

2003/V03



Producer Research Support

Superior Lamb Genetics

White Suffolk Research and Development Group



The project

Only 34% of the breeders in the White Suffolk Society use LAMPBLAN. This project aimed to quantify differences between widely used, proven top sires across breeds to ascertain the position of the White Suffolk in terms of genetic merit, and thereby increase the breeders using LAMPBLAN to 40% of the White Suffolk Society members.

The project group wished to identify and quantify differences in growth and maturity patterns between animals and investigate the effect this has on the ability of offspring to meet market specifications and provide information about market suitability for specific genotypes.

The effect of extreme birth weight EBVs (high and low) on lamb survival was also investigated, providing information about the optimal range of birth weight EBVs.

Producers aimed to develop an appreciation for fat and muscling measured using industry methods to identify its impact on dollar returns.

Objectives

1. Encourage seed-stock producers (an extra 20 breeders) within the Australian White Suffolk Association to use elite genetics in their studs to maximise genetic progress;
2. Through trial work results, create an awareness of the capabilities of LAMPBLAN elite sires by demonstrating that superior LAMPBLAN EBVs can translate into extra dollars for commercial producers;
3. Investigate growth and carcass traits;
4. Investigate wool traits; and
 - Investigate presence of medullated and coloured fibres and the effect this has on wool classification of the flock and the corresponding wool value (ie. whether the White Suffolk places the breeders at a disadvantage compared with other white breeds).
5. Investigate other traits.
 - Highlight differences in Faecal Egg Count (FEC) between sires and identify the threshold levels of FEC that impact on profitability; and
 - Highlight to producers the factors that impact on lean meat yield and meat quality traits.

The White Suffolk Research and Development Group set out to measure the effect that superior genetics can have on the profitability of a commercial prime lamb enterprise. They aimed to be able to evaluate the ability of different genotypes to meet market specifications for weight, fat and lean meat yield and the effect this has on profit.

Generally, sires performed according to their birth weight EBVs and sires that produced heavier lambs generally had more lambing difficulty. Sires whose lambs had longer gestation resulted in heavier lambs.

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Key points

- Sires with higher BWT EBVs produced more lambing difficulty and longer gestation.
- Sires generally performed according to their EBVs.
- Different sires had different growth patterns with some having progeny heavier at certain ages and lighter at others.
- Carcase EBVs are a good indicator of carcase traits at various ages.
- Carcase EBVs and LAMBPLAN indices are an accurate indicator of carcase value and are useful tools for breeding animals with more weight in the high value cuts and ultimately higher value lambs.
- There was no difference in wool density, medullation or skin value of lambs from the different sires irrespective of genetic background.
- There was little or no relationship between length and carcase weight or loin weight.
- Growth and carcase EBVs and the LAMBPLAN indices are useful tools for increasing the value of prime lambs produced.

What was done

Approximately 300 merino ewes were inseminated on 24th February, 2003 to 15 different high profile industry sires (20 ewes per sire). Thirteen White Suffolk sires and two Poll Dorset (PD) sires were used. Adverse weather conditions at the time of lambing, combined with many multiple births, resulted in significant lamb mortality. This was not specific to individual sires however some sires lost more lambs than others. Of particular interest were the rams with less than 10 progeny at weaning. The performance of these rams is estimated with less accuracy than those with more progeny.

At time of birth all lambs were weighed, birth and rear typed, birth difficulty was recorded, date of birth and sex. Weight measures were taken at 50, 100, 150 and 200 days of age and all animals were scanned for fat and muscle depth at 150 and 200 days. Faecal Egg Counts (FEC) were taken on all animals following weaning (a period of higher challenge). OFDA measurements were taken on fleece samples at shearing to measure the level of medullated fibre for each sire's progeny. An additional weight was taken at 250 days and weight, fat and muscle as well as wool density and two length measurements were all taken at 300 days. The animals were slaughtered at an average of 287 days old at Struan Meats and a series of carcase traits were measured including carcase weight, GR fat depth, short loin length, weight of loin, rack, tenderloin, leg, forequarter, shank, bone, trim, fat weight, forequarter fat weight.

All analyses were performed using the latest statistical techniques and software. Each trait was adjusted for significant effects (eg. rear type, sex, etc). The information presented in this report is phenotypic means adjusted for significant effects. This work did not attempt to extract genetic information due to the small size of progeny groups.

Only a proportion of lambs were slaughtered due to costs associated with collection of data of this nature. Consequently, only male lambs were slaughtered with an average of 6.2 progeny per sire.

There was no significant difference in the accuracy of LAMBPLAN EBVs for the sires used in this trial at post-weaning and yearling (96% and 91% accuracy respectively), hence each were compared to phenotypic measures at the appropriate ages.

What happened?

Rams that have high positive EBVs for birth weight (BWT) generally produced lambs above average weight when corrected for birth type and sex, however, this relationship appears to be relatively weak in this data set. There is a large maternal component associated with BWT which may explain these aberrations.

There was very little variation in the data for gestation length, however rams that left higher birth weight lambs also had longer gestation lengths when corrected for birth type. This potentially suggests that BWT EBVs may be positively correlated to gestation length.

There were not enough records to run an analysis on birthing ease. Rams that left high birth weight lambs had more birth difficulty. Most lambs that did have difficulty were singles and >6kg at birth (up to 8.2 kg).



Producer Research Support

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Contact Gerald Martin -
Producer Research Support Coordinator.

Tel 08 8556 2900 or
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Discussion

Analysis of Growth Patterns

Rather than analyse each weight measure as a separate trait, each weight measure was treated as a continuous expression of the same trait that changes through time.

There were marked differences in growth patterns between individual sires. Some sires showed that their progeny grew at a rate faster than average throughout the whole trial, other sires progeny grew slower than average throughout the whole trial. Certain sires grew slower at certain ages (early) and faster than average at other (later) ages.

Analysis of Post Weaning Carcase Measures

Carcase measures were adjusted to a constant weight basis as performed by LAMBPLAN.

Sires generally performed in accordance with their EBVs for fat and muscle measures with a moderate to strong positive relationship existing between the EBV and the corresponding carcase measure at that age. The correlation between carcase measures at post weaning age (200 days) and yearling age (365 days) is not 1. Hence for breeders wishing to provide accurate information to their clients at both ages (eg. domestic vs. export market), measuring these traits multiple times will be beneficial.

Fat Depth

Sires with large negative fat EBVs produced lambs leaner than average at constant weight. Sires with high positive fat EBVs produced fatter lambs on average. A similar pattern was seen at 150, 200 and 300 days. Interestingly, no sires had unacceptably over fat lambs even at older ages.

Eye Muscle Depth (EMD)

Sires with higher EMD EBVs produced lambs with higher EMD at constant weight. Sires with lower EBVs for EMD produced lambs with smaller EMD at constant weight. A similar pattern was seen at 150, 200 and 300 days hence only results for 200 and 300 days were collected.

Analysis of Post Weaning Faecal Egg Counts (FEC) Measures

FEC measures (in eggs per gram) were corrected for rear type. FEC was shown to have no significant effect on the growth traits, however a weak negative relationship was seen between FEC and 150-day weight.

Many sires had very low accuracy for FEC. This highlights the potential need for breeders who have clients in worm prone areas to test their rams for FEC.

It should be noted that FEC is a complex trait both biologically and statistically, hence it is unlikely that the data generated in this trial (small progeny groups) is sufficient to draw solid conclusions about the trait in this study.



Analysis of Carcase Measures at Slaughter

All carcase measures were adjusted to a constant carcase weight. There was a strong positive relationship between yearling weight (YWT) and carcase weight. The relationship between cold carcase weight (corrected for rear type) and YWT EBV was not as strong as expected with some sires producing lambs heavier than expected and vice versa.

There were strong positive relationships between carcase measures at slaughter and EBVs. For example, sires with high EMD EBVs generally produced lambs with more weight in the loin, rack and tenderloin while sires with negative fat EBVs generally produced lambs with less fat in the carcase. This highlights the impact of superior carcase EBVs on value based payment systems as these rams will put more weight into the high value cuts (higher value carcasses) and less fat (higher red meat yield) which results in a higher premium from each carcase produced by sires with better carcase EBVs. This was further highlighted when the carcase value of each lamb was calculated, where a difference of \$34 per lamb was seen between the highest and lowest value progeny groups which equates to \$5,440 additional value over the life of the sire.

In the progeny produced in this trial there was no relationship between wool density and skin value as all skins received the same price. OFDA data were also collected and it was shown that no sire produced an unacceptably high level of unacceptable fibres (objectionable) with the highest being 2.9%. Analysis of wool traits showed that there was no impact on skin value between sires with different genetic makeup, in addition there were no sires that produced unacceptably high levels of medullation suggesting that all rams in the trial were acceptable.

In this study there appears to be little or no relationship between body length and carcase weight. In addition, there was a weak positive relationship between length (tail-rib) and loin weight.

Finally, there was a weak negative relationship between loin weight and short loin length suggesting that shorter loins are thicker and heavier.

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