

Selection of Time of Mating of Merino Ewes

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Summary

On the basis of information available for the Western District of Victoria, an attempt is made to assess the likely outcome of mating at different times of the year.

Mating from August to December is favourable to the growth of lambs, and from October to December it may also be favourable in other respects. January to May are the favourable months for fertility. However from matings in March-April weather conditions at lambing are likely to be adverse, and from matings in March-May lambs without a supply of green feed or supplementary feed, which they will eat, are likely to suffer a set-back when weaned on to dry summer pastures. June, a month during which mating is rarely undertaken, appears to be favourable in all respects.

It is suggested that a wide approach along similar lines might provide useful information on the advantages and disadvantages of mating at different times of the year in other areas.

INTRODUCTION

It may be presumed that the essential aim of mating is to produce as many vigorous lambs as possible under conditions in which they may continue to thrive. For some of the purposes for which sheep husbandry is undertaken it is necessary that the lambs be produced at a particular time of the year. In other instances, as, for example, where wool production is the primary object, the time factor is not so important and alteration of the time of mating may be possible without undue disturbance of the system of husbandry.

In areas of Australia where rainfall is relatively assured, mating on individual properties is undertaken at a more or less uniform time each year. However, even in such a small area as the Western District of Victoria, the time at which mating is undertaken on different properties may vary as widely as October to March or even May (Lang, Tulloh and Fennessy, 1949).

Although the particular times of mating on individual properties were, probably selected on good grounds originally, the reasons for their selection have frequently been forgotten. Further, since their original selection in many instances there have been considerable changes in conditions of husbandry: pasture improvement has extended the season during which adequate feed is available and reduced or eliminated the problem of grass seeds; operative procedures and the chemical industry have supplied means of controlling fly strike; lambing off shears has been proved practical. In addition, more information has become available on the reproductive physiology of the sheep. There are therefore good grounds for re-examining the merits of mating at various times of the year. The object of the present paper is to draw attention to the extent to which within a well-defined environment—the Western District of Victoria—present information allows the development of a useful comprehensive picture of the relative merits of mating at different times of the year.

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THE ENVIRONMENT IN THE WESTERN DISTRICT OF VICTORIA

The nature and magnitude of the seasonal variation in mean monthly temperature, monthly rainfall, expectancy of effective rainfall and quantity of pasture as derived from the data of Hounam (1949) and Twentyman (1938) are depicted in Figure 1.

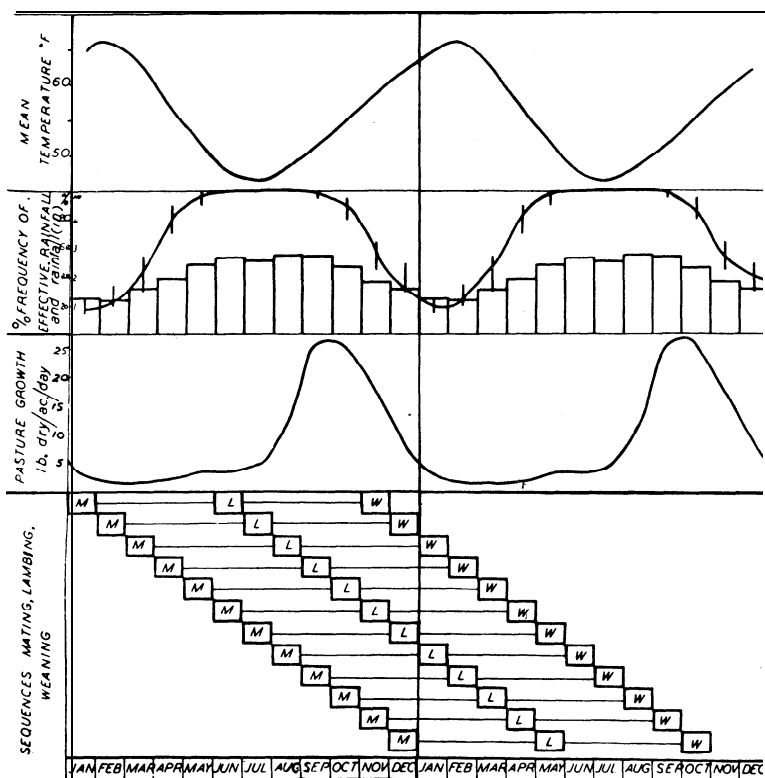


FIG. 1—Features of the environment of the Western District of Victoria and the relation of mating, lambing and weaning at different times to them. Source of data:

Average mean temperature $\left[\frac{\text{Max.} + \text{Min.}}{2} \right]$ —Hounam (1949, p. 51, mean of all stations listed).

Average monthly rainfall and effective rainfall ($0.54 e^{0.7}$, where e represents evaporation as measured in the standard tank)—Hounam (1949, p. 52, and personal communication), means of data for Purulka, Brankholme, Coleraine, Hamilton, Ararat, Wickcliffe, Mortlake, Berrybank, Kokewood, Camperdown.

Pasture Growth—Twentyman (1938).

The annual rainfall occurs mainly in the autumn, winter and spring. Summer conditions are usually dry and warm with occasional hot days. "Effective" rainfall occurs most irregularly during the summer months. It occurs fairly frequently in April and almost regularly from May to November. Winter conditions in addition to being wet are usually cold and windy and frequently the ground is water-logged with surface water lying in all hollows.

Sown pasture, native pasture top-dressed with superphosphate to varying degrees, and native pasture not top-dressed are all

represented. The quality and quantity of feed varies widely at different periods with the different types of pasture. Whatever the type, the feed usually dries off after the spring flush and only dry pasture frequently poor in both quality and quantity, is available during the late summer and early autumn. Some growth occurs in the autumn between the first effective fall of rain and the onset of cold weather. The grass remains green during June and July but little growth occurs. Supplementary feeding is frequently required to maintain weight during the autumn before the break of the season and during June and July. The spring growth begins during late July or August, and from September to December there is usually much more feed than stock can consume.

OUTLINE OF PRESENT INFORMATION ON VARIATION IN FERTILITY, PROLIFICACY, SURVIVAL AND GROWTH

For the present purpose fertility is given its more specific connotation, the ability to produce viable young. Survival has been taken as being related to vigor of lamb at birth and to onset of lactation in the ewe. Course of lactation in the ewe is considered in its relation to growth.

(i) *Fertility*.—Sexual activity of rams in some breeds is reduced during the summer (Robinson, 1951) or following change in the light environment (Moule, 1950). Semen production is adversely influenced by hot dry environmental conditions (Gunn *et al.*, 1942) or by inadequate nutrition (Sapsford, 1951). However, there is no evidence of any reduced sexual activity or poor semen production in Merino rams under the relatively mild summer weather and summer feed conditions of the Western District of Victoria.

Most Merino ewes will mate from January to July (Kelley and Shaw, 1943; Watson, 1956). Behaviour between August and December is variable (Watson, 1956 and unpublished). However, lambing results together with the little direct evidence that is available suggests that in flocks which have been joined regularly during October, November and December, most or all ewes may mate within 4-6 weeks of the introduction of rams during these months. The incidence of oestrus declines when nutrition is poor (Roux, 1936; Hafez, 1952) but sufficiently poor feed conditions are only likely to be experienced during drought.

Among ewes joined in December at Tooradin, most have lambd to the first service (Watson, 1953 and unpublished). Other available data for Victorian conditions have not yet been examined in relation to returns to service, but among ewes joined during the summer there has certainly been no suggestion of any appreciable incidence of failure to lamb of the kind observed in the United States (Dutt, 1954). On the other hand, a high proportion of ewes have returned to service and many have failed to lamb following mating in the late winter and early spring at Tooradin (Watson, 1953, 1957).

Fatness resulting from a high plane of nutrition may possibly lead to reduced fertility, but the evidence is inconclusive (Hammond, 1952).

(ii) *Prolificacy*.—In Merino ewes held in pens at constant weight in Melbourne there was a highly significant seasonal variation in the proportion of twin ovulations characterised by a peak in the autumn and a trough in the late spring (Radford, unpublished).

Attempts to increase prolificacy by providing a rising plane of nutrition during the month prior to mating have met with varying success (Hammond, 1952). Conditions for success need definition, but if ewes are already in good condition it seems unlikely that "flushing" will increase prolificacy.

(iii) *Survival and Growth*.—Light weight of the lamb at birth has been associated with high environmental temperature during pregnancy (Yeates, 1953). Light weight and poor vigor at birth,

delayed onset of lactation and high losses among newborn lambs have variously been associated with an inadequate plane of nutrition (Underwood *et al.*, 1942 ; Wallace, 1948; Thomson and Thomson, 1949; Alexander *et al.*, 1956) and vitamin A deficiency (Miller *et al.*, 1942) during pregnancy. The mild summer temperatures of southern Victoria do not appear to have any influence on the development of the lamb in utero (Watson, unpublished) and sufficient depletion of the vitamin A reserves of the ewe to influence foetal development is also unlikely to occur (Underwood and Conachie, 1941). On the other hand, very heavy losses among newborn Corriedale lambs have been associated with a low plane of nutrition of the ewes during late pregnancy in autumn (Watson, unpublished). Heavy losses among newborn lambs during August and September have also been traced to direct effect of adverse weather conditions on the lambs (Alexander, Peterson and Watson, unpublished).

Insufficient information is available to decide whether milk production ever becomes a limiting factor in the growth of lambs under conditions of the Western District. Suckling lambs certainly continue to grow on dry summer pastures (Watson, unpublished).

Weaned lambs, whatever their age, frequently fail to grow on dry summer pastures (Watson, unpublished; Allden, personal communication), but growth may be maintained by provision of supplementary feed (Allden, personal communication).

THE LIKELY OUTCOME OF MATINGS AT DIFFERENT TIMES OF THE YEAR

The likely fertility, prolificacy, onset of lactation, birth vigor, chances of survival of the lambs, nutritional conditions during the suckling period and after weaning, and the consequent likely growth of the lambs have each been assessed in turn for mating in each month of the year. The picture so developed is summarised in Table I. It presumes that specific disease is absent. It refers, also, to seasonal conditions which prevail in most years and, consequently, it would be expected to vary in detail with the seasonal conditions which actually prevail. However, general trends should not be affected.

There are obviously great gaps in the available information. Nevertheless the information that is available does seem to provide some useful picture of the advantages and disadvantages of mating in most months of the year.

Mating from August to December is obviously favourable for the growth of lambs. Lambs from matings during this period should grow steadily for 12 months (August mating) to 8 months (December mating). Mating during October, November and December, at least, may also be satisfactory in other respects. Certainly in flocks adapted to mating during these months, fertility seems to be high; weather conditions at lambing should be mild ; and, if supplementary feed is provided to prevent decline in condition of the ewes during late pregnancy, the birth vigor of the lambs and the onset of lactation in the ewes should be satisfactory.

January to May are the obviously favourable months for fertility. Prolificacy is likely to be highest, too, in the autumn after the autumn break of the season. On the other hand, from matings in March and April the weather conditions at lambing are likely to be adverse, and lambs from matings in March to May are likely to suffer a set-back for several months as the result of weaning on to dry summer pastures unless green feed or supplementary feed which they will consume can be provided.

June also should be a favourable month for fertility and moderately favourable for prolificacy. The weather conditions at lambing from a June mating should be mild and the birth vigor of the lambs and onset of lactation in the ewes should be good. If the lambs are not weaned until they are six months old they

TABLE I.

Likely outcome of matings in the different months of the year in animals on pasture without supplementary feed in the Western District of Victoria.

Month of mating	Likely to mate	Likely to lamb after mating %	Likely prolificacy	Likely conditions for survival: Birth vigour and onset of lactation and weather	Likely growth of lambs (O, poor or stationary; +, steady; ++, fast)		
					Suckling		After weaning
					months	5	
January	All	90-95	Low	Fair	+	+	+
February	All	90-95	Low to moderate	Fair	+	+	+
March	All	90-95	? ^b	Fair to poor	+	+	+
April	All	90-95	? ^b	Fair to poor	++	++	++
May	All	80-95	High	Fair to good	++	++	++
June	All	80-95	? ^b	Good	++	++	++
July	Most to all ^a	50-90	? ^b	? ^a	++	+	+
August	Few to all ^a	50-90	Moderate	? ^a	+	+	+
September	Few to all ^a	50-90	Moderate to low ^c	Good	+	+	+
October	Few to all ^a	?	Moderate to low ^c	Good	++	++	++
November	Few to all ^a	85-95	Moderate to low ^c	Fair to good	++	++	++
December	Few to all ^a	90-95	Low	Fair to good ^e	++	+	+

a. Dependent on strain; needs to be determined for each long established flock.

b. Physical factors of the environment favour "high"; nutritional factors favour "low".

c. Physical factors of the environment favour "low"; nutritional factors favour "high".

d. Ewes likely to be fat.

e. If break of season occurs in April result should be good.

f. Steady but possibly somewhat slow.

should grow steadily until they are 14 months old. Should supplementary feed be required during the autumn before weaning, the presence of the ewes should encourage the lambs to consume it.

CONCLUSION

At the same time, then, as indicating why the spring and early summer months are so popular for mating in the Western District, this approach suggests that June, a month during which mating is rarely undertaken in this area, may also be favourable for fertility and that it might be more favourable to survival and to the development of the lambs after weaning, particularly in circumstances where it is difficult to provide supplementary feed in the autumn. This view was first advanced in 1953, and information since obtained continues to support it, with the reservation that ewes which mate best in the spring may not be those that mate best in June. However, the object of the present paper is not so much to reiterate this suggestion as to draw attention to the merits of a comprehensive approach. It has yielded useful information for this area. It might well do so for other areas. Indeed, the paper by Moule and Bell (1957) is probably based on an approach somewhat of this nature for Queensland conditions.

Wide as the approach is, it does not consider effects of pregnancy and lactation at different times of the year on other features of the productive capacity of the ewe. It might be still more useful if this aspect also were covered.

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