YEARLY VARIATION IN THE FINENESS OF THE WOOL OF STUD MERINO RAMS

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Summary

The mean fibre diameter of wool of 5818 Merino, rams, measured as two-tooths on a number of Merino studs in N.S.W., has shown considerable variation over a six-year period. It is suggested that the average fibre diameter for as many years as records are available could give a valuable estimate of a stud's real value for fibre fineness and a mean value from which to express individual ram's fineness on a percentage deviation basis.

I. INTRODUCTION

In wool commerce, the visual estimate of fineness although based mainly on crimping, is the chief determinant of clean wool price (Young and Dunlop 1956; Skinner 1961). Recent research in wool processing has strongly confirmed the traditional principle that average fibre diameter is the most important single criterion of performance (Bastawisy, Onions and Townend 196 1 ; Lang 1964).

In the past, wool producers who purchased their ram requirements from Merino studs chose stock for wool fineness on the basis of crimp frequency. With the increasing emphasis on measured fineness in wool buying, it is essential that ram buyers be able to select rams on a similar basis.

Jackson and Roberts (1970) and Turner and Young (1969) have indicated that within a flock the mean diameter of the wool of rams and ewes at 15 to 18 months of age is very similar. In addition, the latter authors have. shown that the mean fibre diameter of ewes at this age is also very similar to the mean diameter of ewes of all ages in a flock.

Although the mixed-age ewes are the main wool producers of a flock, fleece measurement procedures are normally concentrated on the rams. Hence, it is practical to assess a representative value of wool fineness for a stud from the mean fibre diameter of the stud's young rams. Roberts and Heaton-Harris (1966) suggested that measured fineness was an important character in the selection of rams for breeding.

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This paper presents the results of a number of years of measurement of the wool fineness of young rams on leading New South Wales Merino studs, and a system of presenting these results to estimate a value for the stud and for individual rams for measured fineness.

II. MATERIALS AND METHODS

The data used in this study were collected during the tests conducted by the Flock Testing Section of The University of New South Wales, using methods described by Turner et *al.*(1953) for sampling wool, and the air-flow method (Anderson 1954) for measurement of mean diameter. Quality Number (Q.N.) was subjectively appraised by qualified wool experts for three of the six years of the study.

Seven studs were examined over six successive years of fleece measurement of two-tooth "reserve" rams, having been chosen by hand and eye by the stud classer or the owner either as a group from which to select replacement sires or as the more valuable animals for sale at 30 months.

The year of birth of the rams (as indicated in subsequent table column headings) was followed by a period of fleece growth for approximately 12 months prior to their two-tooth shearing. The latter would take from December to March and is hence 15 to 18 months after birth.

The 1964-born rams grew their fleece during 1965, a year of significant drought in most of N.S.W. The 1966-born group also experienced drought in their fleece-growing year of 1967. In both cases, the mean diameter of these rams was invariably lower than the mean for the respective stud over all years.

III. RESULTS

Table 1 contains the mean fibre diameter of young rams in studs classified by district and strain.

The analysis of variance indicates highly significant differences between years and between studs ($P = < 0.01$ in both cases) in mean fibre diameter.

Heaton-Harris (unpublished data) found that the mean fibre diameter of the "reserve" grade of two-tooth rams chosen by sheep classers nominated by the N.S.W. Sheepbreeders' Association did not differ significantly from the mean of the unculled two-tooth ram flock. Accordingly, the values for reserve rams are presented as estimates of the mean of the unculled flock and the mean for a period of years as the value of a stud's mean fibre fineness.

Table 2 shows mean diameter and quality numbers based on diameter using conversion scale of Roberts and Heaton-Harris(1966).

IV. DISCUSSION

Information in Table 2 indicates that, for rams born in 1962 and 1963, quality number derived from crimp is either similar to or finer than that derived from diameter. In the 1964 group, however, the sensitivity of diameter to the lower nutrition of the drought appears to have resulted in a diameter much less than would have been expected from the visual quality number appraisal.

TABLE 1

Mean fibre diameter (microns) of two-tooth rams in a number of Merino studs in New South Wales

Stud No.	District	Strain	Year of Birth						All Years
			1962	1963	1964	1965	1966	1967	
1	Southern Tablelands	Medium Peppin	22.6	22.4	19.2	21.2	19.0	19.6	20.5
		(n)*	162	358	313	406	414	397	2050
2	Central West	Medium Peppin	25.1	24.5	21.8	25.6	23.3	24.1	24.1
		(n)*	100	100	108	120	95	149	672
3	Central West	Medium Peppin	26.0	23.3	22.1	23.0	22.6	24.6	23.7
		(n)*	36	16	22	66	31	42	213
4	Riverina	Medium Peppin	22.3	23.5	21.6	23.1	22.6	25.3	23.1
		(n)*	74	80	80	99	81	76	490
5	Riverina	Medium Peppin	25.7	23.5	23.0	23.6	22.7	25.0	23.9
		(n)*	32	289	100	306	57	279	1063
6	North West	Medium Peppin	21.8	21.1	18.5	22.1	22.0	23.1	21.5
		(n)*	95	191	101	106	122	152	767
7	Central West	South Australian	27.2	25.4	20.4	26.3	25.4	26.0	24.8
		(n)*	35	101	104	89	134	100	563
ALL STUDS			23.6	23.0	20.4	23.0	21.4	22.9	
		(n)*	534	1135	828	1192	934	1195	
								Mean	22.4
								Total	5818

* (n) = number of rams measured.
(Analysis of variance. Between years $F = 9.05$ $P<0.01$.
Between studs $F = 12.32$ $P<0.01$.

This situation is of considerable importance to wool commerce since this is an environmentally stimulated variation in the raw material on which all Australian wool transactions are based. As the use of objective measurement in the sale of wool is developed, the properties of raw wool bulks based on this parameter must be realized not only by the wool seller and buyer but also by the parties involved in ram sales.

In order to make these diameter measurements more useful to ram breeders, discussions have taken place with the Scientific Liaison Committee of the N.S.W. Sheepbreeders' Association. The view was accepted that because of the highly significant yearly variation in fibre diameter, a stud fineness could best be represented by the "all years' mean" derived from the number of years that the flock has been measured. It was suggested that two years be the minimum period but it was recognized that at least four to five years would be required to sample reasonably the yearly variation in diameter.

TABLE 2

Mean quality numbers (Q.N.) of studs based on measured fibre diameters (F.D.)
and on visual assessments

Stud		1962	1963	1964
1	F.D. (micron)	22.6 = 60's	22.4 = 60's	19.2 = 70's
	Q.N.	60's	60's	64's
2	F.D. (micron)	25.1 = 58's	24.5 =58's	21.8 = 64's
	Q.N.	60's	60's	60's
3	F.D. (micron)	26.0 = 58's	23.3 = 60's	22.1 = 64's
	Q.N.	64's	60's	60's
4	F.D. (micron)	22.3 = 64's	23.5 =60's	21.6 = 64's
	Q.N.	64's	60's	60's
5	F.D. (micron)	25.7 = 58's	23.5 = 60's	23.0 = 60's
	Q.N.	60's	60's	60's
6	F.D. (micron)	21.8 = 64's	21.1 = 64's	18.5 = 80's
	Q.N.	64's	64's	64's
7	F.D. (micron)	27.2 = 56's	25.4 = 58's	20.4 = 64's
	Q.N.	58's	60's	60's

An indication of the extent to which the fibre diameter of a particular ram differed from the stud mean could be assessed as the percentage deviation of that ram's diameter from the stud mean for the year in which the ram was measured. For example :

> Over a period of years, stud 1 (see Table 1) has an average or mean diameter of 20.5 microns. The 1966 drop rams were shown as two-tooths in 1968 and had an average diameter of 19.0 microns. If ram number 1 had a diameter of 20 9 microns, it was, therefore, $\dfrac{1.9 \times 100}{19.0}$ = 10% stronger than the average for that year.

> In presenting publicly this ram's fineness, the following information would be supplied :

> Stud 1: Stud's average fineness for all years
> = 20.5 microns = fine wool.
> Range for yearly averages 19.0-22.6 microns
> Ram 1 is 10% stronger the average for the stud.

The table for conversion of diameter to fineness is based on that reported by Roberts and Heaton-Harris (1966).

V. CONCLUSIONS

There is considerable between-year variation in the mean fibre diameter of young Merino rams. Averaging the mean values for a number of years (at least two, preferably five years) provides an estimate of the fineness of the stud from which to express individual rams on a percentage deviation basis. This procedure should provide a more reliable estimate of fineness of the wool likely to be grown by the daughters of the ram under average seasonal conditions.

VI: ACKNOWLEDGMENTS

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