

THE ABILITY OF N.S.W. MERINO RAM BREEDERS TO UTILISE AN
EFFICIENT TWO STAGE SIRE SELECTION STRATEGY

A.E. CASEY*

SUMMARY

A survey of 161 N.S.W. ram breeders (studs) indicates that 75% are well placed to take advantage of the increased efficiency of a two stage sire selection strategy which utilises fleece measurements. While 77% of studs have already developed a form of Two Stage Selection, only 20% are presently using fleece weight and fibre diameter information obtained at both stages.

INTRODUCTION

Many early attempts to introduce selection strategies, which incorporated fleece measurement into Merino ram breeding in N.S.W. met with limited success. Strategies proposed in the mid 1950's had resulted in only 13% of N.S.W. breeders having measured information available at reserve ram selection in 1976 (Savage and McGuirk 1976). In 1976, the establishment of a fleece measurement service and extension program in N.S.W., which accounted for ram breeders marketing needs and constraints, dramatically increased the adoption of measurement by N.S.W. studs. By 1985-86, ram breeders who marketed 53% of rams sold in N.S.W. had measurements available at reserve selection (Butt and Kearins 1987).

While an increase in use of measurements for selling rams had been achieved, there was little indication of how these were being used for sire selection within the industry. With the pending introduction of WOOLPLAN (Lewer et al. 1985), Atkins and Rogan (1986) proposed a "Two Stage" strategy of sire selection which they felt accounted for the selection strategies practised by many N.S.W. breeders.

Subsequently, Ponzoni (1987) and Atkins (1987) highlighted the high genetic efficiency of a Two Stage Selection strategy based on records taken at two consecutive shearings. The continued development and utility of such selection strategies requires information on selection and management practices operating in the Merino industry. A survey of N.S.W. Merino ram breeders was undertaken to establish the industry validity of Two Stage Selection strategies,

MATERIALS AND METHODS

A survey of N.S.W. Merino studs was conducted in 1988/89 using the 1987 joining as a base. Studs to be surveyed were selected to obtain a representative sample of the N.S.W. ram breeding industry based on wool type, flock size, location and breeder type (registered and unregistered).

All studs surveyed were classed as either a one or two stage selector. Two Stage Selectors (TSS) have two major selection events prior to the first joining of rams. The first selection obtains sale rams and reserve stud sires, while the second obtains stud sires from these reserves at a later date. One Stage Selectors (OSS) have a single major selection prior to the first joining at which both sale and stud sires are selected. Studs could have minor selection events (largely for culling), which are typically at lamb marking, weaning and prior to first measurement shearing. Major selection events could use either visual or measured criteria or a combination of both for any trait. Measured assessment used at second stage could be either obtained at first or

* Agricultural Research Centre, Trangie, N.S.W. 2823.

second stage. The age and wool growth at measurement were ascertained as a gauge of breeders ability to conform with Trangie Fleece Measurement Service minimum guidelines.

RESULTS AND DISCUSSION

Of studs contacted, 95% were willing to be surveyed, with a total of 161 being surveyed. The majority (77%) of studs surveyed were TSS.

Two stage selectors (TSS) Those studs defined as TSS largely had management systems which allowed two sets of satisfactory measurement records to be obtained. The first stage selection needs measured information to be obtained prior to 12 months of age to allow a second stage shearing prior to joining at 18 months. Age at first stage should not be less than 10 months of age and wool growth at both stages should be 6 months or greater to conform to Trangie Fleece Measurement Service guidelines. About half (52%) of the TSS surveyed had rams within the age range of 10-12 months at first measurement shearing (Table 1). An additional 25% of studs had rams within the 8 to 10 months age range. 16% of studs had rams within the 12 to 14 month range, making their second stage shearing less than six months wool growth if joining at 18 months of age. The recommended wool growth of six months was being achieved on 85% of studs, with 48% in excess of seven and half months. For the majority (72%) of breeders, the combined age and wool growth at first stage selection is satisfactory to select reserve stud sires.

Table 1 Distribution of Two Stage Selectors by ram age and wool growth at first fleece measurement shearing

Age (months)	Wool growth (months)				Total
	< 6	6-7.5	8-10	> 10	
< 10	14	14	3	-	31
10 - 12	4	30	24	6	64
13 - 14	-	2	9	9	20
> 14	-	-	2	7	9
Total	18	46	38	22	124

A reserve ram shearing was carried out by 80% of TSS with a further 8% having sufficient time (age at first fleece measurement shearing < 12 months) to carry out a reserve shearing if so desired (Table 2). Two thirds of these reserve ram shearings had wool growth of 6 months or greater. 40% of TSS had both the required first stage age (>10 months) and wool growth at second stage (> 6 months) to effectively utilise a two stage selection strategy which incorporates fleece measurement.

Table 2 Distribution of Two Stage Selectors by ram age at first fleece measurement shearing and wool growth at second fleece measurement shearing

Age (months)	Nil#	Wool growth (months)				Total
		< 6	6-7.5	8-10	> 10	
< 10	1	4	10	10	6	31
10 - 12	9	20	22	10	3	64
13 - 14	10	8	0	1	1	20
> 14	5	1	0	1	2	9
Total	25	33	32	22	12	124

No second fleece measurement shearing

84% of TSS use measured criteria to assess fibre diameter at first stage (Table 3). 94% use measured fibre diameter at second stage, however, only 52% use measurements obtained at second stage shearing. Only 69% of the latter group used measured fleece weight obtained at second stage shearing. 39% of TSS used fibre diameter measurements obtained at both first and second stage shearings. Whilst only 3% of TSS used visual criteria alone to assess fibre diameter, 84% consider both visual and measured criteria when assessing fibre diameter.

Table 3 Two stage selection: The number of studs surveyed who use criteria types for fibre diameter and the time second stage measurements were obtained

Selection criteria ⁺ Stage one : Stage two	Measurement used at second stage [#]	
	First stage	Second stage
M : VM	1	1
VM : M	2	2
V : VM	0	16
VM : VM	38	41
M : M	12	4

⁺ Selection criteria: V = visual assessment; M = measured assessment; VM = combined visual and measured assessment

[#] Stage measurements obtained: First stage = records obtained at first stage and used again at second stage; second stage = records obtained at second stage.

Note: Criteria types not shown are V:V (4) and VM:V (3).

One stage selectors (OSS) The fleece measurement shearing carried out by OSS was at an age (< 12 months) which would allow 41% to incorporate a second stage test (Table 4). 73% of OSS did not have a reserve ram shearing, largely due to the later date of their first fleece measurement shearing. The majority (89%) of OSS had more than six months wool growth at fleece measurement shearing.

Table 4 Distribution of one stage selectors by ram age and wool growth at fleece measurement shearing

Wool growth (months)	Age (months)				Total
	< 6	6-7.5	8-10	> 10	
< 10	2	1	0	0	3
10 - 12	1	6	3	2	12
13 - 14	0	1	5	5	11
> 14	1	0	1	9	11
Total	4	8	9	16	37

Practical implications

20% of studs surveyed were TSS, satisfied fleece measurement guidelines and obtained and used measured fleece weight and fibre diameter at both stages. A further 10% of surveyed studs could better utilise two stage selection by obtaining second stage data for fleece weight. Most TSS who use first stage measurements at second stage (Table 3) could use second stage measurements at or near full efficiency without any change to their management system. The use of second stage measurements by this group would increase the proportion of surveyed studs able to utilise a combined Two Stage report (Atkins et al. 1990) to 63%. The use of second stage fleece measurement would require some TSS to modify their sire selection procedure. Visual assessment would be most effectively carried out prior to second stage shearing and sire selections made when measured information is available.

As well as a significant proportion of OSS having a first stage shearing timed to suit a two stage strategy, OSS are not limited by production or marketing factors in their ability to utilise a two stage strategy (Casey unpublished data). Given that TSS is not only genetically efficient (Atkins *et al.* 1990) but also has economic benefits of reduced stocking pressure and measurement costs, it could be expected that up to 50% of OSS could adopt a two stage strategy giving an additional 12% of studs surveyed. A total of 75% of studs (63% TSS and 12% OSS) could operate an efficient two stage selection strategy.

Many OSS have timed their fleece measurement shearing as late as possible in an effort to improve the accuracy (Ponzoni 1979) of this measured assessment. The knowledge that TSS has improved accuracy (Atkins *et al.* 1990) over a single hogget (15-16 months) shearing should encourage many of this group to re-structure. The efficiency of TSS strategy may be even more significant when it is considered that only 24% (Table 4) of OSS have been able to do their measured assessment at the hogget age used by Ponzoni (1987) to compare efficiency of one and two stage selection strategies. The majority of OSS measure rams at younger ages which may be only marginally more accurate than a 10 month age and six month wool growth.

Two stage selection allows studs to sell the majority of rams at the time they are required by clients whilst retaining a proportion to a later date which they consider allows more accurate sire selection. The use of the same strategy to improve the efficiency of measured information should be well received by breeders. Further development of sire selection strategies which incorporate adult information and progeny test results, expressed to allow comparison across ages, should also be well accepted. This will allow breeders, whose task it is to select the best sires irrespective of age, to make accurate allocations. Two stage selection is the vital first step in this multi-stage strategy.

With efficiently operated two stage selection strategies giving substantial benefits (+ 25%) over single stage selection based on a 10 month shearing and marginal benefit (+ 10%) over single stage strategy at 16 months (Atkins *et al.* 1990), 75% of N.S.W. ram breeders are well placed to take advantage of not only a better system but one developed with their needs in mind.

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