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gene in cattle (Menissier, 1980), PSE gene in pigs (McLennan & Phillips, 1992), loci affecting growth, food conversion efficiency and fat content in pigs (Andersson et al., 1994), a growth hormone variant in chickens (Potouhi et al., 1993), the callipyge gene identified in American Dorsets (Cockett et al., 1994), and a possible "eye muscle" size gene in the Australian Poll Dorset (P. Rose pers. comm.). Most of these gene variants have dramatic consequences on the meat production of individuals, many reducing the fat content of the carcass and increasing lean gain and conversion efficiency. Some of these genes may turn out to be impractical for widespread use, or to have undesirable side effects on other traits. However, it is almost certain that a few will be found to be suitable for widespread use by the industry. Terminal sire breeds are the logical way that these genes can be "packaged" and used by the industry, as their use would be restricted to production of slaughter progeny where the benefits from their use are realised.

CONCLUSION

It is suggested that the ideal terminal sire of the future will be white faced, producing fast growing lean crossbred progeny with meat of excellent eating quality. These crossbred progeny will have a wool and pelt value similar to their dam breed and, because of their disease resistance the use of exogenous chemicals will be minimised. In all likelihood at least a portion of these advantages will be due to the strategic incorporation of major genes. Present market trends, and the application of present and likely future technologies for genetic improvement, all suggest an expanding role for terminal sire breeds on NZ farms.

Ewes for more dollars and flexibility

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ABSTRACT

New Zealand's national lamb weaning percentage has hovered around 100% since 1960. This is a disappointing figure considering the number of sheep recording and performance analysis packages that are available to ram breeders. The present "average" NZ ewe probably drops about 1.20 lambs. Assuming 14% lamb losses from birth to weaning, and 6% ewes that die or are dry, each ewe mated weans about one lamb that grows at about 200g per day. One obvious way of improving these figures is to increase lambing percentage. For example, introducing 1/4 Finnish Landrace genes into the base flock has the potential to increase lamb drop by 20%. However, lamb growth rates must also be improved. Incorporating genetically superior milk producingbreeds into the dam side as well will also increase lamb growth rates, resulting in lambs with the ability to grow at 250g per day or better.

Ewes that produce 30% less wool than their contemporaries, but at the same time wean an extra 0.2 lambs that are 20% heavier than the flock average, can increase net sheep income by around 20%. The advantages are not just an immediate improvement in gross margins. Additional to this is the increased flexibility in management policies that result from having faster growing lambs that can be weaned earlier to provide better carcass weights or bigger replacements. This flexibility can be enhanced by introducing breeding programmes that utilise terminal sire breeds to further improve profitability. The major advantage of this more productive ewe is that it breaks the 100% lambing "poverty trap".

INTRODUCTION

In this paper I will address three questions that are I believe are important in analysing the average NZ sheep farm's profitability in terms of per ewe production.
1. What is the average NZ sheep farmer's production at the present time?
2. Why are we there?
3. Is there an option that will increase flexibility and profitability in terms of per ewe production?

What is the average sheep farmer doing?

Data presented in the NZ Meat & Wool Boards' Economic Service annual report for 1992-3, indicate that between 1960 and 1990 the national lamb weaning percentage very rarely rose more than 1-2% above 100%. Over the same period, average export lamb carcass weights consistently hovered around 13.8 kg and in the period 1984-88 often fell almost a kilogram below that level. Since 1990, average carcass weights have crept closer to 15 kg. Each individual will have a different idea as to what the more recent increases mean, but on the whole I find these national averages disappointing. Numerous people including researchers, farm con-
sultants, and several ram breeders have put considerable effort into using The National Flock Recording Scheme, Sheeplan, Animalplan and/or Flock-Linc to make informed management decisions that utilise animals with above average performance in breeding programmes. I'm aware some individual flocks have made big gains over this period, but these have been neither large enough nor frequent enough to show up in the NZ Meat & Wool Boards' Economic Service results. Indeed, we appear to have made little national progress over a very long period. Progress will continue to be negligible while we persist in relying on traditional selection methods within breeds to improve the performance of our sheep.

After 30 years of virtually no improvement I believe that we need to try a new direction.

**Why are we there?**

I have a high opinion of many NZ sheep farmers, their efforts and their abilities. However, I firmly believe that the figures I have quoted so far are as good as can be expected from the breeding stock that we currently use to generate them. So let's look at the traditional ewe that so many of us from the breeding stock that we currently use to generate them. Assuming that 6% of ewes are dry or die prior to lambing and that 14% of lambs born are lost from birth to weaning, the NZ Meat and Wool Boards' Economic Service figure of 100% lambs weaned is the result of a lamb drop of around 120%. Furthermore, the average export carcass weight data suggest that lamb growth rates from these traditional ewes are around 200g per day from birth to slaughter. It is easy to see then, that there are only a few of us achieving 150% lambs weaned and 250g per day lamb growth rates, yet data from NZ, USA and the UK indicate that both of these production levels can be attained by ewes on pasture.

The average NZ sheep meat producer is working under two major constraints - the animals being used inherently have both a low lamb drop and slow growth rates.

**There is an option that will increase flexibility and profitability**

Improving on the production constraints of a low lamb drop and poor growth rates is fundamental to increasing per ewe profitability.

An increase in lamb drop can be achieved very rapidly, simply by adding 1/4 Finnish Landrace genes to the breeding ewe flock. What's even better is that an improvement can be seen in one generation. This simple management tool addresses the lambing percentage question immediately. However, there remains a further requirement.

The end point then is the "+20% ewe" - an animal that has 20% more lambs that grow 20% faster, with perhaps a 30% penalty in wool production. Economically this ewe has several advantages:

<table>
<thead>
<tr>
<th>The basic ewe</th>
<th>+20% ewe</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6 lambs @ 140 kg @ $2.50/kg @ $21.00</td>
<td>0.8 lambs @ 165 kg @ $2.50/kg @ $23.60</td>
</tr>
<tr>
<td>4.5 kg wool @ $4.00/kg $18.00</td>
<td>3.0 kg wool @ $4.00/kg $12.00</td>
</tr>
<tr>
<td>TOTAL return per ewe $90.00</td>
<td>TOTAL return per ewe $45.60</td>
</tr>
</tbody>
</table>

When the +20% ewe is compared to the traditional ewe several advantages are evident:

- gross returns per ewe are increased;
- a proportion of the ewe flock can be mated to a terminal sire;
- lambs that reach higher liveweights sooner and the added bonus of bigger two-tooths, spread the lamb kill and improve flexibility in dry areas;
- larger improvements in lambing percentages can still be accommodated.

In my quest for the "more dollars ewe" I have identified a target breeding animal. The ewe I am aiming for has 1/4-Finn, 1/2-Poll Dorset and 1/4-Border Leicester genes. It clips about 3 kg of wool and has heaps more lambs that grow on their mothers at 250g per day. Introducing the 1/4-Finn genes into our Poll Dorset x Border Leicester interbred ewes is still taking place. From 1976-1984 our "NZ ewes" were producing lambs with carcass weights around 12 kg, plus or minus a kilogram in individual seasons. In 1985 the Poll Dorset x Border Leicester ewes came into the picture and since 1987 carcass weights have consistently been above 15 kg. The increase is, on average, +3 kg; but that's not all the good news.

The big plus is that we have broken the 100% "poverty trap". With lamb weaning figures well over 100%, the use of a terminal sire, to be used on up to half the flock, becomes an obvious management option. This further lifts growth rates to around 300g per day. With a definite breeding strategy in place we are seeing a 4 kg birth weight and 100 days of "bust" feeding producing lambs with a 15 kg carcass off the dam. Weaning a big, saleable lamb gives immediate flexibility by offering pasture management options that are not available when lambs have to be finished prior to going to the works. Furthermore, replacements are bigger as two-tooths and the milking ability of the ewes takes the worry out of higher lambing percentages.

With an improvement in gross returns of $6.60 per ewe, both profitability and flexibility are enhanced simply by adopting a "non-traditional" breeding strategy.

**CONCLUSION**

A viable alternative for the "average" farmer to improve on "average" production figures is to mate Poll Dorset x Coopworth (or Border-Romney) ewe hoggets to a Finn x Poll Dorset ram. The progeny (1/4 Finn, 1/2 Poll Dorset, 1/4-Coopworth), when well fed, will astound with both their physical and financial performance when mated as hoggets a year later. Waiting to mate two-tooths will obviously delay the returns by a year.

Using a new gene mix with well defined production attributes will give us a ewe that earns more dollars and has greater flexibility.