

Accelerating Genetic Improvement with DNA Technology

The introduction of objective measurement and Lambplan® in 1990 was the start of a revolution in meat sheep breeding for the Bradford family at Popanyinning in Western Australia. Dawson and Greta Bradford established Hillcroft Farms Poll Dorset stud in 1972, which is now run jointly with son Dawson and wife Lisa.

Today Hillcroft Farms is one of the biggest Poll Dorset stud herds in Australia, running about 1800 stud ewes. As well as the Poll Dorsets they run 1000 Merino and 1000 Border Leicester cross ewes and are developing a wool shedding flock of 1000 – 1200 ewes based on White Dorrpers. This wool shedding flock will eventually achieve what Dawson considers the highest priority for lamb production—to remove the wool and cost of wool harvesting from a meat operation. DNA technology is giving them the chance to accelerate genetic improvement and achieve this goal more rapidly.

The availability of DNA parentage was an enormous breakthrough for the stud.

The sheer size of the flock and the need to identify the full parentage of such a vast number of progeny meant lambing was a labour intensive period. Mothering up lambs in the paddocks or yards was time-consuming and lacked accuracy.

At best they always knew half the parentage, but the decision to use DNA to provide full pedigree recording has improved data accuracy, reduced labour and allowed easier management at mating and lambing. Instead of lambing down ewes in numerous small paddocks, they are able to run big mobs that are syndicate mated, often using ram lambs to increase genetic gain.

While Dawson says there may be other, more inexpensive ways of determining parentage, DNA offers considerably more. “GeneSTAR® testing gives a more complete genetic picture,” Dawson says.

The early testing initially identified sheep within the flock carrying LoinMAX® genes. To improve muscling, Dawson has looked towards the Myostatin gene called MyoMax® that gives a 10 percent increase in muscling above the breed in which it is instilled.

The genetics were introduced four years ago into a small nucleus that is being back crossed with the Poll Dorsets. Three generations into the backcrossing program, each crossing results in 25 percent of the progeny carrying the necessary single copy of the MyoMAX gene to pass on to their progeny.

The male and female progeny are still subject to rigorous selection for visual traits, making it a lengthy but permanent process that will eventually instil the Myostatin gene in Hillcroft Farms’ flocks. The resulting double copy carriers are noticeably more muscled, while those carrying a single copy are not visually apparent but can be identified from DNA testing.

The same importation of genetics also contained the Inverdale® fertility gene which is being multiplied in a similar but speedier process. This should see the first Inverdale rams released for sale as early as next year. Rams carrying the Inverdale gene will eventually be used in the commercial shedding flock to develop a productive, highly fecund, nonshearing ewe line.



Photo courtesy Farm Weekly

Dawson believes the Inverdale gene has the power to change producers’ economic thinking. While many farmers have not even heard of the gene, he has been surprised by the amount of enquiry received.

The Inverdale fertility gene can significantly increase lambing percentage by 20 – 50 percent, more than compensating for the loss value of wool from not running Merino mothers or another maternal line.

“It is a gene that I wouldn’t recommend to everyone, but for those who can manage the burden of very high lambing percentage it will be a highly productive system,” Dawson says.

Paradoxically, the shedding trait is the one that, at the moment, appears the furthest from being achieved because of the number of complex genes that control shedding.

However, Rome wasn’t built in a day and Dawson has complete confidence that what he has set out to achieve is possible, and hopes to start reaping the rewards for his time and perseverance in the near future.