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There's still big money on the sheep's back

by I. G. Ralph*

The first sheep to arrive in Western Australia, during the late 1820s, were coarse-wooled animals from the United Kingdom and Capetown. The colony's early settlers used them mainly for rations.

Subsequently, better wool-quality Merinos were imported into the State, and flock owners graded up to them. Today this breed is so dominant that less than one per cent of the wool clip has a mean fibre diameter more than 29 micrometres (microns). Seventy per cent of the clip has a mean fibre diameter of 22 microns or finer.

Today, Western Australia's sheep produce about 150 million kg of wool a year, worth $370 million. This represents an average cut per head of 4.9 kg from grown sheep, and 1.5 kg from lambs. In 1979/80 the whole Australian clip was 713 million kg, and the world clip, 2,747 million kg.

Distribution

The distribution of sheep throughout the State has changed, mainly as a result of the big increase in numbers in the agricultural areas especially during the period 1962 to 1968. In 1930 the flock was spread evenly through the pastoral and agricultural areas, but by 1980 the agricultural areas ran 94 per cent of the State's sheep.

About 70 per cent of the sheep in the agricultural areas are run in association with cereal cropping. About a quarter are in areas where wheat cropping is the main income earner. In some cases the sheep are run to control weeds and to use and

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maintain annual pasture legumes which are regarded as nitrogen suppliers for good crop yields.

The environment in which the sheep are run has a major influence on the type of wool produced. Thus, inferior to average top-making wools predominate in wheat/sheep area clips, while good to best top-making wools come mainly from the Great Southern areas.

The effect of a sheep's breeding and environment is reflected finally in the price paid for its wool. In 1979/80, the portion sold by auction at Fremantle (including most wheat/sheep area wools) averaged 390.62 cents per kg clean, but the predominantly Great Southern wools at Albany averaged 397.13 cents per kg clean. The Australian average from all selling centres was 390.08 cents per kg clean.

**District and seasonal variation**

The Mediterranean-type climate strongly influences the amount and type of wool produced in the agricultural areas.

Annual pastures germinate at the break of the season ... that is, when at least 12 mm of rain falls in one or two consecutive days and is followed by enough effective rainfall to sustain growth of the newly-germinated plants for the next 30 days. In the major sheep areas this occurs usually between the middle and end of April. Feed quality is maintained until the end of winter, but falls off dramatically as paddocks dry off in October/November. Dry-feed quality can be affected further by summer rains.

This means that sheep must graze dry feed of decreasing quality for about six months each year. The value of this dry feed varies with the plant species and the district.

In general, dry grass is low in protein compared with dry clover, therefore it is a poor feed for maintaining wool growth. Also plants allowed to grow tall and rank to seeding are of lower quality than those cut off by the sudden onset of the annual summer drought.

Research workers have studied the variation in wool growth throughout the year at a number of sites in Western Australia. For example, the CSIRO sampled weaners and hoggets at Mungomber throughout 1976, and found that wool grew at half the rate on dry feed as on green feed.

About two-thirds of any change in wool growth rate is brought about by a change in fibre diameter. It follows that big variations in diameter occur along the fibres of wool produced in Western Australia.

Weaners are subject to bigger variations in diameter along the fibre than adult sheep. Also, sheep running on grassy pastures show bigger variations than those on legume-dominant pastures.

Pregnancy and lactation put an extra nutritional burden on the ewe. If she lambs and lactates in autumn, her wool growth retardation at that time is so great that 'tender' wool almost certainly results unless large amounts of supplementary feed are supplied.

Despite supplementary feeding, 24 per cent of autumn lambing/spring shorn ewes produced tender fleeces, compared with 2 per cent of the spring lambing/spring shorn ewes in a trial at Merredin Research Station. In general, according to a local wool buyer, the area most affected by tender wool in Western Australia is the south-west, which includes all areas west of the Albany Highway down to the Gordon River.

**Genetic effects**

Apart from nutrition the quality and quantity of a sheep's wool is related substantially to its genetic makeup.

The precise extent to which the superiority of a selected group of sheep is transmitted to their offspring is called heritability. Published results from scientific research on fleece characteristics indicate that the heritability of greasy fleece weights from adult sheep is high, ranging from 30 to 50 per cent. The other main characters involved in wool production, for example fibre diameter and yield, have similar heritabilities.
Testing for residual wax content in scoured wool samples.

Measuring fibre diameter by the airflow method.

In contrast to the measurement of wool fibre diameter and its major influence on clean wool price, the style is assessed subjectively and has only a slight effect on price. Most of the Merino combing wools sold in Western Australia are assessed as ‘average topmaking’. This classification covered 72.4 per cent of Western Australian Merino combing wool sold at auction in 1979/80.

The raw wool characteristics which are of major importance for their contribution to the wool’s processing performance are yield, vegetable matter content, mean fibre diameter, length, strength/position of break, colour, and coloured fibres.

Today, yield, vegetable matter and mean fibre diameter are being measured on practically all fleece wools offered for sale at auctions. Length, strength/position of break and colour are being measured in the Sale by Additional Measurement (SAM) trials being conducted at selected selling centres throughout Australia.

These new measurements are important to the Western Australian wool industry because of the annual summer drought and the resulting autumn thinning of the wool. Wool shorn in the autumn places the position of the break at the tip, thus resulting in a much longer fibre after processing.

Processing performance

The Western Australian wool industry has long accepted that the timing of shearing, because of its effect on the position of break along the staple, could affect the amount of tender wool produced. However, while tender wool is prevalent in spring-sheared weaners and autumn-lambing spring-sheared ewes it is less common in adult wethers irrespective of time of shearing. Therefore researchers regarded as most significant the discovery of a processing difference between October-sheared and April-sheared wools from wethers at Wongan Hills Research Station.

Skirted fleece wool from these wethers was sent to the Gordon Institute of Technology, Geelong, for worsted manufacturing performance tests. This involved passing the wool through a small-scale processing system, starting with scouring, then carding, (where the wool is opened and burr and other vegetable matter removed) and finally combing, through a Noble comb.

These manufacturing tests showed that:

- the combing yields or ‘ears’ were better for the April-sheared than the October-sheared batches,
- the April-sheared wools gave significantly greater mean lengths of fibre in the ‘tops’.

Following up this Wongan Hills result, the Department conducted a larger experiment at the Mt Barker Research Station with six times of shearing: February 21, April 14, June 5, July 27, September 17 and November 11.

The significant results from this experiment were:

- the combing yields ranged from 65 per cent for the February 21 wool to 69 per cent for the wool from the November 11 shearing,
- the mean fibre length in the top, which, after mean fibre diameter, is the most important raw wool characteristic, ranged from 65.1 mm for the September 17 wool to 83.6 mm for the April 14 shearing.

- the vegetable content of the tops showed significant decreases with time of shearing from February through to November. A count of vegetable material, weighted according to length of each particle, gave scores ranging from 37 for the February 21 wool to 7 for the November 11 wool.

The variation in combing yield was similar to that in the estimated Schlumberger Dry Combing Yield quoted in the AWTA core test results on these wools before processing. The vegetable matter in the raw wool, which contributed to the yield differences, is reflected also in particles counted in the combed sliver. The vegetable matter in autumn-sheared wools can lead to quite heavy price penalties even though the amount found in this experiment was likely to be commercially acceptable in the tops.

Conclusion

The value of the Western Australian wool clip, which in 1980/81 grossed $387 million, emphasises the continued importance of wool despite the relative improvement in returns from sheepmeats in recent years. Strain trials within the Merino breed have shown that the dominant strain in Western Australia is capable of achieving high wool cuts and high adult body weights without the penalty of increased fibre diameters.

The common combination of autumn lambing with spring shearing produces a wool fibre prone to break in the carding and combing process thus leading to short fibre length in the wool tops. This characteristic is a problem in much Western Australian grown wool, leading to some mills bypassing the local wool sales.

Sale by description, with measurements for staple strength and position of break are likely to lead, if not to premiums being paid for wool from winter-lambing/autumn-sheared sheep, then at least in the short term to the industry being more aware that Western Australian wools do not necessarily have to produce a short fibre length in the tops.