

SEASONAL CHANGES IN THE OVULATORY ACTIVITY OF EWES SLAUGHTERED IN NORTHERN TASMANIA

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Summary

The reproductive tract was examined in 17000 ewes (largely Polwarth and Corriedale) slaughtered for meat in 1967-70.

A clearly defined seasonal pattern of ovulatory activity was evident, with autumn peaks in both the proportion of ewes ovulating and the incidence of multiple ovulation. A further peak in multiple ovulation occurred in the relatively few ewes which cycled in the spring.

Joining in April/May is therefore recommended for optimal fertility in wool flocks and this recommendation is discussed in relation to ewe nutritional requirements during pregnancy and lactation.

I. INTRODUCTION

The breed structure of the Tasmanian sheep flock differs markedly from that of the rest of Australia. In northern Tasmania the major breeds, Polwarth and Corriedale, accounted for about 45 per cent and 17 per cent of the flock respectively in 1970. A further 24 per cent was made up of approximately equal numbers of crossbreds and comebacks based largely on the two major breeds. Merinos accounted for only 11 per cent (Bureau of Census and Statistics, 1972, personal communication).

The majority of ewes in Tasmanian flocks are joined in the summer-autumn period (January 10%, February 21%, March 40%, April 16%), (Bureau of Census and Statistics, 1972, personal communication). The popularity of March joining appears to be based largely on tradition.

The only published study on the breeding season of sheep in the State is that of Kelley and Shaw (1943) who observed a peak of oestrous activity in April-May in South Australian Merinos at Cressy. The only work I have been able to locate on Corriedales is that of Davis, Kenney and Cumming (1973) in southern Victoria. They observed a higher proportion of ewes lambing and a higher twinning rate from an April-May joining than from a February-March joining. No published information on the breeding season in Polwarths was found.

The study reported here was therefore conducted to establish the seasonal pattern of ovulatory activity of the main Tasmanian sheep breeds.

II. MATERIALS AND METHODS

(a) Collection of specimens

A total of 17155 reproductive tracts were collected from three Northern Tasmanian abattoirs during the three years from April 1, 1967 to March 31, 1970. The number examined per month varied widely (from 61 to 1500) but was less than 100 on only three occasions. When the data for the three years were pooled by calendar month the monthly totals ranged from 673 to 2586.

An attempt was made to obtain identified lines of known breed, age and breeding history but this idea was eventually discarded as impractical.

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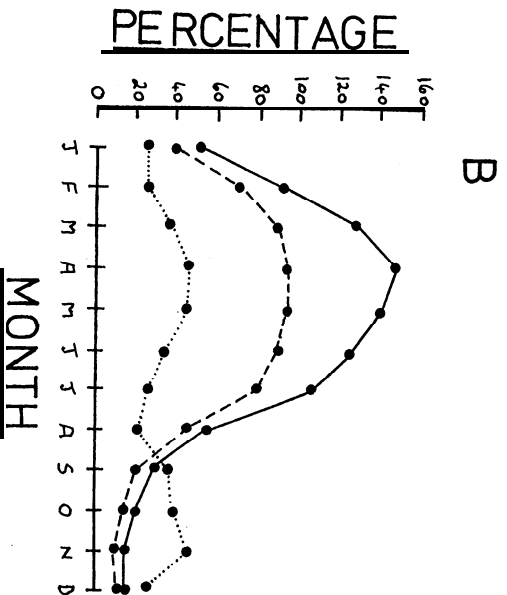
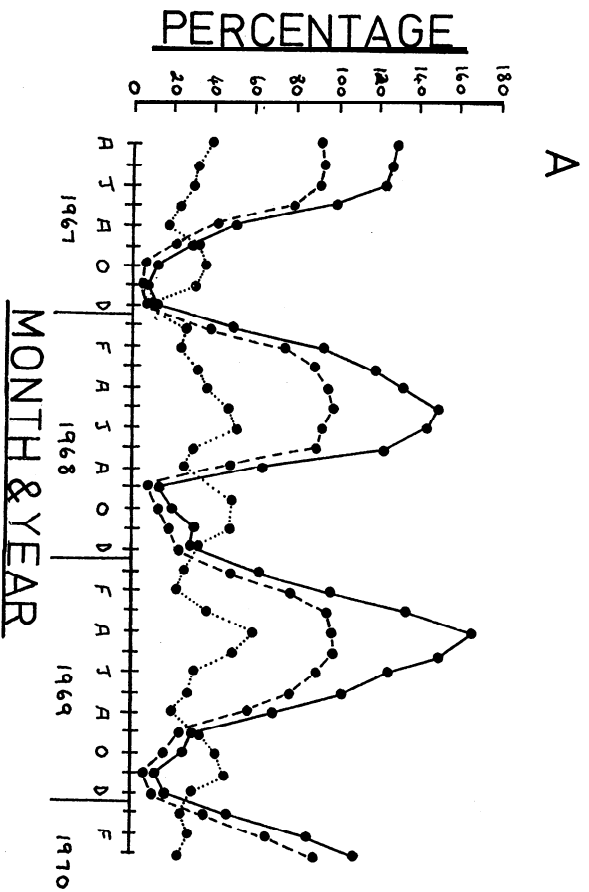


Fig. 1. Monthly ovulation rate, percentage of ovulating ewes, and percentage of multiple ovulations. A. Three-year period. B. Data pooled by calendar month.

- Ovulation rate per 100 ewes examined.
- - -•- Ewes ovulating per 100 ewes examined.
- Multiple ovulations per 100 ewes ovulating.

The majority of the ewes were aged (≥ 5 years old) and the breed structure of the sample approximated that mentioned above.

(b) Examination of internal genitalia

Specimens were usually examined on the day of collection or after cool storage overnight. Pregnant tracts and those of ewe lambs were excluded.

The number and approximate ages of corpora lutea were recorded (Restall 1964), with those of the current cycle being used in the calculation of ovulation rate. Both the ovaries and the uterus with cervix attached were excised using a standard technique and weighed for the first twelve months of the survey.

(c) Statistical analysis

Simple chi-square tests were used where appropriate.

III. RESULTS

(a) Ovulatory activity

Ovulation rate (per 100 ewes examined), percentage of ewes ovulating (per 100 ewes examined), and percentage of multiple ovulations (per 100 ewes ovulating) for each of the 36 months of the study are presented in Figure 1 (a). These parameters have been pooled by calendar month to produce Figure 1 (b). Autumn peaks are evident in all three and there is an additional peak in multiple ovulations in the spring.

Percentage of ewes ovulating was consistently higher in April and May than in March or June. In the pooled data the differences between March (90.1%) and April (95.8%), and between May (97.1%) and June (92.7%) were significant ($P < 0.001$), but there was no significant difference between April and May.

(b) Cyclical weight changes

The monthly mean weights of the ovaries (left + right) and the uterus plus cervix for the first 12 months are plotted in Figure 2. As expected, the fluctuation in both weights reflected the seasonal pattern of ovulatory activity.

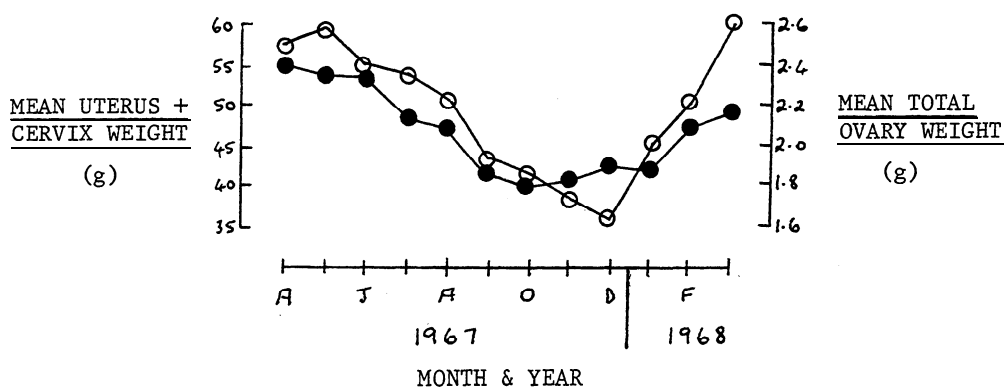


Fig. 2. Monthly variation in mean uterus plus cervix weight and mean total ovary weight.

○ — ○ Uterus plus cervix.
● — ● Ovaries.

IV. DISCUSSION

The seasonal variation in reproductive activity reported here is in general agreement with the results of other workers (reviewed by Braden and Baker 1973). As might be expected from their ancestry, the length of the breeding season of the breeds involved here (Polwarth, Corriedale, and their crosses) appears to occupy an intermediate position between that of Merinos and British Breeds.

A marked seasonal variation in ovulation rate has been demonstrated in some strains of Merinos (Braden and Baker 1973). This has been shown here also, with a high incidence of multiple ovulation in the middle of the breeding season. The further peak in multiple ovulation in those ewes which were ovulating in the late spring was presumably due to the effect of high liveweights resulting from the spring flush in pasture growth.

Taken in conjunction with the results of other workers, this study has provided a foundation on which to base recommendations as to time of joining in Tasmanian wool flocks. For optimum fertility the best mating time is April-May although some variation could be expected due to variability in nutritional conditions between years.

Joining in mid-April to early May, besides ensuring that mating took place at the height of seasonal ovulatory activity, could also enhance lamb survival and ewe lactational performance as a consequence of the adequate pre- and post-lambing nutrition provided by the spring pasture growth (Alexander 1968). Investigations into this latter point are currently being conducted.

V. ACKNOWLEDGEMENTS

I wish to thank Mr. R.I. Thain, who initiated this study, for his advice and encouragement, and Mr. R.J. Napier who conducted the study in its early stages. The technical assistance of several Department of Agriculture officers and the co-operation of the staff of the abattoirs are gratefully acknowledged. The work was supported by the Wool Research Trust Fund.

VI. REFERENCES

- ALEXANDER, G. (1968). Proceedings of the ecological Society of Australia 3 : 125.
- BRADEN, A.W.H., and BAKER, A.A. (1973). In "The Pastoral Industries of Australia". Eds. Alexander, G. and Williams, O.B. (Sydney University Press: Sydney).
- DAVIS, I.F., KENNEY, P.A. and CUMMING, I.A. (1973). Australian Journal of experimental Agriculture and Animal Husbandry 13 : 496.
- KELLEY, R.B. and SHAW, H.E.B. (1943). C.S.I.R., Australia Bulletin No. 166.
- RESTALL, B.J. (1964). Australian Journal of experimental Agriculture and Animal Husbandry 4 : 274.