

EWES FERTILITY

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The importance of the fertility of New Zealand's ewe flock to the national economy is well known and needs no further emphasis.

It is obvious therefore that it is highly desirable that we should have some knowledge of the many factors which contribute to or are involved in this complex subject. In this connection it must be stated at the outset that our knowledge on this subject is by no means yet complete, new information on various of its aspects is constantly being produced by the scientists working in this field, and it may be many years, if ever, before we know all the answers.

Nevertheless there is already sufficient information available to make it possible and worthwhile for each individual to consider carefully the fertility level of his flock with the ultimate view perhaps of improving it.

Egg Production

This must always remain the prime limiting factor in ewe fertility. The number of eggs shed by each individual ewe near the end of her "heat" period sets the upper limit on the number of eggs which can be fertilised at mating by the ram, and thus have a chance of being ultimately produced as full-time lambs.

Many factors govern egg production. The ewe is able to produce eggs only when she is in a breeding state, what is commonly termed "the breeding season". This period may vary both in duration as well as the actual calendar months concerned according to:

- (a) The breed or cross of ewe and
- (b) The individual within the breed.

An example of this difference between the Corriedale and Romney can be seen in Figure 1.

It is interesting to note that much of this variation is due to the day

length experienced by the sheep, which is a short-day breeding animal. Thus there will be differences between the onset of the breeding season of ewes in the extreme north and those in the far south due to latitude and its associated changes in day length. In fact it is this reversal of day length which is responsible for changing the breeding season of northern hemisphere sheep to that of the southern when they are exported to New Zealand.

Now it can also be noted from Figure 1 that the level of egg production is not the same throughout the breeding season, but rises to a peak about six weeks after its commencement. Thus in order to obtain maximum production from any one group of ewes it might pay the farmer to define the onset of the breeding season by running a "raddled teaser ram" with a good sample of his flock from early January. Then as soon as 15 to 20 per cent of the ewes are marked he has fixed the starting point and can calculate his maximum fertility level date six weeks later. The use which can be made of this knowledge will of course depend on each individual farmer's circumstances in respect to feed supplies and general management problems. However, there is an added incentive to do this, because at Lincoln we have found, during a ten-year study of the sheep's ovum, that not all the eggs liberated at any one time are good eggs. Some of them are abnormal and as a result are not able to be fertilized. The proportion of these abnormal eggs is highest at the beginning of the breeding season and lowest, fortunately, about the peak ovulation point. This serves to increase the net gain in fertility, which can be achieved by delaying mating until near the middle of

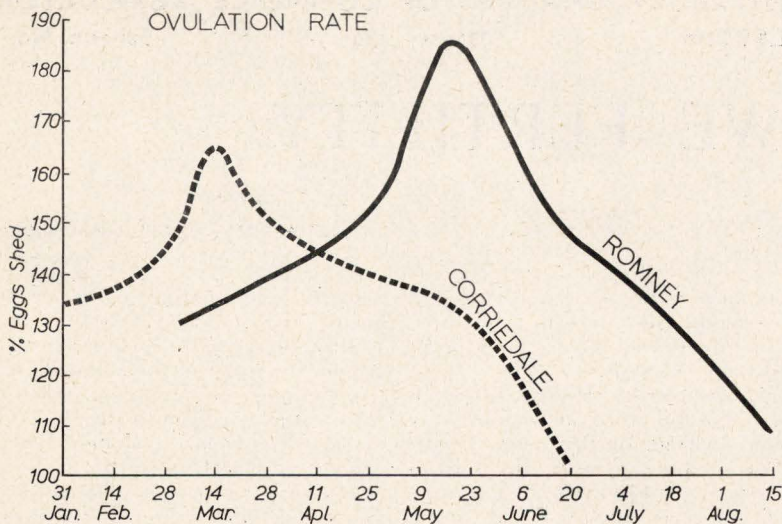


Fig.1

the breeding season. The effect of one month's delay in mating a Romney flock is shown in Figure II.

It will be appreciated that these factors relating to egg production apply in general to all ages and breeds of sheep. There is still, however, the one further advantage, which can be obtained by the later mating programme, of reducing the spread of lambing. Approximately 100 per cent of the ewes will be ovulating around the peak point whereas a month prior to that only about 70 per cent of all ewes will be ovulating at any one time and thus the flock takes longer to get in lamb.

Age Effect

The contribution which age can make towards fertility is well known and need hardly be elaborated on here. The following table based on Lincoln College records over the last twenty years serves to illustrate the point.

Table I.—Effect of Age of Ewe on Lambing Percentage

Age of Ewe at Lambing	Lambing %
2 years	127
3 years	146
4 years	160
5 years	160
6 years	160

Thus for every 100 5-6 year old ewes culled for age and replaced by the equivalent number of two-tooths the reduction in lambdrop will be 33 lambs.

The suggestion here would be to approach culling with the attitude of "how few two-tooths need I put into the flock", and pay more attention to culling on mouth condition rather than age.

Breed Effect

Here again there are marked fertility differences existing between some of the well-known breeds of sheep. But it has not always been easy to obtain figures for the performances of different breeds when run under the same environmental conditions. To some extent these difficulties have been overcome by analysing the data from the Lincoln College stud records for the past 20 years, where the four studs concerned have been given exactly the same treatment in terms of feeding and management.

The picture presented by Table II has been derived on the basis of full-time lambs born expressed as a percentage of ewes mated being a true measure of fertility.

Table II.—Breed Fertility

Breed	%
Border Leicester	166
Romney	149

Corriedale	132
South Down	130

Twin Selection Within the Breed

We may say that in all breeds there is an upper genetic limit on fertility beyond which it is impossible to improve without the addition of new genetic material. This can only be achieved within a breed structure, by the use of certain "strains" which have proved themselves to be high in fertility. To do this, stock have either to be purchased from another breeder who has a flock rated high in this trait or a rigid policy must be adopted of selecting for twins on the side of both the ram and ewes. Improvement by means of twin selection can be slow but it is at least sure. For example at Ruakura a twelve-year twin-selection programme for fertility in a Romney cross flock has resulted in an increase of approximately 20 per cent.

On the other hand faster progress can be made if high-fertility-rated rams from a high-fertility flock or

strain are purchased and used; and of course a combination of these two methods will result in a still quicker approach to the genetic fertility ceiling of the breed concerned.

Crossing Outside the Breed

For immediate results this method cannot be improved upon, but unfortunately of course it cannot be used by registered stud breeders. However, in the commercial flocks substantial increases can be obtained by this means in one generation. For example at Lincoln College with the mating of a high-fertility breed such as the Border Leicester with breeds of relatively low fertility, the Corriedale and Romney, it has been found that the Border Leicester-cross ewe from these matings weans 20 per cent more lambs than each of the respective breeds of parent ewe. Results of a similar nature have also been demonstrated at the Ruakura hill-country station where the Romney ewe flocks are run under extensive, rough North Island hill-

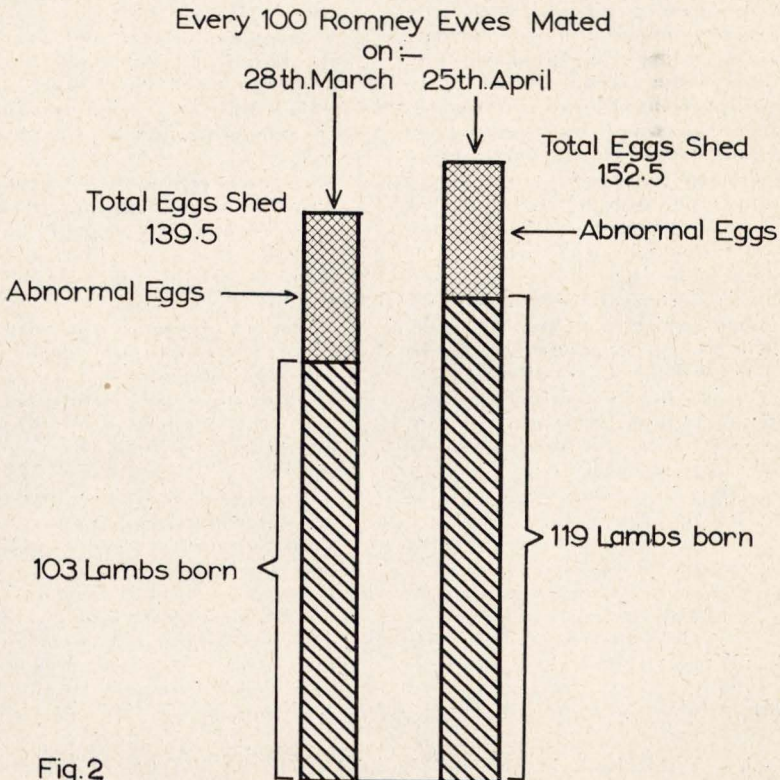


Fig. 2

country conditions. Calculated on the percentage of lambs alive at 28 days per 100 ewes mated basis, their figures are as follows for equally-balanced mixed-aged ewe flocks.

Romney ewes 80.2%
Border X Romney ewes 109.0%

The straight commercial breeder has therefore a quick, efficient method for increasing the fertility of his flock, by mating it to rams higher up the fertility scale than his ewes, and the higher up the rams are the greater will be the degree of improvement.

One word of warning: Be sure that the rams used, whatever the breed or cross, are definitely good-quality sheep and of substantially higher fertility.

Flushing

This practice, namely the mating of ewes when they are in a rising plane of condition, has been known and practised since the days of Aristotle. Its results are well appreciated by most farmers, and by following the practice each individual can be sure he has given his ewes the opportunity to produce eggs to their genetic maximum, commensurate with the date of mating. Once again as in the case of "peak of the breeding season" matings it has to be fitted into the managerial practice and feed position of each farmer concerned. Increases of up to 15 per cent have been achieved by using the flushing technique for three weeks before putting the rams out and two weeks afterwards.

Hormone Therapy

This is a comparatively recent development which has not yet quite reached the stage where it can be recommended for universal use.

It consists of the treating of ewes, prior to tupping, with certain hormone preparations, of which there are several, with the objects of:

- (a) artificially stimulating the number of eggs produced by each ewe and so increasing her chances of multiple birth,
- (b) of concentrating lambing by artificially regulating the "heat" periods of the ewes so that they all occur round about the same date.

Both of these possibilities are highly

exciting and even at their present stage of development are practical possibilities for the stud breeder. But the cost in terms of materials and labour, at present, renders them unsuitable for the ordinary commercial farmer. It should also be remembered that, at least in the first instance, the assistance of a veterinarian or a person trained in the use of hormones should be sought, if this form of fertility augmentation is to be adopted.

With regard to some of the points made, the practical application of them may entail too radical an alteration of hitherto well-tried and tested systems of management to justify their adoption. This is only natural, but then the farmer cannot continue to complain about his low lambing percentages. If increased fertility is available because of extra planning and effort then, as always, it is over to the individual to decide whether the end justifies the means.

Let us summarize the facts available that can contribute to an increased fertility in ewes.

1. Where possible start out by using the breed or cross that has the highest natural genetic level of fertility whilst still being capable of efficient utilization of your type of country.
2. Maximum fertility of all sheep can only be achieved by mating them over their "peak egg-production period"; this is capable of being defined for any one farm.
3. In any flock, two-tooths are the lowest fertility-age-group; therefore keep their proportion down to the absolute minimum.
4. Within any flock fertility may be increased by selection for twinning on the side of both the ram and the ewe.
5. The use of high-fertility breeds for cross-breeding purposes can bring about a rapid and substantial improvement.
6. Flushing of ewes is beneficial and should be practised where possible.
7. The use of hormones for augmenting fertility is of short-term benefit only, and at present is only possible for the stud breeders.