

# Expected responses to selection and index weights



## GENE TALK

Mark Young

**M**y last column (Page 55, *Country-Wide* July issue) stirred up debate about selection objectives. At one breeder meeting I spoke to recently a group of breeders were adamant that we must not make ewes smaller through selection. They were concerned that SIL Dual Purpose (DP, for ewe breeds) indexes were trying to accelerate lamb growth through positive weightings on lamb growth eBVs but decrease ewe size through a negative weighting on the adult size eBV.

Index weights alone do not indicate the direction of the expected responses to selection. We sometimes have to place quite aggressive weightings on some traits to try to work against strong associations between traits.

SIL's negative weighting on adult size for ewes is not expected to lead to decreased adult size. Rather it is expected to favour faster growing lambs with relatively more modest increases in ewe size. We just use the negative weight in the selection index to best discriminate those animals that "bend the growth curve" more, away from the average relationship between growth rate and adult size.

As previously described in this column,

growth rates of immature animals are strongly related to adult size i.e. most of the genes that make animals heavier at one time, make them heavier at other times as well. This can be thought of as "the genes that make you big ..., make you big, make you big, make you big". Not all of the genes that affect growth do this, but most do.

We want to "break" this association through selection to get animals that grow very fast but are not heavy adults. So our breeding programme needs to identify animals of this type. To do this, we must measure body weights at critical times to best discriminate genetic merit for early growth from that for late growth.

New Zealand beef cattle breeders face the same challenge. They want fast growth to market weight but don't want to breed ever heavier cows. Just like SIL DP indexes, beef cattle indexes for self-replacing genotypes place a negative weighting on mature cow weight while positively weighting earlier growth eBVs. In fact they are sometimes trying to do something even more complicated – they may want low birth weight (small size), fast growth (associated with large size) but modest sized cows (associated with small size).

In its simplest form we want animals that are more highly ranked for growth (genetically faster growth) than they are for adult size (genetically bigger adults). Conversely, animals with undesirable growth would be highly ranked for adult size but lower ranked for earlier growth eBVs.

Using SIL eBVs, you can contrast an animal's ranking for WWT (weaning body weight) and LW8 (autumn body weight) compared to EWT (adult ewe body

weight). Equivalent traits for beef cattle would be 200-day and 400-day weight compared to mature cow weight.

Selection indexes make this sort of discrimination easier by putting a negative weighting on adult size (EWT eBV in SIL or mature cow weight eBV in beef cattle) while they put positive weightings on earlier growth eBVs. Animals with a good combination of growth eBVs get higher indexes than those with poor combinations.

We must learn from past selection programmes where selection for early growth rate has been proven to lead to increased adult size. Some people may argue that adult size is not an issue and we need to select only for growth rate. But adult size of ewes and cows directly affects profit and efficiency as discussed in the July column. So we ignore adult size at our peril!

A negative weighting on an eBV in an index does not necessarily mean that a trait will decrease under selection. When traits you want to move apart are strongly and positively related genetically, as growth eBVs are, we need a negative weighting on one trait to best discriminate animals that buck the strong trend we see for growth eBVs to be strongly related to each other throughout growth. Those animals are out there, just not always easy to find.

Beef + Lamb New Zealand and SIL are interested in your views. Please feel free to tell us your thoughts by sending an email to [silhelp@sil.co.nz](mailto:silhelp@sil.co.nz) or leaving a phone message on 0800-silhelp (0800-745-435).

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quality dog tucker freezers is important. Second-hand deep freezers sold as "being suitable for dog tucker" are often not because they may not get cold enough to reach that important -10 degrees.

Farmers are typically vigilant about worming their dogs and freezing meat; the problem can be foreign dogs, which

have not been wormed regularly, coming on to the property.

Restricted Dog Entry signs are available free of charge from Ovis Management to stop dog owners bringing untreated dogs on to a property. The organisation has just upgraded the signs to include a QR code. This code allows dog owners

with the appropriate Smartphone apps to access information on the reasons behind the dog restriction signs.



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