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Can new technology advantage my breeding program: a software tool in practice

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Using a software tool, this study aimed to predict the outcome of a crossbreeding program with two sheep breeds, Lacaune and Texel, using marker technology. The breeding program was conducted in France by the National Animal Research Institute (INRA). The software tool had been used for the evaluation of breeding programs in Sheep CRC Project 1.1.6. The aim was to simulate a crossbreeding program as closely as possible, then predict the outcome and evaluate the practicability of marker technology in breeding programs.

The Lacaune is the traditional milk sheep breed in France. A meat selection line has been developed to combine improved carcass and growth characteristics while retaining good mothering ability. In 2003, the French Breeding Association decided to improve carcass conformation of the meat selection line by infusing it with a gene from the Belgian Texel breed that increases lean meat percentage muscling in the hind-quarter, loin and shoulder. A breeding program was developed that involved strategic crossing and selection on genetic markers to infuse the gene into the Lacaune. INRA at Toulouse, France, was represented on the scientific advisory committee for the establishment and execution of the breeding program. CSIRO Livestock Industries had previously developed a software tool in Sheep CRC Project 1.1.6.

The software tool simulated the existing French breeding program. It showed that after Texel gene infusion, the Lacaune meat selection line had better hind-quarter conformation compared to a breeding program that selects only within the Lacaune breed and focuses on the same characteristic. However, breeders need to establish whether the additional economic gains in increased muscling justify the cost of marker technology.

A software tool can evaluate the use and practicability of emerging technologies, like genetic markers, in breeding programs by successfully predicting outcomes. The software tool used in this study has been further developed for use in education and extension programs. This work was also supported by the French Australian Science and Technology (FAST) Program.