure on flip chart.
expelled. Shortly, the lamb’s front feet and head should appear. Do not rush the process as the tissues of the vulva need time to dilate as well. The lamb’s life is not in danger as it can survive for several hours if the delivery process does not advance beyond this point. You may consider assisting if birth hasn’t completed by two to three hours after the appearance of the water sac. Once the head and shoulders pass through the pelvic opening, the rest of the lamb should come without difficulty. Mucus and fluid are expelled from the lamb’s nose and mouth to allow for normal breathing. The after birth should pass from the ewe shortly after the lambs are born.

The normal presentation for a lamb at birth is front feet first with the head between the front legs. There are a variety of abnormal presentations which occur infrequently. One is front feet first with the head twisted back or tucked down. Another is head first with one or both front legs back. Some lambs are born backward with rear feet first. This is usually no more difficult than the normal presentation. Breech presentations are perhaps the most difficult. That is when the lamb is coming out backwards but the rear legs are tucked under the body.

A careful examination of the ewe is probably the most critical step in assisting delivery. You must determine why the ewe is having difficulty. Remember to be as sanitary as possible. Use plenty of disinfectant and lubrication.

First, check to see if the cervix has dilated. If not, you may be interfering too soon. A lamb will not fit through a cervix that has not dilated. If you force it, you will cause excessive damage to the ewe’s reproductive tract.

Next, check for signs of life in the lamb. Absence of vital signs, sloughing of hair or foul odor usually indicates a dead lamb. The objective then becomes getting the lamb out and saving the ewe.

Finally, determine the position of the lamb. Pulling a lamb should only occur when the lamb is in the “normal” position or “backwards” position. If the lamb is in an abnormal position, it is necessary to push it back in and rearrange it so it will come out normally. You should see front feet and be able to feel the nose coming next. If two feet are protruding, make sure they are both front feet and both from the same lamb. Two lambs will not pass through a pelvic opening at the same time. Lambing difficulty occurs less frequently with multiple births due to the smaller lamb size.

Excessive force should never be used. Forcing a lamb through a small pelvic opening may lead to injury or death of the lamb and paralysis of the ewe. If you are able to determine that the lamb is simply too large to pass through the pelvic opening or that the cervix will not dilate, you should contact your veterinarian because a cesarean section may be the only way to remove the lamb.
Many lambs are pulled by grasping the legs with the bare hand. However, there is a plastic tool made for pulling lambs, as the lamb may be too slippery to grasp by hand. Pull the lamb straight back, then downward as it passes through the birth canal.

Lambs may be pulled through a small pelvic opening by alternately pulling one leg then the other. This allows the shoulders to pass separately.

Once the lamb is on the ground, clear its nostrils and mouth of membranes and fluids so that it can breathe. A long, difficult birth is stressful to the lamb. You may need to lift it by the rear legs and shake it to get the lamb going.

Some dystocia can be prevented by avoiding sires with coarse, bulky shoulders and large heads. Don’t use big, coarse sires on ewe lambs or small framed ewes. Some rams may sire lambs with excessively large birth weights. Cull them or only use them on mature ewes. If a ewe has dystocia year after year, it may be a good idea to cull her.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. What are the indications for a normal birth? What are the indications for a difficult birth? Discuss.
2. What experiences have you had in delivering lambs?

**Process:**
3. What steps can you take to prepare yourself for birthing difficulties?
4. What are some ways to prevent lambing difficulties before ewes are bred?

**Generalize:**
5. What resources are available to you if you encounter a difficult lambing problem?

**Apply:**
6. How might what you have learned in this lesson be applied to other 4-H projects?

**GOING FURTHER:**
1. Visit a veterinary clinic to discuss dystocia problems.
2. Visit a sheep farm where ewes are lambing and witness a birth, normal or problematic.

**REFERENCES:**
Kansas 4-H Beef Leader Notebook (LN-1), 2nd ed.
Leader Notes

ACTIVITY

Author:
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry,
Kansas State University
Sheep Design Team
1. ___________ is another term for lambing difficulty.

2. List three factors that may be responsible for lambing difficulty.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

3. Lambs should only be pulled in the _________ or ____________ position.

4. If the lamb is too large or the cervix won’t dilate, you’ll need a veterinarian to do a
   ___________ ____________.

5. Lack of movement or foul odor may indicate that the lamb is ___________.

6. True or False
   Avoiding sires with coarse shoulders and large heads may reduce dystocia problems.

7. If the lamb is not in the “normal position, what should you do?
   _______________________________________________________________________
   _______________________________________________________________________

8. True or False
   Helping a ewe at the wrong time or using excessive force can be as harmful as not
   helping at all.

9. If delivery is not complete by 2 to 3 hours after expulsion of the water sac,
   ______________________________ may be necessary.
ASSISTING DIFFICULT BIRTHS
SHEEP, LEVEL IV
Leader Key—Birth Worksheet

1. **dystocia** is another term for lambing difficulty.

2. List three factors that may be responsible for lambing difficulty.
   - **large lamb size**
   - **abnormal position**
   - **failure to dilate**

3. Lambs should only be pulled in the **normal** or **backward** position.

4. If the lamb is too large or the cervix won’t dilate, you’ll need a veterinarian to do a **cesarean section**.

5. Lack of movement or foul odor may indicate that the lamb is **dead**.

6. **True** or False
   Avoiding sires with coarse shoulders and large heads may reduce dystocia problems.

7. If the lamb is not in the “normal position, what should you do?
   _Push back in and rearrange correctly so the lamb is in the normal position._

8. **True** or False
   Helping a ewe at the wrong time or using excessive force can be as harmful as not helping at all.

9. If delivery is not complete by 2 to 3 hours after expulsion of the water sac,
   _assistance_ may be necessary.
ASSISTING DIFFICULT BIRTHS
SHEEP, LEVEL IV
Member Handout #4, Birth Positions

NORMAL PRESENTATION

ABNORMAL PRESENTATIONS

Head first with one foot back

Front feet first with head twisted back

Head first with both feet back

Breech

Backwards
Preventing Predator Losses
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• Methods of predator prevention

ABOUT THEMSELVES:
• Preferred method of finding information

Materials Needed:
• Activity Sheet #9, Predator Control Agency Contact (Session One)
• Activity Sheet #10, Predator Control Topic Resource List (Session Two)

ACTIVITY TIME NEEDED: 60 MINUTES PER SESSION
(ALLOW AT LEAST 15 MINUTES PER MEMBER)

ACTIVITY

As discussed in an earlier lesson, coyotes are the major sheep predator; causing losses in some states as high as 8% of the lamb crop and 2.5% of the ewes. Members should become familiar with management practices that may help reduce sheep losses suffered from predation.

Many sheep producers don’t do anything about predators until after they have suffered losses. Then the Animal Damage Control officer is called to shoot or trap the “offending” coyote. While that particular coyote or family of coyotes may be removed, another coyote will likely move into the unoccupied territory. Also, you’ve already lost some sheep. It may be more practical and economical to implement management practices which will prevent predator losses before they happen.

Coyotes tend to kill animals that are easily caught. That includes sheep weakened by poor nutrition, disease or old age, as well as young lambs. Coyotes give birth in April and May and need additional energy to feed the young pups. Thus, coyotes may turn to livestock as an available source of food.

By understanding these two factors about the coyote, producers can reduce the risk of predator losses by avoiding these circumstances. A good health and nutrition program will reduce the number of weakened sheep in the flock, thereby reducing the number of likely targets for coyote attacks. In addition, lambing should occur in a confined situation.

Leader Notes
A week before discussing this lesson, have members select a predator control agency. Give each member Activity Sheet #9, “Predator Control Agency Contact,” as a guide for gathering information. Agency reports by members become the main source for this lesson. Use this lesson only as a supplement to member reports.
and younger lambs should be kept in lots near the farmstead. Once again, you are limiting the exposure of likely targets to the predator. When possible, fall lambing is a good practice. This gives the lambs several months to grow before the peak time for coyote attacks.

If sheep must be kept in areas populated by coyotes, coralling them at night may reduce the chance of predator attack. Having a lighted corral may further reduce the risk.

Removal and proper disposal of dead livestock is extremely important. Carrion tends to attract coyotes and other scavengers, and may condition them to feed on livestock.

Several tactics can be used to try to frighten coyotes away from sheep pastures. Strobe lights, or lights that revolve and flicker may help keep coyotes away. Noise making devices, such as bells, radios and propane exploders, have been used to deter coyotes. When using either of these tactics, it is important to alter to position and frequency every so often. Coyotes are smart enough to recognize a pattern, and can overcome their fears.

Recently, work has been done to develop coyote repellents. The idea is to place a chemical or aversive agent on a sheep carcass or even on the neck of a live lamb(s). When the coyote feeds on the carcass or attacks the “baited” lamb, it will become extremely ill. This in effect teaches the coyotes that sheep are not good to eat, and that they should seek other prey. Testing of the devices has so far yielded inconclusive results.

Another way to reduce coyote attacks is to design a fence that is economical to build, keeps the sheep in and keeps the predators out. Many coyotes can easily cross over, under or through conventional livestock fences. Generally, combining a conventional fence with an electric fence may deter coyotes from entering a pasture. One method is to alter “hot” and “ground” wires at six inch intervals. The wires may be spread farther at the top of the fence. The idea is to make it impossible for the coyote to crawl under, through or jump over the fence without hitting at least one “hot” wire and receiving a shock. Care should be taken to minimize danger to livestock and humans while still maintaining an effective coyote barrier.

Another way to reduce the occurrence of predator losses is to use a guardian. In the past, herdsmen stayed out on the range with the sheep. The presence of humans kept the predators away. However, now days it is less expensive to use a guardian animal. In areas where human populations are more dense, donkeys and llamas can effectively protect the sheep from coyotes. Guardian dogs have been successfully used for centuries. Common breeds include Great Pyrenees, Komondor, Anatolian Shepherd and Akbash dog. From the time they are born, the dogs are raised with the sheep. Usually, their only human contact is with the owner and his family.
**ACTIVITY**

The dog will grow to be fiercely protective of the sheep, and the sheep will not be afraid of the dog. The dog will respond only to the owner who must periodically feed it. The dog will establish a large territory. It will chase away any animals (except sheep) from its territory, and keep intruders from entering. The dog may also treat humans (other than the owner) as intruders as well, so there may be danger if the dog is too aggressive. Generally, dogs are used in areas where human populations are sparse. It is important that the dog be taught to stay in the designated area and not wander onto neighboring properties.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. What predator control topic did you choose to research? Why?
2. What was unique about the topic?
3. Which predator prevention method do you use? Why?

**Process:**
4. When do coyotes usually prey on sheep? Why?
5. If using frightening techniques, what must you remember to do?

**Generalize:**
6. What did you learn about your research skills as you studied your topic?
7. What is your preferred way of finding information on a topic? Why?

**Apply:**
8. How might you find information in the future? Why?

**GOING FURTHER:**
1. Ask a guard dog breeder or producer who uses a guard animal to speak to your group.
2. Ask an experienced trapper or hunter to demonstrate traps, snares, or calls.

**REFERENCES:**

SID Sheep Production Handbook

**Author:**
Jeremy Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team

**Leader Notes**

After agency reports, give members another week to use Activity Sheet #10, “Predator Control Topic Resource List,” to prepare a report on a specific predator related topic. Use dialogue for critical thinking questions after second session.
PREVENTING PREDATOR LOSSES
SHEEP, LEVEL IV
Activity Sheet #9, Predator Control Agency Contact

Directions: Record the following information on a predator control agency.

Name of Predator Control Agency that I contacted: __________________________________

1. Obtain name, address and phone number of assigned predator control agency. Write that
   information in space below.

2. Write a letter to assigned predator control agency asking for information on predators,
   predator control, laws, etc. related to your state. Attach letter to back of sheet.

3. Organize all information in three-ring notebook. Decide the best way to organize the
   information you received. Make a table of contents to make the information easy to find.

4. Present the three-ring notebook to the club so that other members can use it as a re-
   source.
PREVENTING PREDATOR LOSSES
SHEEP, LEVEL IV
Activity Sheet #10, Predator Control Topic Resource List

Directions: Choose a particular topic related to predator control (i.e. guard dogs). Make a list of all information available on the topic. Be sure to include videos, magazines, books, pamphlets, fact sheets as well as names and addresses of reliable sources. Use the agency notebooks put together by members earlier on these topics as a reference.

My Predator Control Topic is: ___________________________________________________

The following is a description of all information related to my topic. Record the following for each piece of information: name, type (video, book, magazine, person, etc.), source (ADC, APHIS, USDA, extension service) and cost.

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79–Sheep, Level IV
Advanced Genetic Concepts
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
  • Definitions of several genetic concepts
  • Relationships of genetic concepts

ABOUT THEMSELVES:
  • The importance of these genetic concepts in their lives

Materials Needed:
  • Activity Sheet #11, Advanced Genetic Quiz
  • Leader Key—Advanced Genetic Quiz
  • Flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

In an earlier lesson, we discussed some basic genetic concepts and looked at what happens when a trait is controlled by a single gene pair with two alleles. Unfortunately, many traits (especially the economically important ones) are controlled in a much more complex manner.

The first example is multiple (>2) alleles. Horn growth in sheep is thought to be controlled by at least three alleles. The “P” allele results in the polled condition. The “p” allele is sex influenced where males are horned and females are polled. A trait is said to be sex influenced when the same genotype is expressed differently in males than in females. A third allele “p'” causes horns in both sexes. Also, polled is not completely dominant to horned. Heterozygous sheep tend to be scurred.

There are six possible gene combinations. Let’s look at the genotypes and discuss the phenotypes:

PP = rams and ewes are all polled
Pp = rams are scurred and ewes are polled
Pp' = rams and ewes are all scurred
pp = rams are horned and ewes are polled
pp' = rams and ewes are all horned
p'p' = rams and ewes are all horned

Leader Notes

Definitions in this lesson should be illustrated in some way. Provide matching lists of terms and definitions or use in a quiz bowl setting, etc.

List alleles and combinations on flip chart or other visual.

Set up a punnet square if you want to know percent of each offspring.
As you can imagine, when you have more alleles and combinations of alleles, selection becomes much more difficult.

Some traits are sex limited (expressed only in one sex). For example, milking ability is an important trait for sheep. Even though a ram does not give milk, he has genes for milk production which he passes on to his daughters.

Sheep have 27 pairs of chromosomes, 26 pairs of autosomes and one pair of sex chromosomes. Most genes are found on the autosomes; however, some traits are sex-linked (controlled by genes on the sex chromosomes). Ewes have two “X” chromosomes and will always pass one or the other on to all their offspring. Rams have one “X” and one “Y” chromosome. They pass the “X” chromosome on to all their daughters and the “Y” chromosome on to all their sons. Any traits controlled by genes on the “Y” chromosome are only found in males and are always passed from father to son.

Another complexity is called epistasis. This refers to the condition where the expression of one gene is influenced by genes at another locus. Fleece color is affected by epistasis.

For the most part, the different modes of inheritance we have discussed up to this point were controlled by a few alleles at one or a few loci. We can classify the expression of these traits into discrete categories with few errors. A lamb is either polled, scurred or horned. Environment has little effect on these traits. A spider syndrome lamb has the defect regardless of nutrition. A ram with the genetics to be horned will be horned regardless of the climate in which it was raised. These traits are known as qualitative traits.

While these traits provide good illustrations of inheritance, they are generally not as economically important to sheep producers as other traits. Examples of economically important traits include fleece weight, average daily gain, feed efficiency and reproductive rate. Most of the traits are controlled by many alleles at many loci with each single gene having a relatively small effect. Since these traits are not discrete (a lamb can gain .5 lbs/day, 1.5 lbs/day or any value in between), they are said to be continuous. These traits are also greatly affected by environment. They are known as quantitative traits. Even though the inheritance is the same as in qualitative traits, the large number of loci results in an expanded range of expression.

Additive gene effects are consistently transmitted from parent to offspring because they are cumulative, independent of other genes and are not affected by the environment. Additive gene effects are, thus, the best indicator of the value of a breeding animal and are known as breeding value. Breeding values, performance testing and EPDs (expected progeny differences) will be discussed in another lesson.
**ACTIVITY**

**Heritability** is that portion of variation due to additive gene action. The more highly heritable a trait (range 0.0 to 1.0), the more likely the offspring will be the average of its parents. When heritability is low, there is a lot of variation due to other things such as environment. Progress made through selection is more rapid when heritability is high. Most reproductive traits (except scrotal circumference at .35) are low in heritability (.05 to .25). Growth traits (weight and daily gain) are moderate to highly heritable (.15 to .40). Carcass traits such as muscle or fat thickness are also moderate to highly heritable (.30 to .50). Most fleece traits are highly heritable (up to .55).

Some genes affect more than one trait. Therefore, we have a means of quantifying these relationships. It is known as **genetic correlation**. Values of genetic correlation range from -1.0 to 1.0. Traits that are independent of each other (have no genes in common) have correlations near zero. If a correlation is high and positive, selection for an increase in one trait will result in a marginal increase in the other trait. For example, the genetic correlation between 60-day weight and 120-day weight is .70. This implies that a lamb with a high breeding value for 60-day weight would also have a high breeding value for 120-day weight. Some traits are negatively correlated. In this case, selection for an increase in one trait can lead to a decrease in the other trait.

This has been a brief overview of some genetic concepts important to sheep breeders.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. How do you prefer to study genetics? Why?
2. Which concept was most difficult to understand? Why?

**Process:**
3. What types of traits are generally economically important?
4. Why is it usually difficult to make improvement in economically important traits?

**Generalize:**
5. How does genetic research benefit people?

**Apply:**
6. How will these concepts help you understand human genetics?

**GOING FURTHER:**
1. Visit a genetic research farm or laboratory.

**REFERENCES:**
SID Sheep Production Handbook

Leader Notes

List low, moderate and high heritability estimates. Ask members to list examples of each.

Outline genetic correlations and their relationships.

Review with Activity Sheet #11, “Advanced Genetic Quiz.” Work in pairs and then as total group.

Do activity sheet or reviews before dialogue questions.
Leader Notes

ACTIVITY

Introduction to quantitative genetics, D.S. Falconer, 1989.

Author:
Jeremey Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
1. The owner of sheep flock A purchases a ram from flock B that has an average daily gain of 1.3 lbs per day. He also purchases a ram from flock C with an average daily gain of 1.1 lbs per day. He randomly mates each of these rams to 1/2 of his ewes. To his surprise, the lambs sired by ram C have a higher average daily gain than the lambs sired by ram B. What possible explanations can you give for this unexpected result?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2. Traits where one genotype is expressed differently between the sexes are known as _______ traits. Some traits, such as scrotal circumference, are only expressed by one sex. They are called _______ traits. Traits inherited by genes on the sex chromosomes are called _______ traits.

3. Describe the differences between qualitative and quantitative traits.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

4. Define heritability:

_______________________________________________________________________

5. Frame size (height) and fleece grade have a negative genetic correlation. If you select for larger sheep (size as your only selection criteria), you will tend to: (circle one)

a) improve the fleece quality of your flock somewhat

b) have no effect on the fleece quality of your flock

c) reduce the fleece quality of your flock somewhat
1. The owner of sheep flock A purchases a ram from flock B that has an average daily gain of 1.3 lbs per day. He also purchases a ram from flock C with an average daily gain of 1.1 lbs per day. He randomly mates each of these rams to 1/2 of his ewes. To his surprise, the lambs sired by ram C have a higher average daily gain than the lambs sired by ram B. What possible explanations can you give for this unexpected result?

- Average daily gain is a quantitative trait (affected by many loci)
- Average daily gain is greatly influenced by environment
- Average daily gain is continuous and thus can be expressed in a wide range

2. Traits where one genotype is expressed differently between the sexes are known as sex influenced traits. Some traits, such as scrotal circumference, are only expressed by one sex. They are called sex limited traits. Traits inherited by genes on the sex chromosomes are called sex-linked traits.

3. Describe the differences between qualitative and quantitative traits.

   **Qualitative**
   - traits controlled by a few alleles at few or one loci
   - highly heritable
   
   **Quantitative**
   - controlled by many alleles at many loci
   - small effect by any single gene
   - greatly affected by environment
   - may have expanded range of expression

4. Define heritability:

   - that portion of variation due to additive gene action

5. Frame size (height) and fleece grade have a negative genetic correlation. If you select for larger sheep (size as your only selection criteria), you will tend to: (circle one)

   a) improve the fleece quality of your flock somewhat
   
   b) have no effect on the fleece quality of your flock
   
   c) reduce the fleece quality of your flock somewhat
Genetic Defects
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
- How to test for genetic defect carriers
- Common genetic defects in sheep

ABOUT THEMSELVES:
- Basic traits they have inherited

Materials Needed:
- Activity Sheet #12, “Defect Quiz”
- Leader Key—Defect Quiz
- Flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

A defect may be defined as any characteristic which reduces the possibility of survival or impairs the producing ability of the individual. We think of lethal defects as those that cause death, and sub-lethal as those that greatly impair the chance of survival. Some producers also consider any trait that greatly reduces the economic value of a sheep to be a defect. Serious hereditary defects are normally of low incidence in most flocks as the affected individuals will likely not live long enough to reproduce. Many defects are inherited as recessives. Because of this, the gene responsible for the defect remains hidden within the “normal” flock and the defect persists at a very low incidence for an indefinite period of time.

Since most defects are inherited as recessives, by culling affected individuals, you are placing selection pressure against the defect. However, theoretically, you will never eliminate it as carriers will persist. A carrier is an individual that is heterozygous for the gene that causes the defect. Carriers appear normal, but will pass on the gene responsible for the defect to half its offspring.

Some defects, such as pigmented fleece cause only a limited economic loss and are not lethal; therefore, producers can tolerate it at low incidence. If the defect causes loss of life or seriously reduces the value of the affected lamb, producers should try to eliminate it from their flock. If a defect is inherited as a simple recessive, then the affected individual is homozygous for the defective gene. We learned in a previous lesson that a lamb gets one set of chromosomes from each of its parents. Therefore, we

Leader Notes
Due to the nature of this lesson, it is recommended that the lesson on basic genetic concepts be taught first.

Begin by having members share experiences they have had with genetic defects. Observe defects via pictures or live animals if possible.

List types of defects and define.

List and illustrate a carrier.
can conclude that both parents of an affected lamb are carriers. If pedigree information is available, culling the affected lamb and both its parents will greatly reduce the occurrence of the gene. In some cases, entire bloodlines (known to carry a defect gene) may be eliminated from the flock.

Let’s look at how a genetic defect may enter an otherwise defect-free flock. If none of the ewes in the flock are carriers, they would all have the genotype “NN” (we’ll use capital N to represent the normal gene and lowercase n to represent the defective gene). The producer purchases a ram that looks normal, but is actually a carrier. In the case of simple recessives (complete dominance), the heterozygous individual (carrier), with the genotype “Nn”, is physically indistinguishable from the homozygous dominant (“NN”) sheep. The ram passes half of his genetics to each lamb.

Ram “Nn” Ewes “NN”

\[
\begin{array}{c}
\frac{1}{2}N \\
\frac{1}{2}n
\end{array}
\begin{array}{c}
\frac{1}{2}N \\
\frac{1}{2}N
\end{array} = \text{all N}
\]

The diagram illustrates that \( \frac{1}{2} \) the offspring will have the genotype “NN” and the other half will be “Nn”. All will appear normal, as none are homozygous recessive. A homozygous recessive lamb “nn” is not possible as none of the ewes are carriers, and they must pass on only the “N” gene.

We can set up a punnet square to further illustrate the possible genotypes of the offspring. Put the sire genotype on top of the square and the female genotype on the left side of the square.

\[
\begin{array}{c|c}
& N & n \\
\hline
N & & \\
N & & 
\end{array}
\]

Fill down the rams genes, then fill across the genes of the ewes.

\[
\begin{array}{c|c|c}
& N & n \\
\hline
N & N & n \\
N & N & n \\
\end{array}
\]

There are 4 possible ways for the genes to combine, half result in “NN” and half in “Nn”. None are “nn”, so all offspring appear normal.

In cases like this, the producer may not realize the defect has entered his flock for 2 or 3 years after he/she purchased the initial carrier. Only if the daughters of the carrier are mated to another carrier or their sire might the defect show up.

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ACTIVITY

If a ram and a ewe produce a normal offspring, you can’t be sure that one or both of them is not a carrier. However, if any ram or ewe produces a defective (recessive inherited) offspring, you can be positive that it is a carrier.

Many producers find it desirable to conduct a progeny test to see if a prospective sire carries a recessive defect. The simplest way to do this is to mate the ram whose genotype is unknown “N?” to actual affected ewes “nn”. Since the ewes can only pass on the defective “n” gene, if the ram is a carrier “Nn” some of the offspring should exhibit the defect. Since the ram appears normal we know that he must have at least one “N” gene. The other could be either “N” or “n”. We can set up the punnet square to look at the possibilities.

Show illustrations on flip chart.

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<thead>
<tr>
<th>Sire = “N?”</th>
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<td>N N or N n</td>
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All normal lambs 1/2 affected lambs

If the ram is not a carrier, all the lambs will appear normal. If the ram is a carrier, some of the lambs will exhibit the defect. If the ram produces at least 5 or 6 normal lambs and no defective lambs, we can be 95% confident that he is not a carrier.

In the case of many defects, actual homozygous recessive individuals are not available for breeding. We can use ewes that are known carriers (appear normal, but have produced at least one defective offspring in the past). Since we know that carriers have the genotype “Nn”, we can set up the punnet square to once again look at the possibilities.

Show illustrations on flip chart.

<table>
<thead>
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All normal lambs 1/4 affected lambs

Once again, it only takes one affected lamb to indicate the sire is a carrier. However, it takes more normal offspring (11) to be 95% confident that the ram isn’t a carrier.

Progeny tests can also be conducted by mating the sire in question to ewes that have a known carrier somewhere in their pedigree, or to the rams own daughters. However, it takes even more normal offspring to be confident that the ram isn’t a carrier.

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<table>
<thead>
<tr>
<th>Leader Notes</th>
<th>ACTIVITY</th>
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<tbody>
<tr>
<td>Now that we know a little about defects and how to get rid of them, let’s look at some examples of defects.</td>
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<tr>
<td><strong>Spider syndrome:</strong> A recently identified, and serious defect is known as spider syndrome. It is often lethal, although some can be kept alive through intensive care. It is also inherited by recessive gene action. The condition involves abnormalities of the musculo-skeletal system, which become evident shortly after birth. Symptoms include extreme height, fineness of bone, lack of muscling and bent leg deformities which give rise to the spider-like appearance. Spider lambs may also have a malformed sternum, crooked spine and an arched or crooked nose. All carriers should be culled, or at the very least only mated to non-carriers with all the offspring being slaughtered. Spider syndrome is generally associated with Suffolks; however, it has been found in other breeds as well. This defect is very costly and seems to be increasing in frequency.</td>
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<td><strong>Jaw defects:</strong> Jaw defects (failure of the incisors to meet the dental pad properly) are found in all breeds of sheep. Monkey mouth (lower jaw extends past the upper jaw) and parrot mouth (upper jaw extends past the lower jaw) are two common types. The degree of severity varies, but it seems to cause the most problems to grazing sheep. The mode of inheritance is not entirely known. Although it is definitely undesirable, culling may only be necessary in extreme cases.</td>
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<tr>
<td><strong>Rectal prolapse:</strong> Although rectal prolapse is largely due to environmental factors, genetics also play a role. Most affected individuals do not survive or are slaughtered. If certain bloodlines (or sires) produce a higher incidence of affected offspring, the producer should consider culling them. Heavy feeding, dusty conditions (which lead to coughing) and extremely short docking may have more to do with rectal prolapses than genetics.</td>
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<tr>
<td><strong>Entropion (inverted eye lid):</strong> Entropion is widespread and affects many breeds. The mode of inheritance is unknown and believed to be very complex. It does appear to be highly heritable. The condition is easy to treat, and generally doesn’t cause much economic loss. However, affected individuals should not be retained for breeding. If untreated, the inverted eye lid causes extreme irritation to the eye.</td>
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<tr>
<td><strong>Cryptorchidism:</strong> One or both of the testes may fail to descend into the scrotum and be retained in the abdomen. The high temperature of the body cavity usually causes cryptorchids to be infertile. The condition appears to be inherited as a simple recessive. Rams with one or both testes held in the body cavity should not be used or sold as breeding rams.</td>
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<tr>
<td><strong>Dwarfism:</strong> Genetic dwarfs have occurred in many species of livestock. It is generally considered a simple recessive, sub-lethal defect. Dwarf lambs are characterized by shortened long bones due to the premature ossification of the epiphyseal plate. With the selection for larger framed sheep, this defect has decreased in recent years.</td>
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</table>
Horns or scurs: Horns are not considered a defect but may cause economic loss or injury to other sheep or people. However, some breeds are supposed to be completely polled. The expression of the trait is different between the sexes and also different between breeds.

Color: The inheritance of color is complex and commercially may not be considered a defect. In some breeds, the presence or absence of certain colors on the legs, ears or face may be a defect if it renders the individual ineligible for registration or reduces the value of the sheep. Colored wool or the presence of colored fibers (black fibers) within the white wool can reduce the value of the fleece. Sheep with a large portion of colored wool should be culled.

Skin folds (wrinkles): Wrinkles reduce eye appeal and make shearing more difficult, but otherwise don’t result in major losses. Skin folds appear to be highly heritable. This is most prevalent in wool-producing breeds.

Belly wool: Many fine wool breeds can have a problem with belly wool (which is less desirable) growing up the sides of the sheep, reducing the overall fleece value. Animals with excessive belly wool should be discriminated against.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What is the hardest part to understand about genetic defects?
2. Have you ever seen some of these defects? Which ones?

Process:
3. Why is it important to know if a lamb is homozygous or heterozygous?
4. Why might a producer not know that a certain defect is not in his flock for 2 or 3 years?
5. Why is it important to recognize how genetic defects are inherited?

Generalize:
6. What are some common inherited traits in other animals? Do they have a positive or negative impact?
7. What basic traits did you inherit?

Apply:
8. How will this understanding of genetics be useful to you in the future?

GOING FURTHER:
• Invite a purebred breeder to discuss bloodlines that have produced spider syndrome.

Use the Activity Sheet #12, “Defect Quiz,” as a review or it could be used as a pre- and post-test.
Leader Notes

ACTIVITY

REFERENCES:
Author:
Jeremey Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
You just purchased a Suffolk ram, and you want to make sure he is not a carrier of spider syndrome. If you mated him to known carrier ewes, and produced 11 normal lambs and no spider lambs, how confident could you be that the ram is not a carrier? ____%

If you got instead, ten normal lambs and one spider lamb, what are the chances that the ram is a carrier? ____%

If you didn’t have any known carriers available, what two other ways could you test the ram?
__________________________________________________________________________
__________________________________________________________________________

Why is it difficult to completely eliminate defects that are inherited as simple recessives?
__________________________________________________________________________
__________________________________________________________________________

Spider syndrome is inherited as a simple recessive. If a spider lamb is born in your flock, which of the following statements are definitely true (T), might be true (M), or must be false (F).

T  M  F  The lamb’s sire is a carrier.
T  M  F  The lamb’s dam is a carrier.
T  M  F  All four of the lambs grandparents are carriers.
T  M  F  The lamb is a Suffolk.
T  M  F  The lamb is heterozygous for the gene causing spider syndrome.
T  M  F  At least two of the lambs grandparents were carriers.
T  M  F  Three of the lambs grandparents were not carriers.
T  M  F  The lamb should not be used for breeding.
T  M  F  The lamb’s twin is not a carrier.
You just purchased a Suffolk ram, and you want to make sure he is not a carrier of spider syndrome. If you mated him to known carrier ewes, and produced 11 normal lambs and no spider lambs, how confident could you be that the ram is not a carrier? 95\% 

If you got instead, ten normal lambs and one spider lamb, what are the chances that the ram is a carrier? 100\%

If you didn’t have any known carriers available, what two other ways could you test the ram?

Mate to ewes with spider producer in pedigree
Mate to daughters

Why is it difficult to completely eliminate defects that are inherited as simple recessives?

Because carriers appear normal but will pass on gene to half of their offspring

Spider syndrome is inherited as a simple recessive. If a spider lamb is born in your flock, which of the following statements are definitely true (T), might be true (M), or must be false (F).

- The lamb’s sire is a carrier. T M F
- The lamb’s dam is a carrier. T M F
- All four of the lambs grandparents are carriers. T M F
- The lamb is a Suffolk. T M F
- The lamb is heterozygous for the gene causing spider syndrome. T M F
- At least two of the lambs grandparents were carriers. T M F
- Three of the lambs grandparents were not carriers. T M F
- The lamb should not be used for breeding. T M F
- The lamb's twin is not a carrier. T M F
Methods of Genetic Evaluation
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
• The value of a contemporary group
• How to calculate estimated breeding values (EBV’s)
• How to calculate expected progeny differences (EPD’s)

ABOUT THEMSELVES:
• Importance of genetics in their lives
• Value of computers in predicting or projecting future possibilities

Materials Needed:
• Activity Sheet #13, Genetic Worksheet
• Leader Key—Activity Sheet #13, Genetic Worksheet
• Flip chart and markers

ACTIVITY TIME NEEDED: 60 MINUTES

ACTIVITY

As we discussed in an earlier lesson, a lamb’s phenotype (outward appearance) is partly due to genetics and partly due to environment. Environment is not passed from parent to offspring but genes are. Therefore, when we select rams and ewes for breeding stock, we would prefer those with the best genetics. In order to accomplish this, we need to separate the genetic affects from the environmental affects.

The first steps in any type of genetic evaluation program are establishing an identification system, and keeping records of the important traits. Both have been discussed in prior lessons.

Some environmental factors, such as birth/rearing type (single, twin, triplet) are known and can be accounted for using adjustment factors. However, factors such as health, weather and management may affect performance but can not be easily accounted for. These may be referred to as unknown sources of environmental variation. The best way to account for these effects is to establish contemporary groups. A contemporary group is defined as a uniformly managed group of animals of similar breed composition, age and sex. An example might be Hampshire ram lambs from the same flock, born in January, weaned at the same time and fed the same ration after weaning. Animals within a contemporary group are exposed to the same environmental effects of management, weather and health.

Create a chart with columns for genetic and environmentally influenced factors that affect flock performance. Solicit responses from the group.

Define contemporary group and discuss its use.

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METHODS OF GENETIC EVALUATION

ACTIVITY

Comparisons within a contemporary group are made using deviations and ratios. A deviation is simply the difference between an animal's performance and the average performance of the contemporary group. A ratio can be assigned by dividing the individual performance by the group average and multiplying by 100. The average ratio is always 100 and any individual with a ratio of over 100 is above average. For example, consider a Dorset ewe lamb that gains 1.0 lbs/day while her contemporary group averaged .7 lbs/day gain. Her deviation would be +.3 lbs/day (1.0 – .7) and her ratio would be (1.0 divided by .7 multiplied by 100) 143. She gained 43% faster than the average of her contemporaries. When all the lambs are assigned a ratio, it is easy to rank them in order, which might aid in selection.

Estimated breeding values (EBVs) are the result of applying genetic theory and statistics to performance records. Several methods can be used depending on the number of records available. In the simplest case, a breeding value is simply the deviation multiplied by a weighting factor, such as heritability.

In the equation, \( EBV = b(P-p) \), estimated breeding value equals the weighting factor multiplied by the difference between individual performance and contemporary group average performance.

Let’s look at an example. A Rambouillet ram has a grease fleece weight of sixteen pounds while his contemporaries average thirteen pounds. The heritability of grease fleece weight is .40. This ram has a BV for grease fleece weight of .4(16-13) = +1.2 pounds. This means he is predicted to have the genetics for 1.2 pounds more grease fleece weight than the average of his contemporaries. If more information is available on ancestors, siblings and offspring, the formula can be extended to include all the information and derive a more accurate prediction. For highly heritable traits, individual performance may be a strong indicator of genetic worth. If the trait is low in heritability, individual performance may not be a good indicator of genetic value.

Breeding values and ratios should only be used to compare lambs from the same contemporary group. A ratio from one group has little meaning in another group as the environmental effects may have been drastically different. Fortunately, much selection of breeding stock (especially replacement ewe lambs) is done within the flock. However, many producers must purchase rams. They select from several flocks (contemporary groups). In this case, we must rely more on individual performance and phenotype.

Since we are often more interested in a sheep’s progeny (offspring) than the individual itself, we would like to predict the performance of the prospective ram’s (or ewe’s) lambs. Each parent transmits half of its genetic material to the offspring. Therefore, we can calculate a flock expected progeny difference (EPD) by dividing the breeding value by

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two. The average flock EPD is zero and EPDs are generally expressed as deviations from that average. If ram A has an EPD for 90-day weaning weight of +4.3, you would expect his lambs to average 4.3 pounds heavier at weaning than the average of the flock. If ram B has a 90-day weaning weight EPD of +5.0 lbs, you could expect his lambs to average 0.7 lbs heavier at weaning than the lambs from ram A.

At this time, sheep EPDs are useful for within flock comparisons only. In order for comparisons to be accurate between flocks or contemporary groups, there must be related individuals in each group. If artificial insemination becomes more popular, some rams may be used as sires in multiple flocks providing the basis for breed EPDs instead of just flock EPDs. As of 1999, the Suffolk, Polypay, and Targhee breeds are attempting to calculate breed EPDs.

When little information is available, the accuracy of values such as EPDs is low. When more information is available (ancestors, siblings and especially offspring) the values become more accurate.

Also, these values are useful when comparing sheep based on one trait. In reality, we select breeding sheep on their merit in several areas. There are various methods of establishing a selection index or system which assigns weighted values to traits so that multiple trait selection can be practiced. These weighing values are difficult to figure because the relative value of any one trait may change from year to year, or even within a year.

**DIALOGUE FOR CRITICAL THINKING:**

**Share:**
1. Which was most difficult to calculate, EBV’s or EPD’s? Why?

2. Have you used either of these values before? When? Where?

**Process:**
3. What is the significance of an EBV?

4. How can you use an EPD?

**Generalize:**
5. What other tools can you use to estimate performance?

6. How might genetic information benefit you personally?

**Apply:**
7. How might you use computers to assist with genetic predictions?

**GOING FURTHER:**
- Ask a producer that uses EBVs and EPDs to share their value for flock improvement.
METHODS OF GENETIC EVALUATION

Leader Notes

ACTIVITY

REFERENCES:
SID Sheep Production Handbook

Author:
Jeremey Geske, Former Extension Assistant, Kansas State University
James P. Adams, Extension Specialist, 4-H and Youth Programs, Kansas State University

Reviewed by:
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team
METHODS OF GENETIC EVALUATION
SHEEP, LEVEL IV
Activity Sheet #13, Genetic Worksheet

Shepherd Monty Dale raised five ram lambs this year. His most important selection criteria is 120-day weight which has a heritability of .30. According to his record book, here are the 120-day weights of his ram lambs:

A = 113, B = 143, C = 125, D = 120, and E = 131

What is the deviation for 120-day weight of ram A? _________

of ram E? _________

Calculate 120-day weight ratios for each of the rams.

A = _________
B = _________
C = _________
D = _________
E = _________

What is the deviation for 120-day weight of ram C? _________

of ram D? _________

The 120-day weight EPD of ram B is _________ and of ram E is _________. In terms of weight of offspring, how would you explain to Monty why he should use ram B instead of ram E as a sire?
Shepherd Monty Dale raised five ram lambs this year. His most important selection criteria is 120-day weight which has a heritability of .30. According to his record book, here are the 120-day weights of his ram lambs:

A = 113, B = 143, C = 125, D = 120, and E = 131

What is the deviation for 120-day weight of ram A? \( -13.4 \)

of ram E? \( +4.6 \)

Calculate 120-day weight ratios for each of the rams.

A = \( 89 \)

B = \( 113 \)

C = \( 99 \)

D = \( 95 \)

E = \( 104 \)

What is the deviation for 120-day weight of ram C? \( -0.42 \) lbs.

of ram D? \( -1.92 \) lbs.

The 120-day weight EPD of ram B is \( 2.49 \) and of ram E is \( 0.69 \). In terms of weight of offspring, how would you explain to Monty why he should use ram B instead of ram E as a sire?
Specialized Marketing
Sheep, Level IV

What Members Will Learn . . .

ABOUT THE PROJECT:
   • Specialty markets for milk and wool

ABOUT THEMSELVES:
   • Their interest in pursuing the unusual

Materials Needed:
   • Flip chart and markers

ACTIVITY TIME NEEDED: 30 MINUTES

ACTIVITY

The majority of US commercial sheep producers raise sheep for the production of meat and/or wool. However, these are not the only valuable products we can get from sheep. In some areas of the country, there are small, specialized markets for sheep products that would otherwise have low value. Utilizing these alternative markets can be very profitable to the resourceful sheep producer.

One such product is milk. All sheep give milk; however, there are some breeds, such as the Friesian, whose only purpose is milk production. Some people are allergic to cows’ milk and must consume milk from goats or sheep. Sheep milk can also be used for making certain cheeses. In a dairy sheep operation, lambs are bottle fed and put on creep feed; ewes are then milked. As with any dairy operation, sanitation and health are of utmost importance. Generally, a producer will set up a contract with a buyer to produce so many pounds of milk before he/she starts the dairy sheep operation. It would be extremely unwise to go through the time and expense of starting a sheep dairy without first identifying a demand for the product and finding a buyer. Under the right circumstances and with some knowledge of the dairy industry, milking sheep can be a profitable enterprise.

In other lessons, we talked about the value of wool, and the characteristics that determine fleece quality. We generally think of fine, dense fleeces that are free from colored fibers and debris as being the most valuable. There are many breeds of sheep with long, coarse wool, as well as many breeds with colored fibers present in their fleeces. The resourceful producer may be able to receive more for these otherwise commercially low valued (since colored fibers don’t take dye well) fleeces by marketing.

Leader Notes
   Have members brainstorm and list specialty markets for sheep products.
   Have members research their favorite specialty market and report back to the group.

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them to hand spinners. A recent popularity surge in hand spinning has increased the demand for naturally colored fleeces. Natural colored fleeces come in various shades or combinations of black, brown, grey, red, tan and white. If you own some colored sheep, you may avoid the low commercial fleece prices by marketing the colored fleeces to hand spinners. Hand spinners often advertise in breed or industry magazines and publications.

Even though the handcraft industry is growing, it is still relatively small in size and cannot utilize all the colored wool produced in the US. A substantial quantity must be sold commercially at a lower price than white wool. With the exception of color, the factors that determine the value of a fleece for hand spinning are similar to the factors that determine commercial fleece value. Individual hand spinners may prefer different shades. Hand spinners generally prefer coarser fleeces; however, uniformity is more important than actual grade. Once again, before you decide to raise a bunch of natural colored sheep, it would be wise to establish a market first.

DIALOGUE FOR CRITICAL THINKING:
Share:
1. What sheep specialty markets have you heard about?

2. What sheep specialty market would you like to know more about? Why?

PROCESS:
3. What is the value of a sheep dairy?

4. Why do you think milking sheep would be better than milking goats or cows?

GENERALIZE:
5. What do you have to know about the market and yourself before planning a special market enterprise?

Apply:
6. What criteria should you use to determine the future of a special commodity market?

GOING FURTHER:
- Research a specialty market and report it to your group.
- Invite a specialty market person to share with your group.

REFERENCES:
SID Sheep Production Handbook

Author:
Jeremey Geske, Former Extension Assistant, Kansas State University
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**Reviewed by:**
Clifford Spaeth, Extension Specialist, Animal Sciences and Industry, Kansas State University
Sheep Design Team