

## Should She Stay or Should She Go?

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

She is one of your favorite ewes. Maybe she has a name. Maybe you think she has a lovable personality. Maybe you think she is “pretty.” But, as you evaluate flock production records, you realize she’s below average. Maybe she didn’t raise a lamb this year. Maybe she lambed late in the season and only produced a single lamb. Maybe her single lamb was among the lighter lambs at weaning, even after correcting for age. The bottom line: Your favorite ewe isn’t contributing her fair share to the profitability of your flock. She is not earning her keep. What do you do? Can you afford to keep an underperforming ewe, even if she is one of your favorites? The question is, **should she stay or should she go?**

### Culling Ewes

Culling is the practice of removing animals that are below average in production, are unsound, or are otherwise undesirable. It is largely driven by economics; that is, ewes should be removed from the flock to save feed for higher performing ewes (in other words, those ewes that are earning their keep). When feed costs are up and (or) lamb prices are down, keeping only the most productive



ewes makes even more sense. Ewes that have bad attitudes, are overly flighty or nervous, or reject or harm their lambs at birth – all things that can make lambing season more stressful or take up more of your time – are candidates for culling. These ewes may not be worth much on the market, but they are worth even less if you have to spend extra time on them every year. **Keeping underperforming or time consuming ewes is economically inefficient.**

The final decision to “keep or cull” should be made at weaning or shortly thereafter. However, candidates for culling are often identified at lambing. For example, if a ewe has severe lambing difficulty, modest milk yield, or poor mothering ability, she gets her ear tag notched and this is noted in your lambing records. That way, you won’t forget her when you make final decisions after she has weaned her lamb(s). Ewes without lambs should be culled as soon as practical.

### Is She Worth Keeping?

**Ewes should be culled on the basis of factors that will limit their future productivity.** In general, these factors may be divided into two categories: 1) Genetic contribution (offspring performance) and 2) Management considerations (temperament, health, etc.). Exact criteria will vary from flock to flock. In addition, measures of performance will depend on the end product (for example, replacement breeding sheep or market lambs).

#### What is Her Genetic Contribution?

The preliminary decision regarding a ewe’s status in your flock is made based on her genetic contribution. Does she pass along “good” genetics to her offspring? Do her lambs excel in growth traits? Will they make good breeding stock for replacement or sale? **Ewes in your flock should be there on genetic merit, rather than sentiment.** The question is, “How do you determine genetic merit?”

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**Using EBVs.** If your flock is enrolled in the National Sheep Improvement Program (NSIP), you can use Estimated Breeding Values (EBVs) to make preliminary “keep or cull” decisions. EBVs are the best tool you have for determining an animal’s genetic merit because they combine all available performance information for a particular trait into a single genetic value for each animal in the flock. Each source of information is weighted appropriately, heritability is factored into the equation, and contemporary groups are used to account for known environmental differences. Therefore, you can fairly compare ewes using these genetic values for economically important maternal, growth, and(or) wool traits and make decisions based on these comparisons.

Typically, for commercial sheep producers, profitability is driven by pounds of lamb weaned per ewe exposed. The more pounds of lamb sold increases revenue and return per ewe. Thus, EBVs of most importance for making “keep or cull” decisions in the ewe flock include:

- Number of lambs born (NLB; evaluates genetic potential for prolificacy)
- Number of lambs weaned (NLW; evaluates combined effects of prolificacy and lamb survival to weaning)
- Weaning weight (WWT; estimates preweaning growth potential)
- Maternal weaning weight (MWWT; estimates genetic merit for mothering ability)

EBV results are organized by sex and stage of production, so all adult ewes are listed together. Using a spreadsheet, ewes can be sorted, from best to worst, on EBVs of a trait considered to be important, for example, NLB. This procedure can also be repeated for NLW, WWT, and MWWT. Ewes with the lowest EBVs for each trait are identified. These are candidates for culling. If your favorite ewe is at the bottom of one or more of these lists, **she should go.**

**Using Trait Ratios.** Participating in NSIP allows purebred producers to get the most genetic information from their records. However, for commercial producers or purebred producers not enrolled in this program, trait ratios are the next best thing for identifying superior (and conversely, inferior) ewes in a flock. A trait ratio compares performance of a ewe relative to her contemporaries (that is, ewes that are uniformly managed and of similar genetic type).

Ewe productivity (total pounds of lamb weaned per ewe exposed) is a good trait upon which to base “keep or cull” decisions because it combines lambing rate (single, twin, triplet), maternal ability (milk production), and lamb growth into a single attribute that can be indexed. A ewe that is average for ewe productivity has a ratio of 100. A ewe that is superior will have a ratio greater than 100 and a below average ewe will have a ratio less than 100. Thus, ewes can be ranked, from best to worst, on total pounds of lamb weaned. A ewe’s superiority or inferiority relative to her contemporaries is quickly identified. Ewes with ratios below the average (100) are candidates for culling. So, if your favorite ewe is at the bottom the list, **she should go.**

### Calculating Ewe Productivity Ratios

**Step 1.** Correct weaning weights for lamb age and adjust for age of dam, sex of lamb, and type of birth and rearing.

$$\text{Age-Corrected WW} = [(\text{Actual WW} - \text{BW}/\text{Weaning Age}) \times \text{Standard Age} + \text{BW}]$$

$$= \text{Prewearing ADG} \times \text{Weaning Age} + \text{BW}$$

where WW = Weaning Weight  
 BW = Birth Weight  
 Standard Age = 60, 90, 120 days.

First, subtract birth weight from weight at weaning. Divide this difference by age (in days) of the lamb when the weaning weight was taken. This gives rate of gain from birth to weaning (preweaning ADG). Next, multiply rate of gain by the standard age (that is, age to which the adjustment is made, which may be from 60 to 120 days). Finally, add birth weight. The result is the age-corrected weaning weight. See **Table 2** for an example.

After correcting for weaning age, weaning weights are further adjusted for nongenetic effects of age of dam, lamb sex, and lamb type of birth and rearing. Adjustment factors have all been derived from NSIP data and are presented in **Table 1.**

**Table 1. Weaning (and Prewearing) Weight Adjustment Factors Derived from National Sheep Improvement Program (NSIP) Data<sup>a</sup>**

Item	Class	Adjustment <sup>b</sup>
Ewe age	1 yr	1.14
	2 yr	1.08
	3-6 yr	1.00
	>3 yr	1.05
Sex	Ram	0.91
	Wether	0.97
	Ewe	1.00
Type of birth and rearing	Single/Single	1.00
	Single/Twin	1.17
	Twin/Single	1.11
	Twin/Twin	1.21
	Triplet/Single	1.19
	Triplet/Twin	1.29
	Triplet/Triplet	1.36

<sup>a</sup> From Sheep Production Handbook, American Sheep Industry Assoc., Inc., 2002 Edition, Vol.7.

<sup>b</sup> Factors not breed specific (generic).

The final adjusted weaning weight (Adj. WW) is obtained by multiplying the age-corrected weaning weight by the three adjustment factors:

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$$\text{Adj. WW} = \text{Age-Corrected WW} \times \text{Ewe Age Adjustment} \\ \times \text{Sex of Lamb Adjustment} \\ \times \text{Type of Birth and Rearing Adjustment}$$

See **Table 2** for an example.

**Step 2.** Calculate total pounds of lamb weaned (ewe productivity) for each ewe using the age-corrected adjusted weaning weights.

**Step 3.** Calculate average ewe productivity for the contemporary group (that is, ewes of similar genetic type managed under uniform conditions).

**Step 4.** Divide each individual ewe's productivity by the contemporary average and multiply by 100.

$$\text{Ewe Productivity Ratio} = \frac{\text{Individual Ewe Productivity (lb)}}{\text{Contemporary Ewe Productivity Average (lb)}} \times 100$$

Round this value to the nearest whole number. See **Table 2** for an example.

**Table 2. Comparing Ewe Productivity (An Example)**

Compare productivity of the following ewes. Assume lambs are weaned at an average age of 60 days.

	<u>Ewe #1</u>	<u>Ewe #2</u>
Ewe age, yr	2	4
Lamb type of birth and rearing	Twin/Twin	Twin/Twin
Lamb sex	Ewe/Ewe	Ram/Ram
Lamb birth weight, lb	8/10	10/12
Lamb weaning weight, lb	45/50	60/65
Lamb age at weaning, days	55	75

Adjusted weaning weights are 63.2 and 70.0 lb for the lambs out of Ewe #1 and 55.1 and 59.9 lb for the lambs out of Ewe #2. These are calculated as:

<u>Ewe #1</u>	<u>Ewe #2</u>
$[(45-8)/55] \times 60 + 8 = 48.4 \text{ lb}$	$[(60-10)/75] \times 60 + 10 = 50.0 \text{ lb}$
$48.4 \times 1.08 \times 1.00 \times 1.21 = 63.2 \text{ lb}$	$50.0 \times 1.00 \times 0.91 \times 1.21 = 55.1 \text{ lb}$
$[(50-10)/55] \times 60 + 10 = 53.6 \text{ lb}$	$[(65-12)/75] \times 60 + 12 = 54.4 \text{ lb}$
$53.6 \times 1.08 \times 1.00 \times 1.21 = 70.0 \text{ lb}$	$54.4 \times 1.00 \times 0.91 \times 1.21 = 59.9 \text{ lb}$

These two ewes weaned 133.2 and 115.0 lb of lamb, respectively, after adjusting for known environmental (nongenetic) effects:

<u>Ewe #1</u>	<u>Ewe #2</u>
$63.2 + 70.0 = 133.2$	$55.1 + 59.9 = 115.0$

If the flock average for ewe productivity is 125.0 lb, these two ewes have ewe productivity ratios of 107 and 92, respectively. These are calculated as:

<u>Ewe #1</u>	<u>Ewe #2</u>
$133.2/125.0 \times 100 = 107$	$115.0/125.0 \times 100 = 92$

The first ewe is 7% above average and is a "keeper;" the second ewe is 8% below average and is a candidate for culling.

### Is She Easy to Manage?

In addition to a ewe's genetic merit, several other factors contribute to her value in your flock. Most of these involve management considerations, and most can cost you in terms of stress, time, and, ultimately, money.

The following are some guidelines for culling a ewe flock based on management-related concerns. Decide which of them impact your flock. Then, make a list of culling criteria and stick to it. Remember, a ewe has to earn her keep.

- **Ewes that are open.** Open ewes are the biggest contributor to low weaning percentages and are costly in terms of feed, labor, and management. Individual ewes that did not lamb one year have a high likelihood of not lambing in the following year. If your favorite ewe failed to lamb, **she should go**. Her only reprieve should be for circumstances beyond her control.
- **Ewes with consistent single births.** Twinning is a lowly heritable trait, which means the reason for single lambs is likely due to non-genetic causes (for example, nutrition). Assuming ewes are in good condition at breeding, they should be expected to produce twins on a regular basis. It will cost you money if they don't. My rule of thumb: A ewe can have one single lamb in her lifetime, excluding her first time lambing.

If your favorite ewe consistently raises only single lambs, **she should go**.

- **Ewes that prolapse.** A ewe that has a vaginal prolapse this year has a high probability of having a reoccurrence next year. If your favorite ewe has prolapsed or has shown she is prone to the prolapse condition, **she should go**. Also, because this problem is highly heritable, you should not keep ewe or ram replacements from her either.

- **Ewes with bad udders.** The udders of all ewes should be palpated two to four weeks after weaning and again before breeding. Ewes with "lumpy bags," as a result of mastitis, should be culled. These ewes create management problems because they generally cannot produce enough milk to maintain the nutritional needs of their lamb(s), thereby creating need to bottle feed the lambs. Low hanging, pendulous udders may be a problem for lambs finding the teats for the first time and are more prone to injuries. If your favorite ewe has a bad udder, **she should go**.

- **Ewes with loose or missing teeth.** This is often an indication of age. A bad mouth impairs a ewe's ability to eat. As a result, she is likely to be in poor condition. She is unlikely to produce twins

and will not milk well as a result of poor feed intake. She may have been a good ewe in her lifetime, but if your favorite ewe has loose or missing teeth, **she should go.**

- **Ewes with chronic disease.** Health issues, such as chronic foot rot or parasite infection, make management of the flock more difficult and can be a drain on time, labor, and resources. Sheep that walk with a habitual limp because of foot rot or scald perform poorly and should be culled from the flock. Ewes that are persistently infected with internal parasites are a hazard to the rest of the flock. If your favorite ewe is always being treated for some health issue, **she should go.**
- **Ewes that are structurally unsound or have unacceptable conformation.** Ignoring structural soundness and conformation will eventually result in animals that are unacceptable. Ewes with weak pasterns and(or) legs that are too straight, for example, should be culled. Regardless of personality, if your favorite ewe is in this category, **she should go.**
- **Ewes with bad dispositions.** Culling a ewe for undesirable temperament is often overlooked; however, this practice can save a lot of stress down the road. In part-time operations, ewe disposition is even more important when making culling decisions, due to lack of time in dealing with poor mothering and poor doing or injured lambs. It's unlikely that your favorite ewe is unlovable, but if she is, **she should go.**
- **Ewes that lamb late in the lambing season.** The lambing season can be divided into early, middle, and late lambing cycles. Generally, lambs born in the early lambing group will be the most productive sheep in the flock. However, reasons for late lambing should be investigated. Reasons that are not the

fault of the ewe include an inadequate nutritional (flushing) program prior to the breeding season and ram infertility. A ewe should not be penalized for reasons beyond her control; however, if your favorite ewe consistently lambs late in the lambing season, **she should go.**

- **Ewes that are hard doing or emaciated.** Ewes that have low body condition scores, when the rest of the ewe flock do not, are candidates for culling. Their nutritional needs are much higher than the average of the ewe flock, and their conception and lambing rates are likely to be low. If your favorite ewe might be called "Skinny Minnie" throughout the production cycle, **she should go.**

### ***At the Barn: Keep or Cull?***

You have done the paper work. You have sorted your flock, from the best ewe to worst ewe, on the basis of estimated genetic merit. If you are enrolled in NSIP, that means you evaluated ewes using EBVs for economically important traits. If you are not enrolled in NSIP, you used ewe productivity ratios. Either way, you have a ranked list of ewes based on estimated genetic merit. In addition, you have reviewed your flock notes and studied production records. You have identified definite culls – ewes that are no longer functional, are unsound, or that have chronic health issues.

Now you head to the barn, where your ewe flock is penned. This is where you combine preliminary assessments made on paper with visual appraisal. Final keep-cull decisions can be made using a stepwise process (**Figure 1**).

- **Step 1:** Sort off definite culls. These are the ewes that, based on your flock notes and production records, are no longer

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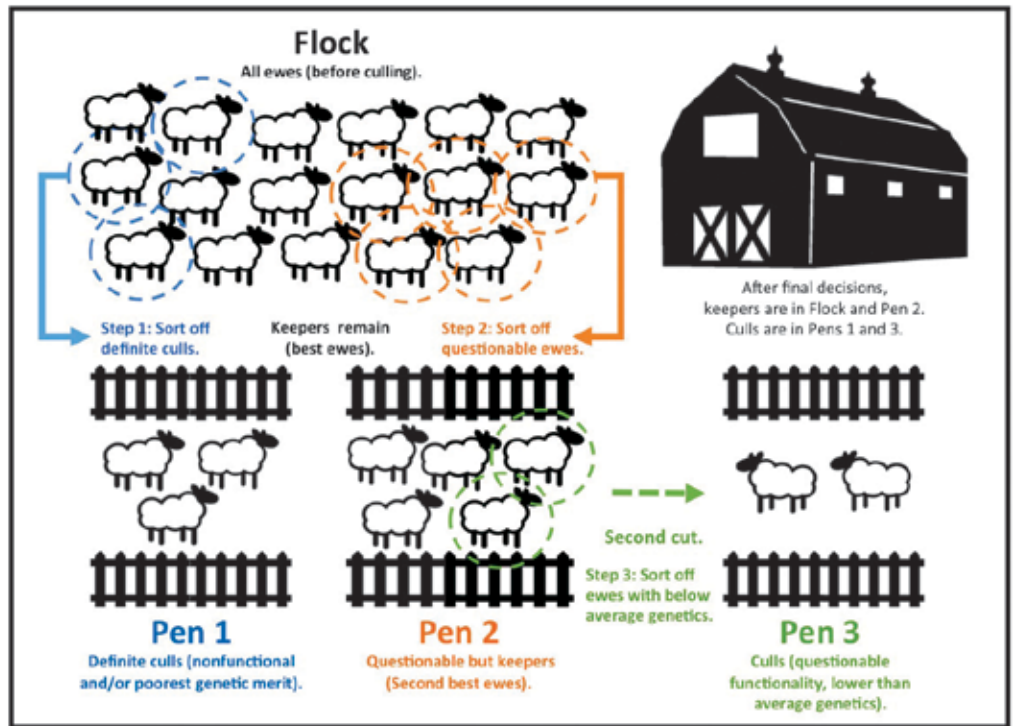


Figure 1. A Stepwise Process for Making "Keep or Cull" Decisions in a Ewe Flock.

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earning their keep (for example, those with loose or missing teeth, non-functional udders, or that are structurally unsound, etc.). These ewes will go in Pen 1. Ewes that are at the very bottom of your EBV (or ewe productivity ratio) list will also go in this pen. Sort through remaining ewes for any non-functional or unsound ewes that you might have missed on paper. Pen 1 is your cull pen.

- **Step 2:** Of the ewes remaining in your flock, sort off any that are questionable. These will go in Pen 2. They are still functional but are less than ideal. For example, these might be ewes with questionable mothering ability, mild udder problems, etc. Pen 2 may include ewes that you identified from your flock notes and production records or they may be those that you identify at the barn through visual appraisal. These are candidates for culling.
- **Step 3:** Go back to Pen 2. Now, sort off ewes with generally low EBVs (or below average ewe productivity ratios). These ewes now have two potential strikes against them: questionable functionality and below average genetics. They go to Pen 3. Remember, you culled the ewes with the very lowest EBVs (or ewe productivity ratios) in Step 1. The ewes in Pen 3 may be better than the bottom ewes, but they

are still genetically inferior.

- **Step 4:** Ewes in Pens 1 and 3 are your culls; they go to town. Ewes never sorted off your original flock are your best ewes. They, along with the ewes in Pen 2, are your keepers. If you want to cull more intensely, go back through the ewes in the Pen 2. On the other hand, if you have initially culled more ewes than you can replace, go back through the ewes in Pen 3 and pull out the least objectionable of these ewes and put them with back with your keepers in Pen 2.

In the end, if your favorite ewe is in Pen 1 or 3, **she should go.**

*Note: If you don't have multiple pens, you can sort ewes using a series of marks. For example, definite culls would automatically get two marks. Questionable ewes would get one mark initially and a second mark, of another color, if found lacking when evaluated for genetic merit. Ewes with two marks, of any color, would be your potential culls; ewes with no more than one mark would be your definite keepers.*

### Now that She's Gone

You made the hard decisions. You culled underperforming ewes. Even your favorite ewe might be headed to town.

Now what? If you are going to keep a constant flock size, culling of ewes leads to selection of replacement ewe lambs. How will you select them? Culling is the opposite of selection; thus, the same criteria you based culling decisions on are used to select replacements.

When selecting ewe lamb replacements, first identify lambs that were born as twins or triplets and select ewe lambs from this group. If additional replacements are needed, select single lambs from young ewes. Even though reproductive rate is lowly heritable (5 to 15%), you can increase profitability of your flock by selecting for multiple births. Next, look at lamb growth. Remember, to compare ewe lambs, their weights need to be corrected to a standard age and adjusted for age of dam and type of birth and rearing. Selection should be among the fastest growing twin lambs. Preliminary selection is made by examining EBVs (or trait ratios) for growth traits. Next, go through all replacement candidates and remove any ewe lamb that has an obvious physical or structural problem. Remember, your goal in selecting replacements is to find

healthy breeding ewes that will improve the genetic merit of your flock.

### Conclusion

Culling underperforming or problem ewes and selecting replacements are some of the most difficult decisions you make each year. Certainly, naming your favorite ewes can make culling more difficult. It's easier if all ewes are considered "just sheep" with nothing special about any of them. A flock of easy keeping, trouble free ewes, with every ewe carrying her load, is possible if you cull rigorously and select replacements that are more productive than the ewes you culled.

***Underperforming ewes should not be maintained in your flock. A ewe can't just be a favorite. She has to earn her keep.***

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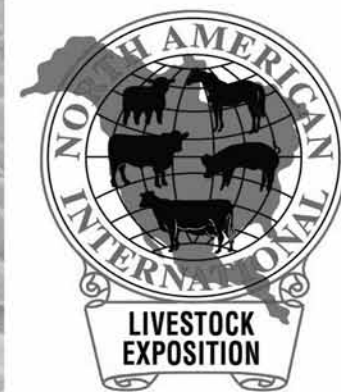
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