

Worm resistance breeding values confirmed

A recent analysis shows worm resistance can be bred relatively rapidly with little effect on other important traits.

The study published in January 2017 by Daniel Brown (AGBU) and Neal Fogarty (NSW DPI), analyzed data from the Sheep Genetics MERINOSELECT database.

Their findings showed that the moderate heritability for worm egg count (WEC) (0.2–0.3) combined with its high phenotypic variation (WEC results for individuals in a mob can range from zero to many thousands) means that worm resistance in sheep can be improved relatively rapidly by selection for low WEC.

The generally low and non-significant genetic correlations between WEC and other production traits indicate that inclusion of selection for low WEC in Merino breeding programs would have little direct impact on response in other important growth, wool, carcase and reproduction traits.

There is some evidence that the environment (worm challenge) where selection occurs has a small impact, so the very best results are likely to come from rams selected in an environment similar to where they will ultimately be used.

How do you start to breed for worm resistance?

If you have not bred for worm resistance it is quite simple to start. It relies on sourcing rams with documented WEC ASBV (Worm egg count Australian Sheep Breeding Values) as there is no other simple or relatively reliable indicator of worm resistance.

The easiest first step is to shortlist the rams you like on your preferred production and visual traits, then review their WEC ASBV. Then simply narrow your shortlist to include only those with at least moderate resistance to worms. The lower/more negative the WEC ASBV figure, the more worm resistant the ram is.

What do the WEC ASBV figures mean?

The figures are percentages compared to the group average, which is the same approach used with clean fleece weight ASBVs. In contrast, body weight and fibre diameter have ASBVs in units of kilograms and microns respectively.

Compare ram A with an ASBV figure of –30 to ram B with a figure of 0. The progeny of ram A are expected to have average worm egg counts 15% lower than the progeny of ram B (assuming the rams were mated to one line of ewes and they and their lambs have been run together). For example, if ram B's progeny have an average worm egg count of 1000 eggs per gram (epg), ram A's lambs will average about 850 epg.

While the difference between the rams is 30%, they only contribute half of the lambs' genes, so 30 divided by 2 = 15% difference in the lambs.

Currently, the top 10% of animals for yearling WEC in the Sheep Genetics MERINOSELECT database have an ASBV of –45 or better (more negative); these would be considered the most worm resistant animals available, but there will be fewer animals at this level.

Animals that have higher (more positive) WEC ASBV are less resistant to worms. Currently, the 20% of Merino sheep in the database that have the highest (worst) yearling WEC ASBV have values of 10 or higher.

Table 1. The yearling WEC ASBV percentile bands for sheep in the MERINOSELECT database.

Percent of animals	YWEC ASBV
Top value	–93
1%	–74
5%	–53
10%	–45
20%	–35
30%	–27
40%	–21
50%	–13
60%	–6
70%	1
80%	10
90%	21
Bottom value	156