The influence of exercising rams on the lambing performance of a Merino ewe flock

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Received 6 February 1992; accepted 26 August 1992

The effect of exercising Merino rams on the lambing performance of 2227 Merino ewes was investigated. The ewes were divided into three groups of which two were mated to exercised rams and the third to non-exercised rams. No significant differences were obtained in body mass between the exercised and non-exercised rams. A significant ($P \leq 0.05$) difference in cumulative lambing percentage over an eight week lambing season was found between ewes mated to exercised rams (91.9%) and ewes mated to non-exercised rams (75.9%).

Die effek van oefening van Merinoramme op die lamprestasie van 2227 Merino-ooie is ondersoek. Die ooie is in drie groepe verdeel, waarvan twee met geoefende ramme en een groep met ongeoefende ramme gepaar is. Geen betekenisvolle verskille is tussen die liggaamsmassas van die geoefende en ongeoefende ramme verkry nie. 'n Betekenisvolle ($P \leq 0.05$) verskil is in die kumulatiewe persentasie ooie oor 'n agt-weke-lamseisoen gelam, tussen dié ooie wat met die geoefende ramme (91.9%) teenoor dié wat met die ongeoefende (75.9%) ramme gepaar is, gevind.

Keywords: Ewe fertility, exercise, Merino rams.

Several aspects of male fertility, viz. testis size, mating behaviour, libido and semen quality, have received a great deal of attention from many researchers (Fields *et al.*, 1979; Carter *et al.*, 1980; Gherardi *et al.*, 1980; Crichton & Lishman, 1984; Purvis *et al.* 1984; Kilgour, 1985; Schoeman & Combrink, 1987a; 1987b). However, little attention has so far been given to the physical fitness of rams.

During the breeding season a ram tends to cover greater distances per day in search of ewes exhibiting oestrus. Camp size determines the distance a ram will cover in search of ewes in oestrus (Lindsay & Robinson, 1961a; 1961b). The latest trend of rearing rams in ram sheds or small paddocks may stress rams during the mating season, especially in cases of a large ram:ewe ratio.

The objective of this study therefore was to investigate the influence of exercise of rams on the lambing performance of ewes.

Data were obtained from a Merino flock which comprised 2227 mature ewes and 59 rams varying between 31 and 33 months of age on a farm in the Carolina District in the eastern Transvaal.

Seventy rams were initially thoroughly tested for fertility and libido. Those considered to be of low fertility, due to low sperm counts and sperm abnormalities, were excluded and the remaining 59 rams were subsequently randomly divided into three groups of 16, 17 and 26 (Groups 1, 2 and 3 respectively).

For a period of 12 weeks prior to the mating season (beginning of September), rams of Groups 1 and 2 were exercised by jogging them for approximately 3 km/d, which took them 25 min at a steady pace of approximately 5 km/h. Rams of Group 3 were not exercised and acted as a control group.

All rams grazed on harvested maize lands before the mating season. Groups 1 and 2 were pooled for the period they were exercised. The ram flocks (exercised and non-exercised) were interchanged between lands on a weekly basis to ensure that no differences in the feeding status existed due to a possible difference in grain leftovers on the harvested lands.

Ewes were also kept on harvested maize lands before, during and after the mating season. Four weeks before the mating season, the ewe flock was randomly divided into two flocks. These two flocks were also interchanged between the lands on a weekly basis to counteract any possible difference in grain leftovers. At the beginning of the mating season the ewes were randomly divided into three groups of 523, 639 and 1065 ewes respectively (Groups 1 , 2 and 3) to be mated to rams of Groups 1, 2 and 3 respectively. The interchanging of groups between lands continued throughout the mating period.

Differences in ram:ewe ratios and differences in the percentage of ewes which lambed each week were tested by means of the chi-square test (Steyn *et al.*, 1984). Critical z values were used to determine between which groups differences occurred (Geunther, 1964). Analysis of variance was used to test for differences in body mass of rams (Steel & Torrie, 1980).

Group sizes and ram:ewe ratios are shown in Table 1. These ratios were not significantly different between the three groups.

Table 1 Group sizes, number of rams per group, number of ewes per ram and ram:ewe ratio for the three groups

Group	Number of ewes	Number of rams	Ewes per rams	Ram:ewe ratio
1	523	16	32.7	3.1 : 100
2	639	17	37.6	2.7 : 100
3 (control)	1065	26	41.9	2.4 : 100

The sizes of the ewe groups were predetermined by the owner so as to comply with the sizes of the lands on the farm. Groups 1 and 2 were mated to the exercised rams and Group 3 to the control rams which were not exercised. The mating period was 55 days.

Rams were weighed fortnightly throughout the trial. Mean body mass of rams in the three groups, before exercise, at the beginning of the mating season and at the end of the mating season, are presented in Table 2.

No significant differences were found between the three groups at any stage. There was a small decrease in body mass from the beginning of the experiment to the start of the mating season, as was the case to the end of the mating season. The body mass of the exercised rams (Groups 1 and 2 pooled) decreased by 4.8% from the start of the mating season up to

the end thereof, while the decrease was 7.4% in the case of the non-exercised rams.

During the lambing season, which lasted eight weeks, the number of ewes which lambed was recorded on a daily basis and results are presented in Table 3.

Table 2 Mean (± *SD*) body mass of rams (kg) of Groups 1, 2 and 3 before exercise, at the beginning of the mating season and at the end of the mating season

	Mean (± *SD*) body mass (kg)		
	Group 1	Group 2	Group 3
Before exercise	68.6 ± 5.1	70.1 ± 5.3	69.7 ± 6.4
Start of mating season	66.2 ± 4.8	67.9 ± 5.1	66.2 ± 6.1
End of mating season	64.2 ± 4.6	63.4 ± 4.4	61.3 ± 5.1

Table 3 Percentage ewes lambed per week of the three groups

		% Ewes lambed		
Week	Week ending on day	Group 1	Group 2	Group 3 (Control)
1	7	6.3^{a}	4.2^{ab}	2.7^{b}
2	14	9.6^{a}	13.6^{a}	10.0^{a}
3	21	14.3^{a}	40.6^{b}	22.2^{c}
4	28	38.3^{a}	25.5^{b}	25.4^{b}
5	35	14.4^{a}	2.0^{b}	11.0^{a}
6	42	4.7^{a}	4.2^{a}	2.5^{a}
7	49	1.7^{a}	3.0^{a}	2.2^{a}
8	55	0.2^{a}	0.8^{a}	0.0^{a}

$^{a-c}$ Values with the same horizontal superscript do not differ significantly ($P < 0.05$).

In all three groups, the highest percentage of ewes lambed during the third and fourth weeks ending on days 21 and 28 respectively. The low percentage of ewes which lambed during the first two weeks indicated that only a small percentage were cycling at ram introduction. It was followed by a lambing peak during the third and fourth weeks, which may be related to male stimulation (Martin *et al.*, 1986; Haynes & Haresign, 1987). The marked increase in lambing percentage between weeks two and four was significantly different between groups and could be ascribed to a difference in stimulation due to the difference in ram:ewe ratio. Although the ram:ewe ratio for Group 1 was smaller than that of Group 2, the large response in lambing percentage in Group 1 occurred only in week 4 and not in week 3 as was the case in Group 2. This would lead one to assume that there was adequate stimulation in all three groups (Martin *et al.*, 1986). Significant ($P \leq 0.05$) differences were obtained during weeks 1, 3, 4 and 5 only. The rate at which the ewes lambed decreased considerably from week 6 onwards, which indicates that a mating season of longer than 6 weeks is of no practical value.

Although there were large differences in ewe group sizes, no adverse effect on flock fertility was found when groups of rams were joined with larger flocks compared to smaller flocks, provided that there were between 1 to 3 rams per 100 ewes (Dawe *et al.*, 1970; Raadsma & Edey, 1984). It can therefore be assumed that differences in lambing percentage were not caused by differences in flock size or in the ram:ewe ratio.

Differences between groups for cumulative percentages of ewes lambing each week are presented in Table 4. Although ewes in Groups 1 and 2 were all mated to exercised rams, there were significant ($P \leq 0.05$) differences in the cumulative percentage of ewes which lambed during weeks 3 and 4 respectively. The cumulative percentage of ewes in both Groups 1 and 2 were significantly ($P \leq 0.05$) higher than in Group 3 from the fourth week.

Table 4 Cumulative percentage ewes lambed per week of the three groups

		Cumulative % ewes lambed		
Week	Week ending on day	Group 1	Group 2	Group 3
1	7	6.3^{a}	4.2^{ab}	2.7^{b}
2	14	15.9^{a}	17.8^{a}	12.7^{a}
3	21	30.2^{a}	58.4^{b}	34.9^{a}
4	28	68.5^{a}	83.9^{b}	60.3^{c}
5	35	82.9^{a}	85.9^{a}	71.2^{b}
6	42	87.6^{a}	90.1^{a}	73.7^{b}
7	49	89.3^{a}	93.1^{a}	75.9^{b}
8	55	89.5^{a}	93.9^{a}	75.9^{b}

$^{a-c}$ Values with the same horizontal superscript do not differ significantly ($P < 0.05$).

The cumulative lambing percentages, with the data of Groups 1 and 2 pooled and compared to those of Group 3, are presented in Figure 1. A significant ($P \leq 0.05$) difference in cumulative lambing percentage was evident from week 3 onwards between ewes mated to execised rams (91.9%) and ewes mated to unfit rams (75.9%). The non-exercised rams had a lower plateau value than the exercised rams (Figure 1), probably due to the lack of endurance in the non-exercised rams to find and serve all the ewes in oestrus or a better ability of the exercised rams to induce ovulation.

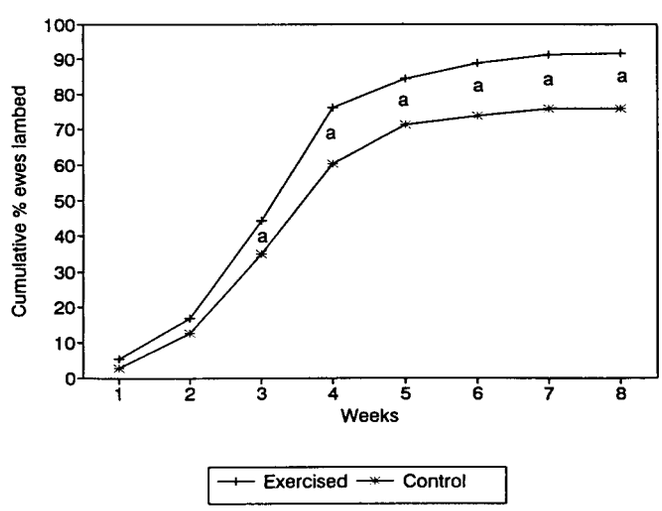

Figure 1 The cumulative percentage of ewes lambed per ewes joined to either exercised or non-exercised rams over eight weeks ($^{a}P < 0.05$).

The results clearly demonstrate the importance of fitness of rams during the mating season. Higher lambing percentages can be achieved if rams are exercised before the mating season, especially in cases where rams are kept in either ram sheds or small paddocks.

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