Simplifying selection

GENE TALK

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Selection indexes are familiar tools to bull and ram breeders but not always well understood by their clients. So what does a selection index tell a bull or ram buyer?

Breeders in New Zealand measure a range of key performance traits to assess merit. Those using Breedplan (beef cattle) and SIL (sheep) submit that information for genetic analysis to get the best estimates we can of genetic merit, the "estimated breeding values" (eBVs) you may have heard of.

EBVs are for individual traits but we all know that good merit in a single trait doesn't make a good animal – we are looking for those that perform well across the key traits affecting farm profit. By assessing genetic merit in key traits as eBVs, we are part way there.

It is difficult to juggle lots of figures for a range of traits in one's head when assessing the merits of different animals, and modern genetic evaluation systems keep adding traits as science extends the boundaries of our knowledge. Some people have told me it is "getting more complicated".

Selection indexes are a way to simplify selection by looking at overall genetic merit, across key traits and using a common scale, usually in dollars or cents. They combine genetic merit for traits with very different units of measurement into one figure e.g. for sheep traits like wool production (kilograms a year), number of lambs born a year, weight of lambs at weaning, carcase yield percent and faecal egg counts (a measure of parasite resistance).

Selection indexes take account of relative values of different traits AND variation in the traits AND their genetic control. They deliver the best estimate of overall economic merit.

Usually, an overall index is the first

Overall genetic merit is measured across key traits and using a common scale.

thing to look at when selecting bulls or rams, then at components of the index to assess balance across traits or to focus on a few key traits of interest to you.

SIL makes looking at balance easier by grouping eBV traits into goal trait sub-indexes when they contribute to the same outcome e.g. the Lamb Growth sub-index combines merit for weaning weight (WWT), milking ability (WWTM) and carcaseweight (CW – the measure of post-weaning growth). There are other sub-indexes for reproduction (litter size), lamb survival, meat yield (of the carcase), wool production, adult ewe size and a variety of health traits. Some are based on merit in two or more eBV traits. You can delve deeper down to eBVs to address specific requirements.

Indexes are one of the most useful things to judge genetic merit by but are not perfect. Firstly, because they are a single figure, they don't tell you about balance across traits. Two animals might have similar indexes for overall merit but one has good performance across all traits while the other has exceptional merit in one or two traits masking average to poor performance in others.

Secondly, indexes can be dominated by one or two traits with high economic merit (e.g. number of lambs born) but these are not what you want to focus on. This means the index is not optimised for your requirements. You can still use the index - set a "window" of acceptable values (upper and lower limits) for such a trait, then look for animals with good overall indexes that also meet this constraint.

Another reason they are not perfect is that they rate animals for genetic merit only in traits the evaluation

system analyses. For traits like structural soundness, live animal assessments can be used, but generally animals offered for sale will not have problems with this.

SIL has selection indexes optimised for most sheep farms, for dual purpose (breeding own replacements) and terminal sire (all lambs go to meat production) sheep. Beef breed societies publish information on a variety of selection indexes to suit different beef production situations. Check out the PBBNZ website (www.pbbnz.com) to find links to these groups.

Indexes measure overall genetic merit across different traits. They are usually expressed in units related to farm profit. They are best used at the first stage of selection before you look at component traits.

B+LNZ and SIL are interested in your views. Feel free to tell us your thoughts by sending an email to silhelp@sil.co.nz or leave a message on 0800-silhelp (0800-745-435).

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Did you know? Catgut, which was formerly used for tennis racket strings, does not come from cats. It comes from sheep, pigs and horses. The small intestines from 11 sheep were needed to make one tennis racket before we went to synthetic strings. Sheep do more than this for Wimbledon though – the felt on the outside of balls is usually made of wool treated to make it last as long as possible.