Grading up to a Wiltshire flock of shedding sheep (progress report)

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The majority of the New Zealand sheep industry presently comprises Romney-based breeds (Romney, Romney composites and crossbreds), producing coarse wool between mean fibre diameter between 33 and 37 microns (Beef + Lamb NZ 2022). Few coarse woolled sheep farmers today are recovering the costs of shearing, and many are not able to meet shearing costs with wool revenue. One option to combat this deficit is to breed a "no wool" or "self-shedding" sheep. The polled Wiltshire breed has been promoted as an option to rapidly introduce shedding into a flock The New Zealand Wiltshire is not a pure Wiltshire, due to the usage of other breeds in the grading up process of this breed type (Parry *et al*. 1991). Some farmers are (or already have) graded-up to a Wiltshire flock but what's lacking is quantified researched results that show the potential impacts to provide a way forward for other sheep farmers, who might be contemplating a move to a self-shedding sheep. A research project at Massey Universities Riverside farm 10 km north of Masterton is gathering the information to do this. The project aims to quantify the benefits and costs of the change from a Romney to a self-shedding Wiltshire. The project has two aspects, firstly to model the profitability of such a change and secondly to undertake a multi-year flock study recording production and performance as the flock is graded to a Wiltshire flock.

Modelling has indicated that in the long-term a change to a self-shedding flock will be profitable. The modelling suggests that the coarse wool greasy price would have to exceed $4.15/kg greasy to break even on the costs of shearing in many farming scenarios (based on 2019 costs and revenue Farrell *et al.* 2020). However, this model is limited by scant objective data in regard to actual production data over the transition period. Some of the assumptions were based on anecdotal industry data, or trial data from more than 20 years ago.

The Riverside study started in 2020 with the mating of 400 Romney ewes bred to either Wiltshire rams or Romney rams. Each subsequent Wiltshire-cross ewe generation was then back-crossed to different pure-bred Wiltshire rams to generate successive cohorts. The resulting ewe lambs from this first breeding (i.e. half bred Wiltshire) were then bred as hoggets to Wiltshire rams late April 2021 to generate three quarter Wiltshire lambs, that were born in October 2021 The project continues with seven eighths Wiltshire lambs to be born in 2022 and fifteen sixteenths born in 2023. At each lambing these lambs will be compared to the base Romney flock at Riverside farm. All female lambs born were subsequently first breed as ewe lambs i.e. the fifteen sixteenths ewe lambs born in October 2023 are to be bred to Wiltshire rams in late April 2024.

The reproductive performance of ewes bred to either Romney or Wiltshire rams showed few differences. There were no differences in pregnancy, fecundity or lambing rates of ewes bred to either Romney or Wiltshire rams. Lamb live weights at birth and docking did not differ among single, twin and triplet lambs sired by either Romney or Wiltshire rams, however at weaning Romney-sired triplet lambs were heavier than Wiltshire triplets. Combined, these results suggest that in this flock there was little impact of introducing Wiltshire rams to a mixed-age Romney ewe flock on ewe reproductive performance and the growth of the F1 progeny to weaning (Corner-Thomas *et al.* 2021).

Lambing of ½ Wiltshire cross ewe hoggets occurred in late September 2021. There were no differences in fertility or fecundity between half Wiltshire cross hoggets and the Romney hoggets nor were there any difference in lamb growth between the three-quarter Wiltshire cross lambs and Romney lambs to weaning (Corner-Thomas *et al*. 2022). Subsequent matings of these same ewes as two tooths (2022) and four tooths (2023) also indicate no differences in lamb production between the half Wiltshire cross and Romney ewes.

The 2022 matings involved another group of three-quarter Wiltshire hoggets and similar results to the 2021 cohort were obtained. The 2023 matings included three-quarter and seven-eighths Wiltshire hoggets and three-quarter Wiltshire two tooths. Again, there were no appreciable differences to the comparable Romney cohort in fertility, fecundity or growth of the lambs to weaning.

Scoring of the degree of fleece shedding was undertaken by trained personnel (one to two per event, recorded as scorer contemporary group) using the shedding score (0 to five with increments of 0.5; no shedding to full shedding) method of Johnson *et al*. (2007) and O'Connell *et al*. (2012). This shedding scoring was undertaken each January or February and again the following February when at the 2-tooth age. At weaning, a small percentage (1.6%) of Wiltshire lambs showed early signs of fleece shedding. Shedding score increased as the percentage of Wiltshire increased in the crossbred lamb with less than 10% of the seven-eighths Wiltshire cross lambs showing no signs of shedding (shedding score of 0).

The results of the current study and another at Port Waikato indicate that a high level of lamb shedding is a useful selection tool for farmers looking to identify adult animals which will have a greater fleece shedding (Sneddon *et al.* 2023). Dag score is also being recorded on a scale of 0 (no dags) to five (very daggy). Results to date indicate a slight decrease in Dag score as the percentage of Wiltshire increases in the crossbred lambs. Parasite status has been measured using faecal egg counts and when taken at 80 days of age there were no differences between the Romney and the Wiltshire cross lambs.

There seems to be no appreciable decrease in animal performance as a Romney based flock is crossed with Wiltshire rams and the resulting progeny is then back-crossed to Wiltshire rams to generate successive cohorts. More information is be generated over the next three years and once this data is collected the original assumptions in the model will be revisited.

This trial is generously funded by the LA Alexander Trust and the Massey University Foundation

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