CHAPTER 7

Genetic improvement

Genetic improvement has the potential to significantly improve most traits that contribute to the profitability and sustainability of any sheep enterprise. Determining the proportion of animal performance due to genetics, rather than the environment, is possible with some understanding of genetic principles.

The process of genetic improvement in a commercial flock seems simple – define the objectives and then find the animals that will achieve these objectives. This chapter aims to assist producers by outlining the process for setting breeding objectives and the genetic principles that help to identify the genetic merit of animals.

Genetic potential

Chapter 1 outlined the key profit drivers and how to identify weaknesses and strengths in the farm business. Many traits that affect farm profit can be improved through genetics, including the quantity of product (e.g. kilograms of meat or wool per head) as well as the quality, which influences value (e.g. fibre diameter and leanness of meat). Other factors that have less direct effect on profit, but can have an impact on future viability and profitability, are traits such as resistance to disease and constitution.

Wool

Merinos have been the main sheep breed in Australia, contributing to both the wool and meat industries. Changing demands over time (e.g. quantity of wool, quality of wool or meat) have led to cyclical changes in the breeding objectives of the Merino. This, coupled with the diverse climatic and geographic areas in which Merinos are run, has provided the sheep industry with a large and genetically diverse population to select from.

A number of resource and demonstration flocks have been developed over time to illustrate the potential for genetic change. One such trial was the QPLUS$ demonstration flock run at Trangie. Ten years of selection showed changes in fleece weight and fibre diameter for two objectives, as