PRODUCTION PARAMETERS FOR MERINO, DOHNE MERINO AND SOUTH AFRICAN MUTTON MERINO SHEEP

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SUMMARY

Production parameters were obtained from Merino, Dohne Merino and South African (SA) Mutton Merino stud flocks. Merino lambs were more ($P<0.05$) likely to be born as singles than Dohne Merinos and SA Mutton Merinos. Pooled triplet and quadruplet litters were more ($P<0.05$) common in Dohne Merinos than in Merinos, while SA Mutton Merinos had more ($P<0.05$) lambs in this class than Dohne Merinos. Within litter size classes, Dohne Merino twins were more likely ($P<0.05$) to survive to weaning than Merino contemporaries. Average lamb production (kg of lamb weaned per lambed ewe per year) over three lambings were higher ($P<0.05$) in SA Mutton Merinos than in Dohne Merinos, while Dohne Merino ewes outperformed ($P<0.01$) Merino ewes. Yearling SA Mutton Merinos were heavier ($P<0.01$) than Dohne Merinos, which were heavier ($P<0.01$) than Merinos. An interaction ($P<0.01$) between breed and sex for yearling traits was also evident. Merinos produced more ($P<0.01$) clean wool than Dohne Merinos, which produced more ($P<0.01$) clean wool than SA Mutton Merinos. Average fibre diameter of Merinos and Dohne Merinos was similar, but SA Mutton Merino wool was broader ($P<0.01$).

Keywords: Production, sheep, wooled breeds

INTRODUCTION

The Dohne Merino and South African (SA) Mutton Merino make an important contribution in numbers to the wooled sheep population of South Africa. The SA Mutton Merino was derived from the German Merino, that was imported from Germany in the 1930s (Terblanche 1979). The Dohne Merino, developed from the Merino and the then German Merino, was originally intended for semi-intensive farming in the Eastern Cape grassland regions (Kotzé 1951), but since proved itself as adaptable under widely divergent conditions. This has resulted in sustained growth for the breed and expansion to other areas in South Africa (Laas 1982). These breeds adapted well to South African conditions, and became the main dual-purpose breeds. Both breeds are currently being exported to other parts of the world. Yet there are limited comparative studies on their relative performance compared to the Merino. This study reports production parameters for Merino, Dohne Merino and SA Mutton Merino flocks under typical South African stud breeding conditions.

MATERIAL AND METHODS

Data recorded over a 15-year period (1980-1994) in stud flocks of Merinos, Dohne Merinos and SA Mutton Merinos were analysed. The studs consisted of 80-120 breeding ewes each, maintained on the Mariendahl experimental farm of the University of Stellenbosch. The climate at the site is Mediterranean, with an annual (mostly winter) precipitation of 605 mm. The ewes were maintained in separate flocks. All flocks utilised irrigated kikuyu and dryland grass-clover paddocks. Cereal stubble was seasonally available. The pasture was supplemented with 0.5 to 1.0 kg per head per day of a complete diet (14 % crude protein and 9.7 MJ metabolizable energy per kg) during late

pregnancy and lactation. Management programmes were the same for all flocks. Lambing management was intensive, ewes being run on small (*c.* 0.25 ha) paddocks. Lambs were identified with their dams at lambing and housed in individual interior pens of 1.5 x 1.2 m for 2-5 days, after which they were joined with other lambed ewes in groups of 20-30 ewes with their progeny on small paddocks. During this period, they received the same diet that was used to supplement the pastures *ad libitum*. Survival to weaning and weaning weight were recorded individually. Weaning weights were recorded for 1,473 Merino lambs, 2,332 Dohne Merino lambs and 2,218 SA Mutton Merino lambs. A total of 352 artificially reared lambs were regarded as having died prior to weaning. After weaning, at an average age (±SD) of 110±22 days, progeny of the respective breeds grazed together, separated on sex. They were shorn as lambs at an age of approximately 5 months and selected according to breed standards. At the following shearing at 10-12 months, greasy fleece weight was recorded of those lambs retained after lamb selection. A mid-side sample was taken for the determination of clean yield, fibre diameter and staple length. Fleece-free body weight was recorded after shearing. Clean fleece weight was calculated individually. Fleece weight and staple length were adjusted to a constant growth period of 183 days. Yearling live weight and fleece traits were recorded for 826 Merinos, 1,607 Dohne Merinos and 1,535 SA Mutton Merinos.

Selection procedures in all three studs were consistent with practices in the stud industry and the respective breed societies. Rams and, in rare cases, ewes were introduced from other leading studs of all breeds. Proportions (litter size, lamb survival) were compared among breeds, using Chi^2 procedures (Siegel 1956). Continuous variables were analysed by least squares (Harvey 1990). The fixed model employed included the effects of breed, year, sex, age of dam (2-7+ years) birth type (single, twin or pooled triplets and quadruplets) and two-factor interactions for yearling traits. Weaning age was included as a linear regressor in the analysis on weaning weight. The objective of the investigation was the comparison of the three breeds. The variance attributable to sires within breeds would have contributed little to this objective, and were included with the remainder.

RESULTS AND DISCUSSION

Single lambs occurred at a higher ($P<0.05$) frequency in Merinos, compared to Dohne Merinos and SA Mutton Merinos (Table 1). Twin births were more prevalent ($P<0.05$) in Dohne Merinos. Larger litter sizes were observed at a low frequency in Merinos. It was more ($P<0.05$) prevalent in the other breeds, particularly in SA Mutton Merinos. Survival was independent ($P>0.05$) of breed for singles and triplets (Table 1), although single Dohne Merino lambs tended ($P<0.10$) to have a higher survival rate than Merino contemporaries. Merino twins also had a lower ($P<0.05$) survival probability than Dohne Merinos. Overall, Merino and Dohne Merino lambs were more ($P<0.05$) likely to survive to weaning than SA Mutton Merinos. Given the results obtained within litter size classes, this appears to be associated with the smaller litters produced by Merino ewes compared to SA Mutton Merinos and the higher probability of survival to weaning in litters ≤ 2. Dohne Merino lambs weighed 16.4 % more ($P<0.01$) than Merino contemporaries at weaning (Table 1). The difference for weaning weight between these breeds were previously reported to be 19.4 % (Basson *et al.* 1970). SA Mutton Merino lambs weighed 24.3 % ($P<0.01$) more than Merinos at weaning.

The total weight of lamb weaned by ewes over three consecutive production seasons (lambing at 2, 3 and 4 years of age) was considered next. Merino ewes (n=169) produced an average (±SE) of

31.3±1.1 kg of lamb per season over that period. The lamb output of 260 Dohne Merino ewes was 33.5 % higher (41.8±0.9 kg of lamb per season; P<0.01). Means derived from data of Basson *et al* (1969) suggested a 20.3 % advantage of Dohne Merino ewes compared to Merino ewes. A further improvement (P<0.05) of 6.9 % was observed in 237 SA Mutton Merino ewes, which produced 44.7±1.0 kg of lamb per season. The lamb output of SA Mutton Merino ewes was previously reported to be 14.5 % higher than in Dohne Merinos (Schoeman 1990).

Table 1. Litter sizes, lamb survival and weaning weight (SE) of Merino, Dohne Merino and SA Mutton Merino lambs

Numbers and proportions	Breed			Chi^{2}*
	Merino	Dohne Merino	Mutton Merino	
Total number of lambs	1,786	2,740	2,790	
Proportions in litter sizes				
Single	0.319^{a}	0.179^{b}	0.164^{b}	180.7
Twin	0.657^{b}	0.698^{a}	0.629^{b}	29.1
Triplet +	0.024^{c}	0.123^{b}	0.207^{a}	324.8
Proportion of lambs weaned				
Overall	0.825^{a}	0.851^{a}	0.794^{b}	30.0
Single	0.872	0.916	0.882	5.8
Twin	0.813^{b}	0.872^{a}	$0.847^{a,b}$	19.4
Triplet +	0.500	0.637	0.567	5.7
Weaning weight (kg)	25.9^{3} (0.4)	30.2^{2} (0.2)	32.2^{1} (0.2)	

* Critical value for 2 degrees of freedom = 5.99

^{a,b,c} Proportions with different superscripts differ (P<0.05) in rows

^{1,2,3} Means with different superscripts differ (P<0.01) in rows

For yearling traits, the interaction of breed with sex was significant (P<0.01) in most instances. In general, SA Mutton Merino yearlings were heavier (P<0.01) than Dohne Merinos, which in turn were heavier (P<0.01) than Merinos (Table 2). Breed differences were larger in ewes than in rams. Dohne Merino and SA Mutton Merino ewes were 17.1 and 32.6 % heavier (P<0.01) than Merino contemporaries, respectively. The corresponding differences for ram yearlings amounted to 13.4 and 26.5 %, respectively.

Yearling clean fleece weight and clean yield decreased (P<0.01) from Merinos to Dohne Merinos and further (P<0.01) to SA Mutton Merinos (Table 2). In this case, breed differences were smaller in ewes than in rams. Clean fleece weight of Dohne Merino and SA Mutton Merino ewes amounted to respectively 70.1 and 52.8 % of that recorded in Merinos. Corresponding values for rams were 66.5 and 48.9 %, respectively. The clean wool production of mature Dohne Merino ewes was previously reported to amount to 69.7 % of that of Merino ewes (Basson *et al.* 1969). Greeff (1990) reported that the respective fleece weights of Dohne Merinos and SA Mutton Merinos amounted to 64.3 and 51.8 of that of Merinos. Mature Dohne Merino ewes produced 4.3 kg of greasy wool in the study of Schoeman (1990), compared to 2.9 kg in SA Mutton Merinos. The clean yield of Dohne Merino and SA Mutton Merino ewes was respectively 93.5 and 86.6 % of the corresponding value for Merinos. The corresponding values were 89.5 and 81.5 % in rams. The fibre diameter of Merinos and Dohne Merinos of both sexes was similar, while SA Mutton Merino fleeces were approximately 8 %

broader (P<0.01). The yearling staple length of Dohne Merinos and particularly SA Mutton Merinos were shorter (P<0.05) than that of Merinos.

Table 2. Least squares means (±SE) for yearling production traits in ram and ewe Merinos, Dohne Merinos and SA Mutton Merinos

Trait and sex	Breed		
	Merino	Dohne Merino	Mutton Merino
Yearling weight (kg)			
Ram	60.3[3] (0.6)	68.4[2] (0.3)	76.3[1] (0.2)
Ewe	43.3[3] (0.5)	50.7[2] (0.2)	57.4[1] (0.2)
Yearling clean fleece weight (kg)			
Ram	3.50[1] (0.04)	2.33[2] (0.02)	1.71[3] (0.02)
Ewe	2.84[1] (0.03)	1.99[2] (0.02)	1.50[3] (0.01)
Yearling clean yield (%)			
Ram	72.4[1] (0.5)	64.8[2] (0.2)	59.0[3] (0.2)
Ewe	73.9[1] (0.5)	68.9[2] (0.2)	64.0[3] (0.2)
Yearling fibre diameter (μm)			
Ram	21.8[2] (0.1)	22.0[2] (0.1)	23.7[1] (0.1)
Ewe	21.9[2] (0.1)	21.8[2] (0.1)	23.7[1] (0.1)
Yearling staple length (mm)			
Ram	59.6[1] (0.7)	57.3[2] (0.3)	49.5[3] (0.04)
Ewe	58.6[1] (0.7)	55.9[2] (0.3)	49.4[3] (0.03)

[1,2,3] Means with different superscripts differ (P<0.01) in rows

In conclusion, it was evident that the dual-purpose Dohne Merino and SA Mutton Merino outperformed Merinos as far as lamb output was concerned. Weaning and yearling weights followed a similar pattern. These breeds maintained a similar ranking when assessed for their efficacy of nitrogen utilisation for body protein synthesis (Du Plessis and De Wet 1981). Merinos outperformed the other two breeds with regard to wool production traits. They were previously shown to be more efficient in utilising diet nitrogen for the synthesis of fibre protein (Du Plessis and De Wet 1981). SA Mutton Merinos produced stronger wool than the other two breeds.

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