



THE VALUE OF USING HIGHER YIELDING, HIGHER GROWTH RATE, MATERNAL AND TERMINAL SIRES

By Bruce McCorkindale & Tim Byrne on 7 September 2016

DISCLAIMER

Every effort has been made to ensure the accuracy of the investigations, and the content and information within this document. However, AbacusBio Limited expressly disclaims any and all liabilities contingent or otherwise that may arise from the use of the information or recommendations of this report.

Introduction

The use of terminal sires can alter a farms seasonal profile of lamb supply and feed demand by improving lamb growth rates and survival compared to lambs born from maternal sires. The higher growth rates and survival are achieved through a combination of hybrid vigour and genetic selection for growth of lean meat.

If the maternal traits of a flock are also subjected to change by using sires selected for higher yield and higher growth rates, then the seasonal flow of lambs can be further influenced. The consequences of this selection will be to produce a flock of heavier bodyweight ewes and lambs with increased growth rate and yield, which impacts lamb supply and profitability via two main pathways:

- Through greater numbers of lambs being killed earlier, freeing up summer-autumn feed for other opportunities, plus, gaining a \$/kg advantage for larger numbers processed in the pre-Christmas period, or,
- Lambs being killed heavier at the same date.

With many NZ sheep flocks achieving lambing %'s greater than 140% survival to sale, there are a great number of these flocks that could significantly increase the proportion of their ewes mated to terminal sires, whilst still producing plenty of maternal ewe lambs for replacements from the balance of the ewes.

The purpose of this report is to:

- Analyse the financial impacts of increasing the proportion of ewes mated to high performance terminal sires from zero, to 10% and then to 40% in an above average ewe flock (achieving +140% lambing and 18kg carcass weight lambs from 70kg ewes)
- Repeat the analysis based on a ewe flock where maternal traits have also been selected for higher yield and growth rates.

The responses to both the use of high performance terminal sires and high yielding maternal sires have been estimated based on genetic trend differences (between Wharetoa and the industry average) and the performance of the Wharetoa commercial flock which uses rams from the Wharetoa Stud flock in South Otago. The maternal ewe flock is a stabilised Texel x Coopworth.

The analysis was completed using the bio-economic modelling tool Farmax.

Base farm model

A base farm was created representing a summer reliable sheep farming property comprising 300 ha of cultivatable land and 50 ha of steep grazing. The property grows 15 ha of swedes, 6 ha of fodder beet and makes and feeds 300 bales of balage.

This base farm was then stocked with a flock comprising 3048 ewes at mating, 785 Hoggets (unmated) and finishing all lambs to an average of 18.1 kg carcass weight. Mating date was April 15th and weaning the 10th December. All ewes are mated to maternal rams.

Mating and weaning dates and the underlying farm pasture + crop production remain the same across all models.

Terminal sires

The impact of the terminal sire was to lift average lamb weaning live weight by 3 kg compared to the maternal breed, and it was assumed that post weaning growth rates would be 15% higher compared to the maternal breed. The hybrid vigour impact was also expected to aid lamb survival with a 3-4% rise in lambing % for those ewes mated to the terminal sire.

The terminal sire breed chosen within the Farmax options was Polled Dorset. Growth rates for the terminal sire lambs were lifted a further 20% based on the genetic trends of the Wharetoa terminal rams.

Wharetoa Maternal sires

Based on genetic trend differences (between Wharetoa and the industry average) and the on farm commercial flock performance on Wharetoa, the impact of changing the ewe flock to incorporate the attributes of the Wharetoa ewes were expected to be an increase in the average yield of all lambs by 1.5% (from 42% to 43.5% through the main part of the season), plus an increase in the bodyweight of the ewes from 70kg to 75kg as at the 1st July (about 2.5kg lighter than this at mating). This increase in ewe bodyweight also produced an increase of 8% in the lambing per cent (from 141% to 149%), which increases further to 152% when mated ewes are mated to terminal rams (hybrid vigour effect). The Wharetoa maternal effects combined with good spring feeding lifted weaning weights by around 3kg.

Pricing changes

In light of recent announcements from one major Meat Company that they will remove the discount for heavy lambs up to 25kg carcass weight, the default schedule in Farmax has been adjusted to remove the penalty at these weights.

All models use the current Farmax default South Island schedule as at 1st September 2016 albeit with this discount adjustment.

Valuing feed saved – the two methods used

The two approaches taken to value feed saved from an earlier kill date has been as follows.

- Keep carcass weights the same (just over 18kg) and use feed saved to increase the base number of ewes first, and then use remaining feed to finish summer store lambs at a margin of \$15/head
- Increase lamb carcass weights first to around 22 kg and then increase ewe numbers if possible. No store lambs.

Results

Using high merit terminal sires over typical above average ewe flock

Table 1: Summary of changes from increasing proportion of base flock ewes mated to terminal sires

	Base Maternal flock	10% Terminal	40% Terminal	40% Terminal Heavy lambs
No. Ewes	3048	3114	3114	3106
No. Ewe hoggets	785	800	800	800
No lambs sold (including stores)	3510	3568	4028	3618
No. maternal lambs sold at weaning	549	485	319	319
No. Terminal lambs sold at weaning	0	149	598	129
No. home bred lambs on hand at end Feb	1750	1550	826	1641
No home bred lambs on hand at end March	1157	507	319	700
No. summer store lambs finished	0	14	413	0
Whole season average kill date (excluding store lambs, including cull ewes)	21 st February	12 th February	29 th January	14 th February
Average kill date maternal lambs	28 nd February	22 nd February	19 th February	19 nd February
Average kill date terminal lambs	N/A	16 th January	14 th Jan	22 nd February
Average lamb \$	\$87.82	\$89.02	\$89.25	\$94.02
Total margin	\$301,413	\$309,606	\$329,085	\$318,383
\$ gain from base	0	\$8193	\$27,672	\$16,970

Using high merit terminal sires plus maternal sires selected for high yield and growth

Table 2: summary of changes from increasing proportion of ewes mated to terminal sires in a Wharetoa maternal flock bred from high yield sires.

	High Yield Maternal flock	10% Terminal	40% Terminal	40% Terminal Heavy lambs
No. Ewes	3054	3081	3089	2992
No. Ewe hoggets	800	800	800	770
No lambs sold (including stores)	3605	3782	3823	3713
No. maternal lambs sold at weaning	1699	1455	975	946
No. Terminal lambs sold at weaning	0	334	1308	671
No. home bred lambs on hand at end Feb	1572	1412	787	1320
No home bred lambs on hand at end March	273	69	68	151
No. summer store lambs finished	0	0	0	0
Whole season average kill date (excluding store lambs, including cull ewes)	24 th January	20 th January	9 th January	24 th January
Average kill date maternal lambs	27 th January	25 th January	20 th January	20 th January
Average kill date terminal lambs	N/A	28 th December	29 th December	31 st January
Average lamb \$	\$90.21	\$93.35	\$93.73	\$99.08
Total margin	\$340,473	\$358,087	\$364,854	\$367,815
\$ gain from base	\$39,060	\$56,674	\$63,441	\$66,402

Terminal sire – 100% plus buying replacements

Two models were also created where 100% of the ewes were mated to terminal sires and replacement two toothed were bought in @ \$175. Lambs were taken to heavy weights (21.8kg). With no ewe lambs to retain the flock size increases and 100% of the lambs are available for sale.

This system shows a \$56,000 economic gain compared to the base maternal flock which rises to \$83,000 if the Wharetoa high yielding ewes were purchased as replacements at the same price.

Conclusions

The analysis shows there are significant economic benefits for farmers to make greater use of high merit terminal sires.

For a 3000 ewe flock the improved margin achievable from 40% of the ewes mated to terminal sires was \$28,000 compared to a base maternal flock.

When the underlying ewe flock is bred using Wharetoa sires with an emphasis on greater yield and growth rate the total economic gain is further enhanced. This combination of genetics also opens up the ability to take lambs to much heavier carcass weights without significant delays in the average kill date.

For a 3000 enhanced ewe flock the improved margin achievable with 40% mated to terminal sires is \$63,000 to \$66,000 over the base maternal flock.

The calculated gains are based on the same feed supply. While the larger ewes have higher maintenance requirements their productivity gain and the opportunity to use feed saved through earlier sales more than offsets their additional demand.

The increased number of sales in the earlier part of the season, particularly at weaning, will also create a flock with greater resilience in the face of an unpredictable summer feed supply. This opens up the option of killing large numbers early at good weights or retaining lambs for longer and killing at very heavy weights if feed conditions are favourable.

The analysis also highlights that there are still opportunities for sheep farmers to greatly improve the profitability of their business from within their existing sheep enterprise and therefore without the capital investment or other systematic changes required by shifting to other enterprises.