



Sheep CRC Practical Wisdom Notes

Document ID:	SheepCRC_25_29
Title:	Growth and carcass characteristics of the major sheep breeds in Australia
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Key words:	sheep; growth characteristics; major sheep breeds;

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It should be cited as:

David Pethick (2008) - Growth and carcass characteristics of the major sheep breeds in Australia

Growth and carcass characteristics of the major sheep breeds in Australia

Key points

- A number of breeds and their crosses contribute to the sheepmeat industry in Australia.
- Traditionally, these include the Merino, the Border Leicester and the terminal sire breeds such as the Poll Dorset.
- Differences in carcass and growth characteristics between genotypes contribute to how quickly they reach carcass weight and to their carcass value measured as lean meat yield, loin weight and deposition of fat.

Introduction

A number of breeds and their crosses contribute to the sheepmeat industry in Australia. Traditionally, these include the Merino, the Border Leicester (as a maternal sire) and the terminal sire breeds such as the Poll Dorset (selected for carcass attributes).

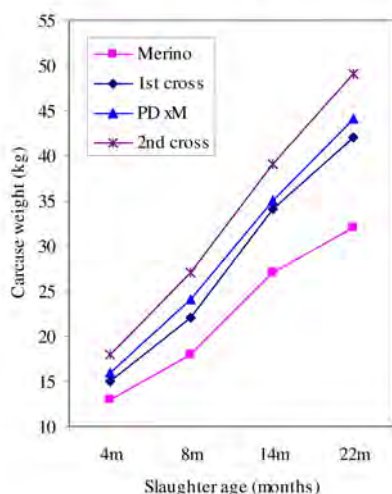
How does growth compare across breeds?

A study included Merinos, Border Leicester x Merino (first-cross), Poll Dorset sires x Merino (PDxM) and Poll Dorset x first-cross (second-cross). All sires were selected for positive growth rates (using Australian Sheep Breeding Values for post weaning weight). Lambs were slaughtered at 4, 8, 14 and 22 months of age, to show changes in carcass characteristics from sucker lambs to adults in these genotypes. Figure 1. (Right) Carcasses from a group of 22 month old hoggets run together, showing a range of genotypes.



Figure 1. Carcasses from a group of 22 month old hoggets run together, showing a range of genotypes.

Change in carcass weight over time



At any particular slaughter age, there was a variation of weights across the genotypes, as shown in Figure 2. The carcass weights at 22 months ranged from 32 to 49 kg; equivalent to approximately 70 to 105 kg liveweight. Similarly, the average carcass weight at 8 months ranged from 18 to 28 kg; equivalent to approximately 42 to 62 kg liveweight, depending on breed.

As expected, the Merinos lagged in growth rate by 2 to 7 months behind the crossbreds with the second-cross lambs growing the fastest. The Merinos slowed after 14 months (at approximately 57 kg liveweight).

Figure 2. Changes in carcass weight versus age at slaughter.

How does fat compare?

Fat was measured as depth over the GR site (the site for assessing fat post-slaughter), the C site (over the loin) and the rump. Total carcass fat was also measured. Despite the weight differences at the same age, the pattern in fat deposition was similar between breeds, with fat deposition increasing significantly after 14 months. At a 30 kg carcass weight, all animals were extremely fat (GR fat score 4 or greater).

Where does the fat go?

All breeds showed a similar pattern of deposition at the three measured sites, as illustrated in the graphs below for the Merino and the second-cross lambs.

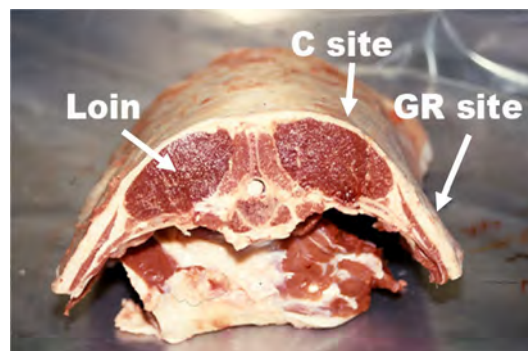


Figure 3. Cross section through the carcass at the 12th rib showing the loin muscle, C site and GR site.

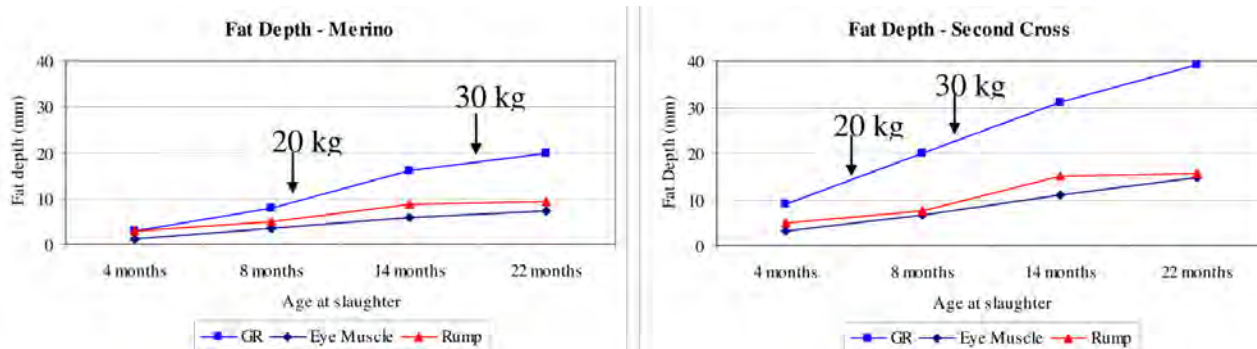


Figure 4: Fat depth of Merino (left graph) compared to second-cross (right graph) at different sites and progressive slaughter ages. Arrows indicate time when weights were achieved.

Merinos are generally considered to be the leaner breed, which is the case when comparing animals of the same age. When slaughtered at similar carcass weights, they were leaner at the GR site, but not in total fat (as shown in the tables below). At 20 kg carcass weight, the Merinos were about 5 months older than the second-cross, were leaner at the GR site, but had similar carcass fat to all genotypes (see Table 1).

Table 1: Colour stability of different muscles and their commercial cuts.

	Merino	First-cross	Poll Dorset x Merino	Second-cross
Loin (g)	494	498	547	562
Lean meat (kg)	15.3	15.1	15.4	15.4
Total carcass fat (kg)	4.1	4.3	4.0	4.2
GR (mm)	9.3	12	10.5	11.8
C (mm)	4.0	4.5	3.2	4.0
Rump (mm)	5.6	5.6	4.4	5.5
Average age to reach weight (months)	9	7	6	5

Similarly, when slaughtered at 30 kg carcass weight (Table 2), the Merinos had more carcass fat than both Poll Dorset genotypes, but were still leaner at the GR site. At this weight there was a ten-month age gap, and a considerable difference both in age and stage of maturity. The first-cross lambs were the fattest at the heavier carcass weight, with a similar GR to the second-cross. Hence, tissue depth at the GR site does not explain all the variation in fat in a carcass, (although it remains the best predictor of those currently available).

Table 2. Characteristics of a 30 kg carcass.

	Merino	First-cross	Poll Dorset x Merino	Second- cross
Loin (g)	724	677	740	716
Lean meat (kg)	20.8	20.5	21.4	21.2
Fat (kg)	8.1	8.4	7.5	7.8
GR (mm)	18.5	22	19.5	21.8
C (mm)	6.7	9.5	6.1	7.4
Rump (mm)	9.2	11.2	8.5	8.7
Average age to reach weight (months)	19	12	11	9

These tables show that in the Merino and the first-cross, proportionally more of the fat is stored over the rump. Past research has also shown that Merinos store more fat as non-carcass fat (not measured in this study) than the Poll Dorset. From a management point of view, this also supports research and observations that the GR site is inadequate as a measure of total fat reserves for Merinos. When comparing animals at the same GR depth, Merinos will have considerably more fat stored elsewhere.

How does the loin compare?

Eye muscle was measured as depth and cross sectional area. Eye muscle depth did not increase in any breed beyond the age of 14 months. However both loin weight and eye muscle area continued to increase beyond 14 months in all animals indicating a widening of the muscle beyond this age. Terminal sires such as the Poll Dorset that have been selected for growth and muscling exhibit earlier maturing of loin weight (Tables 1 and 2). The Merinos, as shown in the tables above, can produce similar loin weights to the crossbreds, but only at heavier carcass weights, which take longer to achieve.

When comparing animals for lean meat yield at the same carcass weight of 20 kg, there is little difference between the Merino, Poll Dorset or second-cross carcasses. However, the weight of the loin, as the highest value cut, is 10–15% greater in the Poll Dorset-crosses, which represents significant extra value at the retail end. For example, compare two consignments (one Merino, one second-cross) each of 1000 lambs killed at 20 kg carcass weight with the same lean meat yield as measured in Table 1. The second-cross consignment could yield an extra 60 kg loin, with the loin likely to retail for some 50–100% higher price per kilogram than other carcass cuts.

Take home messages

- In the sheepmeat industry, the terminal sire (e.g. Poll Dorset) contributes to growth and leanness and the maternal sire (e.g. Border Leicester) to growth and fatness. Hence, the second-cross animal reaches carcass weights fastest.
- When killed at the same weight, the Merino will be considerably older, but not leaner than the crossbreds on a carcass fat basis.
- Assessment of total carcass fat using the GR site is not entirely accurate when comparing across breeds and ages.
- At similar lean meat yields there were significantly greater weights of loin in the Poll Dorset-crosses than in the Merinos, representing higher value.

Further information

For further information visit: <http://www.sheepcrc.org.au>

Acknowledgements

This research was funded jointly by the Sheep CRC and Meat and Livestock Australia.

