

ACE evaluations

SIL Technical Note

Relates to: Comparing genetic merit across flock and across breed

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Summary

- ACE evaluations consider genetic merit for key production traits in sheep
- Listings are posted on the internet for the top performing sheep across a variety of traits and indexes
- ACE indexes are based on standard SIL indexes but are not the same in all cases
- SIL is working to enhance ACE evaluations – to add traits, to increase the pool of animals evaluated and to fine tune analyses
- Check out www.silace.co.nz

Background

Gains through genetic improvement require a means to validly compare genetic merit of animals. Within flock, this requires correction for known, non-genetic effects and the use of information about the performance of relatives. This can be extended to across flock comparisons provided there is the means to make meaningful estimates of non-genetic, flock effects. In practice this means “benchmarking” lamb performance through use of common sires.

Until recently this was very demanding on technical resources – computer hardware and software specifically. As the power of these technologies has increased we can now extend this further and begin to make comparisons across breed as well as across-flock.

It is well-known that in most situations there is more genetic variation within breed than between breeds. Such across-flock, across-breed comparisons can be used to find the best animals for specific production characteristics, irrespective of the breed or the flock they are from.

Who set up ACE?

ACE stands for **A**dvanced **C**entral **E**valuation. It is an initiative of SIL and it’s collaborators. ACE evaluations would not be possible without access to the data from the Alliance initiated Central Progeny Test trials, which have evolved, and now include data from three progeny test sites – Woodlands (Southland), Lincoln (Canterbury) and Poukawa (Hawkes Bay). A variety of groups have made significant contributions to this work and facilitated the ACE evaluations. The assistance of Alliance, AgResearch, Lincoln University, On-Farm Research and Abacus Biotech are gratefully acknowledged. Meat & Wool New Zealand, as well as funding SIL, is also contributing funds for ongoing support of these progeny test sites.

What ACE is

ACE ranks animals for genetic merit according to specific criteria. A variety of lists are produced, to characterise animals from different perspectives.

In order to participate in ACE evaluations breeders must be recording pedigree and performance on farm, and using the SIL system.

Many breeders in New Zealand give permission for their flock data to be used in the ACE evaluation. However, ACE will only rank animals where good genetic links between flocks allow valid comparisons to be made. Some good animals may not appear on ACE lists if they have not given permission for their data to be used, or if they are not well linked for the traits in question. Without such links their merit cannot be validly compared to others in the evaluation. A later section looks at linkage briefly.

ACE only lists animals of high genetic merit. The aim is to make widespread use of these in the industry. For this large-scale evaluation, there is no value in identifying and publishing lists containing information on animals of lower genetic merit.

ACE uses the SIL system to estimate genetic merit. Reports are formatted in the same way as those used by SIL breeders.

ACE will update the evaluations regularly. Keep an eye on the website for this.

What ACE is not!

ACE does not provide the definitive description of genetic merit. For several reasons.

Firstly, not all sheep are farmed in the same way, for the same purpose. ACE focuses on the two dominant types – **dual-purpose** sheep, where some lambs are destined for meat production while others are kept as replacements for the ewe flock, and **terminal sire** sheep, where, commercially, all lambs born to a sire are destined for meat production. Clearly, maternal production traits are important in the former case but not the latter.

Not all breeders will face the same challenges to their breeding programme and some will be aiming for a different sector of the market. ACE recognizes this and produces a variety of listings that will be of interest to most breeders.

So ACE does not identify the top, single sheep in New Zealand!

While ACE ranks animals on key production traits, it does not do so for ALL traits important to sheep production. SIL focuses on traits amenable to measurement on farm and genetic analysis. Other traits, such as structural soundness, are not part of the SIL system at this time. As with SIL, the ACE system is another powerful tool that breeders can usefully apply to their breeding programme.

In addition, two features of the SIL system are NOT part of ACE – the trait of Survival and maternal breeding values are routinely part of many SIL evaluations but are not part of ACE.

Survival is a “new trait” not considered directly before the SIL system was developed. Recording methods for Survival data vary considerably between flocks which may cause problems in such a large analysis. For this reason it is currently excluded from the ACE rankings.

Maternal breeding values cannot be estimated because of the scale of the genetic ACE analysis and limits imposed by the hardware and software we are currently using.

Both these limitations are being addressed.

ACE lists

Currently, the following listings are available on the ACE website.

These lists are based on “ACE indexes” which are similar but not necessarily the same as SIL standard indexes. If you are familiar with SIL indexes, check out the equivalence of ACE indexes with those you are using. Do this by looking at what breeding values are included, and the weightings on these, for the indexes that you are interested in.

| List | Composition |
|-----------------------------------|---------------------------------------------------------------|
| <u>Composite indexes</u> | <i>Made up of these single trait sub-indexes</i> |
| ACE Terminal Sire | TS Growth + TS Meat |
| ACE Dual Purpose | DP Reproduction + DP Growth* + DP Wool |
| ACE High Performance Dual Purpose | <u>HP Reproduction**</u> + DP Growth* + DP Wool |
| ACE Maternal | DP Reproduction + DP Growth* |
| ACE Dual Purpose WormFEC | DP Reproduction + DP Growth* + DP Wool + DP Meat + DP WormFEC |
| | |
| <u>Single Trait Indexes</u> | <i>Traits in index as breeding values</i> |
| DP Reproduction | NLB |
| Dual Purpose Growth | WWT, CW, EWT |
| Terminal Sire Growth | WWT, CW |
| TS Meat | LEAN, FAT |
| DP Wool | LFW, FW12, EFW |
| DP WormFEC | FEC1, FEC2, AFEC |

* DP Growth does NOT contain the maternal weaning weight BV (WWT_M)

** HP Reproduction has a lower weighting in the index than DP Reproduction – so NLB BV will have less impact on the overall index

A work in progress

ACE is an ambitious undertaking. It is a good start but there are some issues requiring more attention. The following list of issues are currently being addressed. Others will be added to the list as we become aware of them and their importance to the industry.

- ACE will increase in value as we are able to rate animals in more flocks. This requires more flocks to agree to participate and for these flocks to become linked, directly or indirectly, with the main ACE evaluation group of flocks.
- Maternal breeding values cannot be estimated since the ACE evaluation is so large. SIL is working to expand the capability of the software and hardware to overcome this limitation.

- Some ACE indexes have fewer traits in them than commonly used SIL indexes. As linkage between flocks and breeds improves for all traits, and as we address issues limiting the current analysis (maternal BVs), ACE will be able to offer more comprehensive indexes for ranking animals. However, single-trait focused lists will always be important while we have breeders pursuing slightly different breeding objectives.
- Current ACE evaluations do not account for hybrid vigour. Experts believe this will have little effect on Growth, Meat and Wool traits. While it is more likely to affect Reproduction, much of the breed crossing of interest occurs with similar breeds (Romney, Coopworth, Perendale) and more significant crosses are already present in the composite breeding flocks. Preliminary indications are that attempts to address hybrid vigour will yield only small gains as the effects are likely to be small and are hard to quantify from field data. SIL is working to implement a robust method that will address hybrid vigour without introducing biases to the analysis. It is reassuring that much genetic progress has been made in the past, in the presence of hybrid vigour (e.g. in the development of new breeds) and experts believe the effect of hybrid vigour, while present, does not invalidate the ACE evaluation.

ACE has value to the industry and this value will increase as these issues are addressed.

Flock linkage

Across-breed links are obtained from the information collected at the three progeny test sites. Here, rams of different breeds are mated to ewes and the performance of their progeny measured. In some cases daughters are kept for evaluation of maternal traits.

Within-breed links are obtained largely from existing collaborative breeding groups in the industry. These are usually based on sire referencing whereby common rams are used so that reference sires have progeny in more than one flock.

Some flocks may be well-linked with other flocks in a collaborative breeding group. However, if this group is not linked to one of the progeny test sites that ACE uses then the whole group will be excluded from the rankings that ACE publishes.

ACE publishes, on the website, visual depictions of a linkage analysis for key traits. These help show which flocks are well linked and which are not.

A brief point about linkage must be made. Good linkage is obtained when a sire has progeny in two, or more, flocks. Buying a young ram from another breeder which then has all its progeny in your own flock does not give adequate linkage for across-flock comparisons. SIL can provide more detailed information on linkage if you require it.

Using ACE lists

Listings available on the website (www.silace.co.nz) are formatted in the same way as those used by breeders using the SIL system. From this website you can download descriptions on how to interpret ACE information.

Need more information?

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