

Ewe efficiency

SIL Technical Note

Relates to: Selection to increase productivity per unit of ewe body weight

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Date: 18 November 2005

Summary

- Efficiency is defined as more production relative to size of the ewe
- SIL Dual Purpose selection indexes favour efficient sheep
- They do this by rewarding higher reproductive rate, better survival, better milking ability, greater wool weight and faster early growth while penalizing adult size
- Breeders are encouraged to record a later bodyweight to better estimate merit for adult size.
- Increased efficiency is not necessarily associated with a reduction in the size of ewes

Background

Historically, genetic improvement schemes in New Zealand focused on production. Costs of production were not considered. Therefore more “growth” was seen as desirable, to get lambs away earlier, without consideration of the consequence this may have had on adult ewe size.

Ewe sizes have increased in the last 10-20 years. In part this is due to a shift in focus from per hectare production to per head production, and consequence increased feeding levels. In part it reflects “smarter” management to get the best from productive genotypes. A further part is due to breeders successfully selecting for increased size at younger ages.

Modern selection methods allow faster gain than previously possible. Some experienced breeders believe that, in their situations, increased growth potential achieved through selection, leads to increased adult ewe size which erodes advantages from fast growing lambs. Big ewes eat more, and part of what they eat is for themselves, not their lambs. These breeders want to increase early growth without commensurate increases in ewe size.

Some people use the term “curve bending” to describe the goal of increasing early growth while holding, or reducing late growth. This is because we want to alter the shape of the typical growth curve. This objective is accepted as desirable by many in the beef breeding industry, although they want to reduce birth weight as well.

However, efficiency is more complex than this. Other traits are important in defining the “efficient ewe”.

Definition of efficiency

Efficiency is not just curve bending. An efficient ewe may also produce more wool, have more lambs, be a good mother or milk well. Super ewes will do all of these things! So the following traits need to be considered, taking account of their economic value, the degree to which they are inherited and their relationships with each other (associated BVs in brackets).

- Early growth (WWT & CW) vs late growth (EWT)
- Fleece weight (FW12)
- Reproduction (NLB) vs ewe size (EWT)
- Survival – both direct (the lamb’s vigour) and maternal (mothering ability)
- Milking ability (WWT_M)

It should be emphasized that this definition does not prevent a large ewe being more efficient than a small ewe. Efficiency is production **relative** to ewe body weight.

Genetics of Efficiency

These traits vary in the degree they are inherited. Unfortunately some are lowly heritable e.g. weaning weight, reproduction, and survival. SIL indexes take account of this as well as the degree to which genes influence more than one trait.

Since weaning weight is lowly heritable relative to other LW measurements, SIL recommends measuring an autumn LW as well to better discriminate animals on the basis of early growth relative to late growth.

Selecting for Efficiency

SIL indexes take account of the economics of productive traits in terms of returns and of costs. They use appropriate discounting methods to account for when income is earned. For the traits themselves, they reward good performance in traits that increase returns while penalizing performance where it increases costs of production.

Using standard SIL DPO indexes will favour more efficient sheep. You can examine the nature of differences between sheep by looking at performance in component traits.

Is Ewe bodyweight an adequate measure of what a ewe eats?

Much evidence exists to suggest that body weight is the major determinant of what a sheep eats for maintenance - big sheep eat more. In practice it is very difficult to estimate actual feed intake at pasture. So currently body size is the most practical predictor of feed requirement.

Estimating genetic merit for adult size

SIL uses bodyweight information collected to estimate genetic merit for adult ewe size (EWT BV). Where only WWT and autumn weight (e.g LW6) have been collected it uses these to estimate this. Better discrimination is got by measuring a later LW as well e.g. LW12 or LW18. Obviously, the later LW is better.

SIL does not use adult bodyweights measured later. Animals may vary in bodyweight at these times for a variety of reasons, such as how many lambs they have weaned in the last couple of seasons, and this may cause differences between animals that are difficult to correct for. SIL can correct for hogget lambing effects on the pre-mating 2-tooth bodyweight (LW18). It is more difficult to do this for older age groups.

Using LW data to predict genetic merit for NLB

Number of lambs born and bodyweight are genetically correlated, although the effect is not strong. Other things being equal, bigger ewes have more lambs. SIL uses information on autumn bodyweight (LW6,8or10) to predict the NLB BV more reliably. SIL recommends this be done.

It is possible to predict NLB BV without using bodyweight as a predictor. This will produce less reliable BVs with a smaller spread of values. These BVs will still be influenced by bodyweight given the natural genetic relationship between the traits.

SIL recommends using LW to predict NLB BV for several reasons. Firstly, the standard SIL indexes have been developed with index weights that assume LW is being used as a predictor for the NLB BV. These index weights are not optimal when bodyweight is not used to predict NLB BV. Secondly, NLB BV will be estimated more accurately using LW as a predictor. Thirdly, where the aim is to produce animals with high NLB relative to their LW, using LW as a predictor of NLB will not eliminate the ability to discriminate and identify these animals. Animals with genetically high NLB relative to their EWT will be identified with the appropriate economic emphasis.

Best practice

SIL recommends the following practices:

- To put more pressure on ewe body weight relative to early growth, measure an autumn LW (LW6,8or10) on as many lambs as practical, then measure a later LW on your ram hoggets (LW12), if there are sufficient still on hand, and on your 2-tooth ewes prior to mating (LW18).
- When measuring LW18 on 2-tooth ewes, ensure their hogget lambing information is on SIL and complete.
- If reducing gains in ewe size is less of a priority, don't measure LW12 or LW18.
- Collect comprehensive survival and lambing data to obtain the most reliable estimates of genetic merit for NLB and Survival

Reporting on Efficiency

SIL recommends you simply use standard SIL DPO indexes. If you are interested in the components of an index, and are trying to characterize what is leading one animal to have a higher index (= more efficient), you can look at components of the index or components of the sub-indexes.

Need more information?

Contact your SIL bureau or call 0800-745-435 (0800-SIL-HELP).