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Breeding to improve maternal efficiency and productivity in maternal sheep breeds

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SUMMARY

In the past decade producers have been rewarded by high prices for lamb. This has been driven by an increase in international demand for Australian lamb meat and a limited supply of lamb due to adverse seasonal conditions and decreasing sheep numbers (ABARE 2010). As lamb now makes a greater contribution to the profitability of sheep enterprises than wool, weight of lamb weaned and productivity of the ewe will become increasingly important (Wang and Dickerson 1991; Snowden and Fogarty 2009). In addition, Australia's sheep producing regions have experienced drought conditions for most of this period.

Ewes must cope with large variations in feed supply and remain productive for at least 4 years. During early lactation and feed shortages, ewes are in negative energy balance. The aim of this project is to quantify phenotypic and genetic relationships between the ewe's ability to maintain body condition (fat and muscle), wool production and maternal productivity. The primary hypothesis is that ewes with high estimated breeding values (EBVs) for fat depth (according to yearling ultrasound scanning) will be able to cope with variations in feed supply because of greater energy reserves.

The initial trial includes 2100 ewes from a maternal composite flock near Holbrook, New South Wales. Ewes will range from lambs, joined at 7 months, to 5-year-old ewes. Liveweight and body condition score will be measured at before joining, at joining, at the autumn lamb marking (about the end of the first trimester of gestation) and at weaning. The ewes will also be scanned for fat and muscle depth at weaning and autumn. These measures of ewe condition will be used to develop an understanding of the yearly fluctuation in body composition.

Analysis will take into account age, previous reproductive performance, weight of lamb weaned, lactation length and management group. The model will also fit a breed relationship matrix, breed dominance relationship and sire and animal effects. Young ewe EBVs associated with growth and body composition traits will also be accounted for as covariates.

The first trial will elucidate the importance of maternal efficiency on the ability of the ewe to wean a lamb and the role of fluctuations in body composition during the year. Additional data will be analysed to ensure sufficient variation in environmental conditions. We plan to analyse data from the Maternal Central Progeny Test and Information Nucleus Flock projects.

This study will provide the sheep industry with a better understanding of longevity of ewes, heritability of fluctuations in body composition, use of fat measurements to improve maternal performance, breed differences in maintenance of condition and maternal performance.

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