

Who's your daddy?



GENE TALK

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Modern genetic evaluation systems rely on having a pedigree with good accuracy – that is, only some errors occur in matching animals to their parents.

Best-practice recording systems involve single sire mating to a known group of ewes or cows, to match sires to dams, then recording birth information at or near birth, to match offspring to dam.

Genetic evaluations based on such pedigrees have proven to be remarkably robust and deliver demonstrable genetic gain – see Sheep Improvement Limited's (SIL) sheep industry genetic trend graphs online at bit.ly/112Wfqd.

In sheep and cattle the power of selection pressure is largely delivered through sire selection. Because these species mate many females to one male, and because artificial insemination can ratchet up this ratio dramatically, only a few males are needed of those available for selection.

As a consequence sire families are the key unit in the genetic evaluations done by SIL or Breedplan. And so, sire-to-sire parentage links are critically important in the pedigree. If a sire used does not come from the sire family we think he did, the estimated breeding values he was selected on will have been influenced by performance of the wrong set of half-siblings. New DNA technologies have given us a look at how accurate parentage can be under industry best practice recording. Work funded by Ovita (a sheep research consortium that has evolved to be part of Beef + Lamb New Zealand Genetics) looked at paternity – male parentage – of sires where there was a DNA sample for the sire and also for his sire as identified in SIL records.

A high degree of accuracy was found

with 90% of sires matching the sire listed on SIL. This may explain why some young rams or bulls never match their potential. If they have been assigned to the wrong sire family then their “estimated” genetic merit will not line up with their true sire family. This comes right once we get performance information from their progeny but that may be too late to discover this! Such “errors” in pedigree act as a drag on genetic gain.

Some may be concerned there were 10% errors in sire paternity but we should salute the success of our breeders in achieving 90% accuracy! Given you cannot be present for every mating or birthing event, you cannot expect 100% accuracy – and recording errors occur even with fastidious record keeping. These may include labelling errors when DNA samples are collected so sometimes an apparent sire-to-sire mismatch might mean DNA needs to be sampled and tested again to eliminate that source of error.

There is an opportunity to make faster genetic gain through lifting pedigree accuracy by requiring all sires used to have a paternity test for their sire.

Looking backward we can see significant genetic change can occur when pedigrees are 90% accurate. Looking forward, there is an opportunity to make faster genetic gain through lifting pedigree accuracy by requiring all sires used to have a paternity test for their sire. This will make the key sire-to-sire links in the pedigree near 100% accurate while adding only a little cost to a breeding operation. The certainty that a sire used has the sire we think he does is valuable.

From an accuracy point of view we are only interested in who the true sire is. From a breeding programme point of view, we might want to know this for potential sire candidates before we make a final selection decision, so we don't use a sire that is not from the family we think he is.

Unfortunately that can be done only by testing all potential candidates, getting tests run and results back before final sire selections are made. So it costs more to do this. Talk to a commercial DNA test provider such as Zoetis – go to bit.ly/1hQ0GnO – to find out more about sire paternity testing options and pricing.

Some breeding groups have already embraced sire paternity testing and have made it mandatory for all sires. This will lift the accuracy of their genetic evaluations and so accelerate genetic gain.

I expect that in future some breeders may pay big money for particular bulls or rams contingent on a DNA paternity proof confirming they have the sire the records say they do.

If commercial farmers want the same degree of proof, expect to pay more for rams or bulls. If you are buying the animal because of the sire he has you may want this certainty. However, breeders will need to test more animals to provide this proof for bulls (or rams) on sale so the extra cost will exceed the cost of a single sire paternity test.

DNA testing is a rapidly evolving field. Right now, strategic DNA tests for sire paternity will deliver value to all ram and bull breeders in New Zealand at relatively low cost. Sometimes sire paternity can be bundled with a package of other DNA tests so ask the DNA test provider about the sire paternity option.

You can give B + LNZ Genetics or SIL your thoughts on this topic by email to silhelp@sil.co.nz or by leaving a message on 0800-silhelp (0800 745 435).

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