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RECOMMENDATIONS FOR MANAGEMENT OF FLOCKS DURING JOINING

By K. P. CROKER, Sheep and Wool Branch

THE age or experience of the ram, the number of ewes it has to serve and the management of the ram and ewe flock at mating time all influence the lamb-marking percentage.

These are the findings of a systematic research programme conducted over the period 1963 to 1965 by Dr. R. J. Lightfoot,* in collaboration with Mr. J. A. C. Smith† (1966) and continued by the author in the years 1967 to 1969.

A high density of rams, in some cases up to 4 per cent. (4 rams per 100 ewes), improved flock fertility when—

- young (1½-year-old) rams were used
- previously unmated 2½-year-old rams were used
- 1½-year-old rams were joined in equal proportions with older rams
- ewes of low fertility because of clover disease were joined
- a concentrated drop of lambs in the first three weeks of lambing was required.

The management of rams and ewes before and during joining can influence the number of lambs eventually produced. In Western Australia, management practices have generally been based on tradition, information from other States and ideas from overseas. For the most part this information has been applicable but research by the W.A. Department of Agriculture over the last seven years has shown that some modifications to joining management can lead to better lambing performances.

Background

Reports from the Eastern States and New Zealand suggest that under certain conditions as few as one ram per 100 ewes results in satisfactory crops of lambs. It is doubtful whether many flocks in W.A. experience similar conditions to those in which these investigations were made. With this in mind a series of experiments was initiated in the wheatbelt between 1963 and 1969 to review the whole question of joining management.

The original experiments were carried out at the Wongan Hills and Newdegate Research Stations and on a private property at Nangeenan. The results of this work have recently been published (Lightfoot, 1968; Lightfoot and Smith, 1968). Using Merino ewes and two-toothed Merino rams the experiments showed consistent and clear-cut advantages of joining at a rate of more than one ram per 100 ewes (see experiment 3 in the Table). High ram percentages, in some cases up to four rams per 100 ewes, resulted in more ewes being mated, fewer returns to service, a more concentrated lamb drop, a substantial increase in the number of lambs born and a higher incidence of twins.

The research also showed, however, that it was not always necessary to use such a high proportion of rams to gain the best lambing results. Many other factors, particularly the age and experience of the rams, were found to be important.

Some of these factors are discussed below, and their effect on the recommended percentage of rams to be joined to the ewes is noted.

Age and experience of rams

The results above refer only to 1½-year-old rams. The situation with older rams proved to be somewhat different.

* Adviser, Sheep and Wool Branch.
† Agricultural adviser, Merredin.
Unless a very long, protracted lambing can be tolerated, 2-tooth rams should be joined separately from older rams and at a higher concentration—up to 4 per cent. With older, experienced rams, 2 to 2½ per cent. rams can be used unless
- The ewes are of low fertility due to clover disease.
- The joining period is very short (less than 6 weeks).
- A more concentrated drop of lambs is required.

In Experiment 2, 1½-year-old rams were compared with sires 2½ years of age, in each case at 2¾ rams per 100 ewes joined. The older rams produced semen of better quality before, during and after joining, and a higher percentage of lambs was born.

The suggestion that mature rams were more fertile than 2-tooths was examined further in Experiment 4. This experiment compared 1½-year-old versus 3½ to 5½-year-old rams and within each age group, joining at the rate of either 2 or 4 per cent. (4 or 8 rams per flock of 200 ewes). The results confirmed earlier findings that 2-tooth rams produced more lambs when joined at 4 rather than 2 per cent. (90 versus 79 per cent. lambs born). This was not the case with the older rams, however, which produced 91 per cent. lambs born regardless of whether they were joined at 2 or 4 per cent.

Experiment 7 was similar, and confirmed these findings.

In summary, these experiments showed that—
- 2-tooth rams were less fertile than mature rams (2½ to 5½ years old) when both were joined at 2 per cent., but of equal fertility when both were joined at 4 per cent. rams to ewes
- With an eight-week joining period there was no advantage in joining more than 2 to 2½ per cent. mature rams. It should be noted however that use of 4 per cent. mature rams did result in higher fertility during the first three weeks of joining, and therefore in a more concentrated lamb drop.

The question remains to be resolved whether the higher fertility of mature rams is due to better semen quality or better mating efficiency, perhaps associated with past experience. Evidence from this research programme indicates that both factors are involved.

In Experiment 9, 4-tooth rams that had not been joined previously were compared with 2-tooths. Under these conditions the older, but inexperienced, 4-tooths gave the same results as the younger rams, so it is possible that previous mating experience, rather than age or maturity, is what determines mating efficiency.

**Joining rams of mixed ages**

The above findings led to a study of how a flock of rams of mixed ages would perform at similar mating densities to those used in previous experiments. Two-tooth and mature rams were mixed in equal proportions and mated to ewes at the rate of either 2 or 4 per cent. (Experiment 5). The results (see Table) show that under the conditions of the experiment there was a considerable advantage in joining at the higher percentage. This is probably because—

1. older rams are usually more fertile than 1½-year-old rams so mixing the age groups is likely to produce a fertility response intermediate between the responses of the two groups mated separately, and
2. mature rams often dominate younger rams so that if the groups are mixed the older rams serve more ewes and the effective percentage may be lower than suggested by the total number of rams used.

In practice it is better to mate 1½-year-old rams separately and to use a higher percentage than is normal for mature rams.

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Duration of joining

A further point to be considered is the period for which the rams are joined with the ewe flock. In general, as the period of joining is lengthened, less advantage will result from using a higher percentage of rams. Although fertility during the first three weeks of joining will be reduced when a low percentage of rams is used, the ewes have more chances to conceive later in the joining period. If joining is sufficiently prolonged, say 12 weeks, the total number of ewes conceiving will eventually equal that achieved by using a higher percentage of rams for six weeks.

Whether or not to use a higher percentage of rams therefore depends to some extent on the value placed by the wool-grower on obtaining a quick, concentrated drop of lambs.

Variation in fertility between rams

There is great variation in fertility between individual rams, but this difference becomes less as the percentage of rams joined to ewes mated increases.

For example, in Experiment 3, the percentage of ewes lambing to ewes joined varied from 37 to 83 per cent. when using one per cent. rams (four rams, each joined to 100 ewes); from 54 to 88 per cent. using 2 per cent. rams (four rams, each joined to 50 ewes), and from 88 to 92 per cent. with 4 per cent. rams (four rams, each joined to 25 ewes).

Joining rams individually or in groups

Because of the large variation in fertility between individual rams it is seldom wise to join single rams to small groups of ewes. For example it would be better to join four rams as a group to 200 ewes rather than join each individually to 50 ewes.

There are two reasons for this:

First, when joined to groups of rams most oestrous ewes are served by more than one sire. Therefore a ewe served first by a ram of low fertility has the chance of being covered by a highly fertile ram an hour to two later.

Second, if mated individually, a highly fertile ram “settles” all of his ewes during the first 17 days of joining leaving him with no work during the following weeks. If this ram is mated together with others he “settles” additional ewes later during joining, as he has access to ewes returning to service 17 days after being mated by the less fertile rams.

Joining rams in drafts

It is often suggested that it would be beneficial to join rams in drafts—for example, join only half of the rams at first, and add the remaining rams after two or more weeks. Although the question was not examined specifically, evidence from the experiments indicates that the practice could not increase fertility, but would be likely to reduce it.

During the breeding season (about December to July) all ewes in the flock regularly come into oestrus (heat) every 17 days. Therefore, during the first two to three weeks of joining all ewes should be served, requiring a maximum concentration of rams. If only half the rams are joined the ram percentage will be reduced during this critical period and fertility will suffer.

Joining ewes affected with clover disease

When the general fertility of ewes is low because of clover disease the response to an increased percentage of rams is greater than in other flocks.

In Experiment 6, using ewes with a history of clover disease, an increase in ram percentage resulted in a very large increase in lamb drop. This contrasts with Experiment 5, using normal ewes, when the increase in lamb drop with the higher percentage of rams was much smaller.

When ewes are affected by clover disease the transport to sperm within the reproductive tract is greatly hampered. By increasing the number of rams present, each ewe can be mated more times during oestrus, so that more sperm is available to fertilise the eggs. This increases the chances of the ewe being fertilised.

Where flocks are affected with clover disease and fertility is low, a high proportion of rams should be used.

Management intensity during joining

Experiment 8 compared the lambing performance of ewes, using different management techniques. One group was kept in small paddocks and mustered twice

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daily (intensive management), while the second group was mustered only once a week (extensive management).

The “intensive” group showed no improvement in lambing when the percentage of rams joined was increased from 1 to 4, although the lamb drop was more concentrated. The extensively managed group gave a much higher lambing percentage in the flock mated with 4 per cent. rams than in the flock mated with only 1 per cent. rams.

The significance of this finding is that as paddocks are usually large and flock management during joining usually extensive, profitable responses to increasing the percentage of 2-tooth rams used for joining can be expected.

**DETAILS OF JOINING MANAGEMENT EXPERIMENTS**

<table>
<thead>
<tr>
<th>EXPERIMENT No.</th>
<th>PERCENTAGE OF RAMS</th>
<th>AGE OF RAMS</th>
<th>INDIVIDUAL OR GROUP MATING</th>
<th>COMMENTS</th>
<th>PER CENT LAMBS BORN TO EWES MATED</th>
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