MATING OF HOGGETS

K. H. C. LEWIS*

ALTHOUGH far from being general on New Zealand farms the practice of mating ewe hoggets has had its adherents for many years. The experience and opinions of these farmers are generally favourable but not always precise, and little accurate information seems available on the subsequent productive performance of these animals. Furthermore, so far has hogget mating been thought to be outside accepted management that until recently there has been almost a complete lack of published information on the breeding season of the Romney ewe hogget. Such information is reviewed by Ch'ang and Raeside (1957), who have their own important contribution to make.

Overseas information supports the practice. Careful work by Spencer *et al.* (1942) with Hampshire ewes lambing as hoggets showed that the growth rate over a period of five years was not affected once the difference in liveweight due to the yearling (hogget) lactation was recovered at the four-tooth stage. Two-tooth lambing performance was slightly inferior but comparable over the remainder of the productive life.

This and other work extending over the lifetime of the sheep (Bowstead, 1930; Briggs, 1936) indicates that the initial advantage in lamb production from the additional mating is held over the lifetime of the animal.

Critical work by Palsson (1953) involving dissection to determine differences in carcass composition has shown that at 16 months of age, hoggets which had reared lambs had lighter carcasses, which were narrow in both fore- and hind-quarters. The bones were of normal length but thinner, and muscle and fat development were retarded. One year later, however, at the normal two-tooth weaning no differences in carcass conformation were apparent. He concluded that the mating of ewe hoggets did not permanently check their growth and development provided their nutritional requirements were satisfied.

The data given in this paper represent the initial phase of an investigation of the lifetime productivity of ewes which have reared lambs as hoggets. It has been preceded by three season's work of an exploratory nature, the results of which have been confirmed by the larger number of sheep reported here.

* Dept. of Agriculture, Invermay Research Station, Mosgiel

Stock and Management

From the Station flock approximately 300 ewe hoggets were drafted, selected broadly for adequate development and divided by restricted randomization on weight into two groups. One identified group of 100 was returned to the Station hogget flock as a control. At 83 lb average liveweight in early May, 1958, these hoggets were considered to be well developed. Although their exact age was not known they were born during late September-early October and thus were 8 to 8½ months of age at the onset of their breeding season.

One raddled Southdown ram was joined with 198 ewe hoggets on 16 April to await mating activity and on 5 May two further rams were added. Matings were recorded once daily from markings, the colour of which was changed at 12-day intervals. Numbers painted on the side of each hogget assisted identification. Observation and recording continued until 30 June (67 days after the first recorded oestrus), when to avoid the confusion of a further colour cycle all marked sheep were withdrawn from the rams. One ram remained with unmarked ewes until 28 July. Favourable conditions for mating were provided by 3 to 4 acre paddocks.

The feeding of the control group followed normal Station practice for ewe hoggets. No attempt was made to flush the mated group which was carried on grass with hay supplements until early July, then joined with the Station hoggets until 10 September when it returned to grass with a limited oat supplement. No difficulty was experienced in promoting satisfactory development in all experimental animals.

In the spring the lambing group was given preferential treatment to weaning while control sheep were less favourably grazed to avoid excessive fattening.

Results

Onset and Pattern of Oestrum

The first recorded oestrus (which may not have been an onset) on 25 April was isolated and followed by a trough of inactivity for 10 days (Fig. 1). Moderate but consistent activity started on 3 May and continued throughout that month. Isolated onsets only were recorded after the first week in June, the latest being 29 June. The mean date of onset, 22 May, was comparable with that found by Ch'ang and Raeside (1957) in North Island Romney ewe lambs.

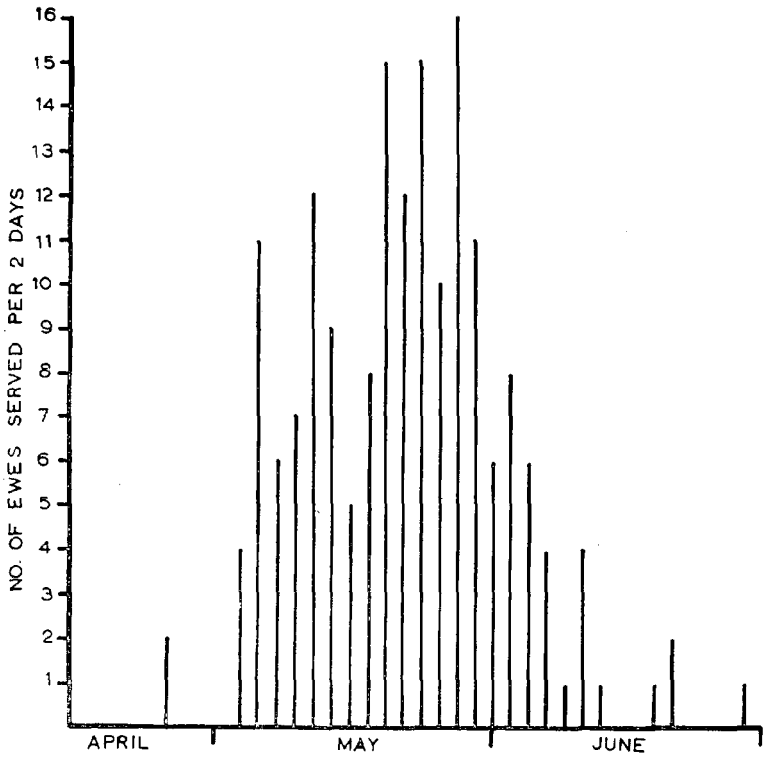

Fig. 1: Onset of oestrum.

As the rams were removed from cycling hoggets, *i.e.*, those in oestrum, at the end of June the pattern of the return to anoestrum is not known. This also meant that earlier onsets favoured conception and that 70 per cent. of barren hoggets either did not enter oestrum or had but one cycle.

Table 1 shows body weight at approximate time of onset of oestral activity for various classes of performance. The difference

TABLE 1: RELATIONSHIP BETWEEN LIVEWEIGHT ON 5 MAY AND OESTRAL ACTIVITY

Performance	*No.*	*Per cent.*	*Wt.* (lb)	*Range* (lb)
Cycling	179	91	83.8	57 to 95
Pregnant	132	67	83.9	—
Not pregnant	47	24	83.5	—
Non-cycling	17	9	78.0	68 to 94

of 5.8 lb in liveweight between cycling and non-cycling hoggets was significant at the 1 per cent. level. Although liveweight at puberty was prominently associated with entry into oestrum, the success of consequent matings appeared unrelated to this factor. Differences of a similar order have been found by other workers where, however, differentiation of barrenness into cycling and non-cycling types was not always made. It was noticeable however that hoggets exhibiting oestrus were scattered over the entire weight range and this lends emphasis to the age-weight interaction suggested by Ch'ang and Raeside (1957).

The results of service are presented in Table 2. The ratio of services to conceptions, 1.88, can be used as a measure of fertility. Fertility level, so measured, was influenced by the removal of the rams from cycling hoggets at the end of June. Of the 47 cycling barren hoggets, 29 had not been marked in the 20 days preceding the removal of the two rams on 30 June, and the majority of these (24) had exhibited one cycle only. If late entry into the breeding season is associated with an early departure they may have returned to anoestrum.

TABLE 2: RESULTS OF SERVICE

No. services	*No. ewes*	*Pregnant*	*Barren*	*Total services*
0	17	—	17	0
1	122	94	28	122
2	44	31	13	88
3	13	7	6	39
TOTALS	196	132	64	249

LAMBING

The average lengths of 115 gestation periods (range 139 to 152 days) were as follows:

102 single births	145.1 days
13 twin births	146.0 days

These data were derived from the once-daily recording of matings and births. The mean date of birth was 19 October.

Lambs were weighed and tagged at birth. Abnormalities of birth and mortality were recorded although in many cases accurate diagnosis of the cause of death was not possible. Whenever possible, lambs were fostered on to retain the mother as a lactating hogget. The flock generally was placid with a strong mothering instinct not greatly inferior to that of mature ewes and rather better than that of two-tooths.

A high incidence of abnormal presentations was noted. Of 15 such presentations, nine were of the "head and one foreleg type". Rectifying these conditions was more difficult than in two-tooths because of the small size of the pelvic girdle. Malpresentation was not however a major cause of lamb mortality. Those few births classified as "assisted" were mainly due to constricted vulvae. One hogget developed pre-natal bearing-trouble and died after bearing twins. This was the only hogget loss associated with lambing. The vital statistics of lambing are given in Table 3.

TABLE 3: SUMMARY OF LAMBING PERFORMANCE

Barren:		
Cycling	47	
Non-cycling	17	
		64
Normal births		100
Born alive:		
Assisted	4	
Malpresented	11	
		15
Born dead:		
Assisted	1	
Malpresented	3	
Premature	4	
Normal	9	
		17
TOTAL		196

BIRTH WEIGHT

The mean weight of single and twin births is shown in Table 4.

Earlier experience had consistently shown a mean birth weight for Southdown cross singles of 8.0 to 8.5 lb, approximately 1 lb lower than the same cross born to two-tooth ewes. The birth weight of the limited number of twins is high relative to singles, and may indicate an appreciable reserve in foetal development factors.

TABLE 4: BIRTH WEIGHT OF LAMBS

		No.	*Weight* (lb)		*Range* (lb)
Single	male	63	8.82	8.29	12.6 to 4.8
	female	50	7.61		
Twins	male	16	7.34	7.12	9.3 to 4.6
	female	10	6.76		

A possibility that where lambing extends late into the spring, exceptionally good feeding conditions in late pregnancy might result in increased birth weights is not supported by birth weight data. No difference was found in the sex-corrected-weight of single lambs born before and after 19 October, the mean birth date of all lambs. Nevertheless the contribution of heavier lambs to abnormalities of birth was high.

Of 20 births of lambs 10 lb or more in weight, 35 per cent. were normal, 45 per cent. were assisted or were malpresented, and 20 per cent. of the lambs were born dead. The frequency of abnormalities in the birth weight range 9.0 to 9.9 lb approximated that of all births, 76 per cent. of which were normal.

Twin Births

Hoggets bearing twins were allowed to rear their lambs except in cases where the removal of the lambs was necessary for their survival. Of 14 sets born, five only were reared intact to weaning. Four sets were broken by death or mothering off at birth and five by deaths after tailing.

In spite of relatively high birth weight and apparent viability at birth, twins made an excessive contribution to lamb losses, namely, 13 of a total of 28 twin lambs failed to survive to weaning. The growth rate from birth to weaning of 0.283 lb per day was below that for singles. Although heavier losses and lower liveweight gains are an expected feature of multiple births it is probably unwise to continue to rear twin pairs particularly where a foster mother can readily be found.

Lamb Wastage

The death rate of lambs up to weaning (Table 5) exceeds that expected under favourable weather conditions and close shepherding. Eighteen per cent. of lambs born died before tailing and 27 per cent. did not survive to weaning. Of the post-tailing

Table 5: Lamb Wastage

	Number	*Per cent. of ewes mated*
Lambs born (including prematures)	146	73.7
Lambs born at term	142	71.7
Lambs born alive	129	65.2
Lambs surviving 24 hours	124	62.6
Lambs surviving to tailing	120	60.6
Lambs surviving to weaning	106	53.5

losses (14) four deaths were due to white muscle disease. The influence of the disease on losses at birth and subsequently was not clear. Such wastage has not been characteristic of the progeny of hoggets in past experience. Nevertheless young stock may prove to be more susceptible to conditions inducing white muscle disease in their progeny and they should be protected in whatever ways our limited knowledge permits.

Lamb Growth to Weaning

Although warm dry spring conditions favoured lamb growth a progressively drier summer made feed suitable for lactating ewes difficult to find. The mean age at weaning was 89 days (range 52 to 114 days), thus giving a rather wide range of nutritional and environmental conditions. The average gain of 0.394 lb per day for single lambs from birth to weaning was satisfactory but fell short, however, of results obtained with earlier born lambs from two-tooth ewes under similar environmental conditions.

It is obvious, however, that lactational capacity was well established. Udders were variable in size, shapely, and teat development was good. Assessments of udder size when related to growth rate of lamb in the early part of lactation suggested that a positive relationship existed, but as the dates of initiation of lactation differed by up to 30 days an accurate estimate of the relationship may not be possible.

The effect on growth rates of conditions leading to clinical symptoms of white muscle disease appearing in this flock cannot be assessed. Lambs will be fattened on forage and carcass weights determined.

Growth and Development of the Hogget

The mean weight of lactating hoggets on 16 January was 108 lb when their lambs were weaned, some 8.5 lb lighter than barren and dry hoggets and 6.5 lb lighter than controls. A precise estimate of the effect of pregnancy and lactation on bodyweight is not possible in this trial where the feeding regimen of both control and barren ewes differed from that of productive ewes.

In two previous trials lactating hoggets had reached 110 to 115 lb at weaning and had become comparable with controls in bodyweight and appearance within a further 9 months. The resilience of young stock to early stress has been established (cf., Coop, 1956) and under good conditions of feeding and management full recovery in condition of these ewes is expected.

WOOL PRODUCTION

All hoggets were shorn in April prior to the start of tupping. The mean unskirted fleece weights at shearing in November are shown in Table 6.

At the time of shearing the hoggets had been lactating for an average of 36 days. A reduction in the amount of wool produced can be expected to follow pregnancy and lactation. This is perhaps best represented by the difference of 0.46 lb between "cycling barren" and lactating hoggets. Here again the comparison is obscured by the separation of these classes of hoggets prior to and throughout lambing. The difference has not been tested for significance.

TABLE 6: UNSKIRTED FLEECE WEIGHT (LB)

	Number	*Fleece weight*
		(lb)
Non-cycling	15	5.69
Cycling barren	43	5.93
Lactating	128	5.47
Control	100	5.27

Conclusions

Over 100 lambs have been reared from ewe hoggets. As yet only overseas work carries the assurance that no detriment to productive function will follow where good conditions of rearing prevail. This implies freedom from the current obscure ills of young stock. Work so far indicates that no major stresses are involved in pregnancy and lactation. However, although effects on growth and development may be expected to disappear before the four-tooth mating important effects on longevity particularly in terms of soundness of teeth and udder may yet arise.

The establishment of an experimental flock of ewes which have reared lambs as hoggets will be followed by continued recording of lifetime production. When relationships are established between hogget and subsequent breeding performance, their value as aids to selection can then be assessed.

From the more immediate point of view the farmer on the better class of land may choose to tap the productive potential of his hogget flock. A limited trial mating may be needed to convince him of the wisdom of his decision. Where lambs entering oestrum in May can experience one or perhaps two cycles only before rams are removed to avoid very late lambs, lambing percentages above 50 to 60 cannot be expected.

Literature Cited

BOWSTEAD, J. E. (1930): *Sci. Agr., 10:* 429.
BRIGGS, H. (1936): *N. Dakota Agr. Expt. Sta. Bull. No. 285.*
CH'ANG, T. S., RAESIDE, J. I. (1957): *Proc. N.Z. Soc. Anim. Prod., 17:* 80.
COOP, I. E. (1956): *Proc. N.Z. Soc. Anim. Prod., 16:* 31.
PALSSON, H. (1953): *Anim. Breed. Abstr., 23:* No. 208: 53.
SPENCER, D. A., SCHOTT, R. G., PHILLIPS, R. W., AUNE, B. (1942): *J. Anim. Sci., 1:* 27.

DISCUSSION

Q.: *On what basis is it assumed that lambs from ewe hoggets may be more susceptible to white muscle disease than lambs from older ewes?*

A.: The disease was observed in this flock only. No cases were seen in 3,000 lambs from two-tooth and older ewes on the Station.

V. R. CLARK: At Lincoln College we found the incidence of white muscle disease to be higher in the progeny of hoggets than in the progeny of older ewes.

Q.: *Why are ewe hoggets better mothers than two-tooth ewes?*

A.: The comparison of temperament may not be reliable. This flock had been closely observed and frequently handled at mating and became accustomed to humans.