The Reproductive Performance of the Nigerian Dwarf Sheep

by

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SUMMARY

THREE of the most important parameters of reproduction in sheep, the age at first lambing, the lambing interval and the number of lambs born per ewe at each lambing, were analysed from the herdbook of the breeding flock of the University of Ibadan for the period-1968 to 1974. The means were as follows:

1. age at first lambing:	**424·9**	**(310-692) days**
2. lambing interval:	**234·4**	**(151-571) days**
3. number of lembs at birth	**1·4**	**(1-3)**

Of the 663 lambings, recorded, 38 percent resulted in twins and 4 percent in triplets. The percentage of multiple births increased with the number of lambings an ewe had completed. The wide ranges in performance indicate that there is scope for improvement of the reproductive potential of this breed of sheep through improved management and or through selection.

INTRODUCTION

Very little attention has in the past been paid to the study of the biology of reproduction of the Nigerian Dwarf sheep. Earlier attempts on this (Hill 1960, Dettmers and Loosli 1974) have been confined to the gross picture of their reproductive performance. Efforts have therefore been made in this paper to examine in greater details three of the most important parameters of reproduction in the Nigerian Dwarf Sheep-the age at first lambing, the interval between lambings and the performance at lambings.

MATERIALS AND METHODS

The raw material for this study came from the herd book of the breeding flock at the University of Ibadan Farm. The period covered extend from 1968 to 1974. The records were kept by the herdsmen and the parameters recorded include flock number, birth weight, sex, type of birth, dam number and sire number. The animals were allowed to breed all the year round.

Age at first lambing

The age was calculated from the day of birth to the day prior to the date of the first lambing. For this parameter a total of 70 ewes born between 1972 and 1973 were used in the calculation, the choice of period depending entirely on the accuracy of the information recorded. The means and distribution of the age at first lambing were determined and an analysis of variance was done to determine the effect of season of birth on the age at first lambing.

Interval between lambings

This interval was calculated from the day of one lambing to the day prior to the date of the next lambing. A total of 457 births from 122 ewes spread over the period of 7 years -1968 to 1974-was analysed to determine the mean, the distribution and the effect of the stage of lambing on the interval. The number of lambings per ewe ranged from 2 to 10. The repeatability of the lambing interval using the analysis of variance method (Turner & Young 1969) was estimated.

Performance at lambing

The number and sex of the lambs born per ewe at lambing were determined from 663 lambings recorded between January 1971 and December 1974. Monthly and yearly effects were calculated using the analysis of variance. The pattern of incidence of multiple births was also checked. Estimates of the repeatability of the number of lambs born per ewe using two methods - analysis of variance method and the regression method were calculated.

RESULTS AND DISCUSSION

Age at first Lambing

The mean age at first lambing obtained for the flock was 424·9±20 days, range 310±696 days. The summary of the distribution of the age at various intervals is illustrated in figure 1. About 78·6% of all the ewes had their first lambing before the age of 500 days (16 months approx.) at a mean age of 406·9±11·5 days, range 350-494 days. This therefore suggests that the normal age at first lambing for the Nigerian Dwarf sheep would be in this range. The ewes born in the dry season (October - March) had their first lambs at a significantly younger age (395·5 days) than those born in the wet season (443 days). This is not surprising since the former group had to go through the dry season still suckling and weaned when pastures become easily available the following wet season. This therefore suggests that there may be room for improvement in the flock performance through improvement in the environment of the flock. Indeed Orji and Steinbach (1976) were able to reduce the age at puberty in the Nigerian Dwarf ewe through supplemental feeding.

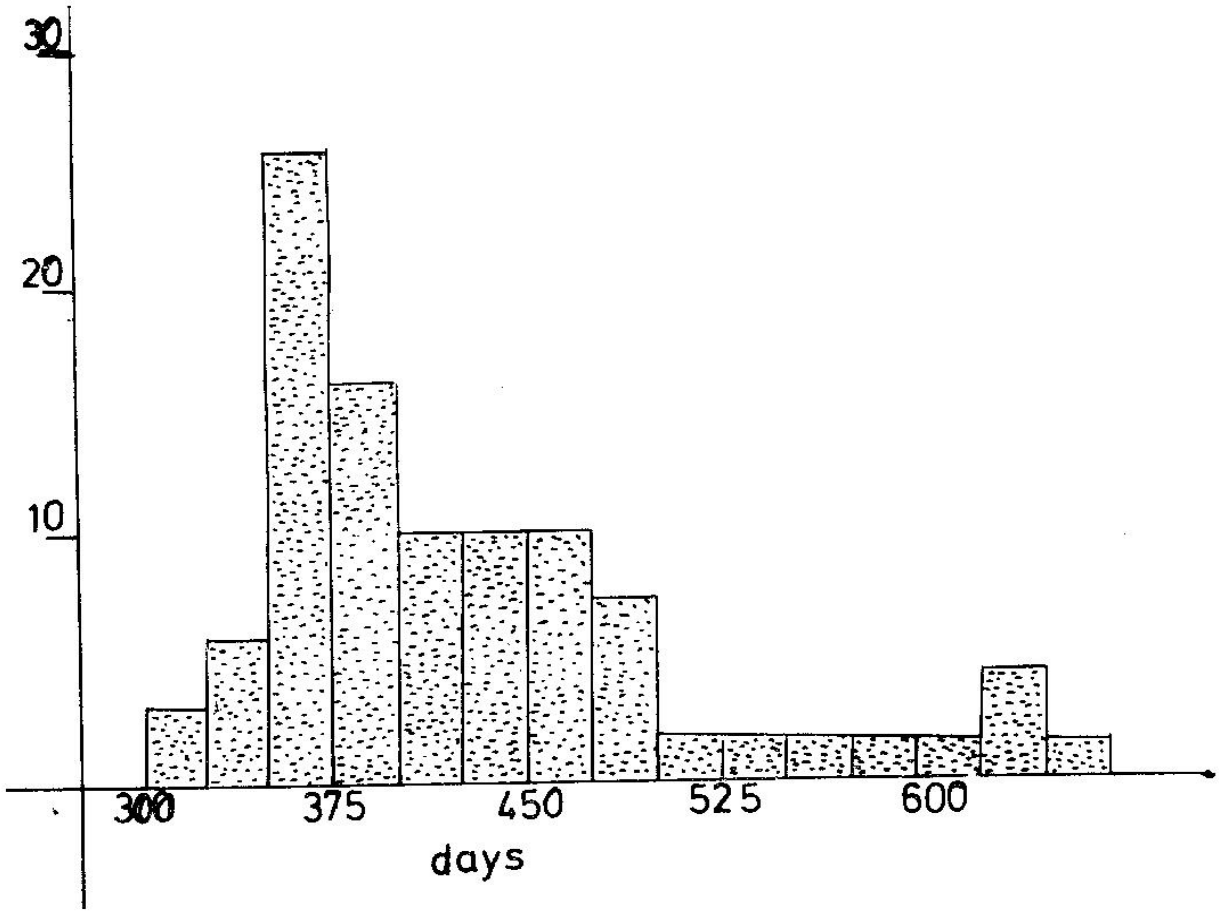

Figure 1 : **Frequency Distribution of the age at first Lambing**

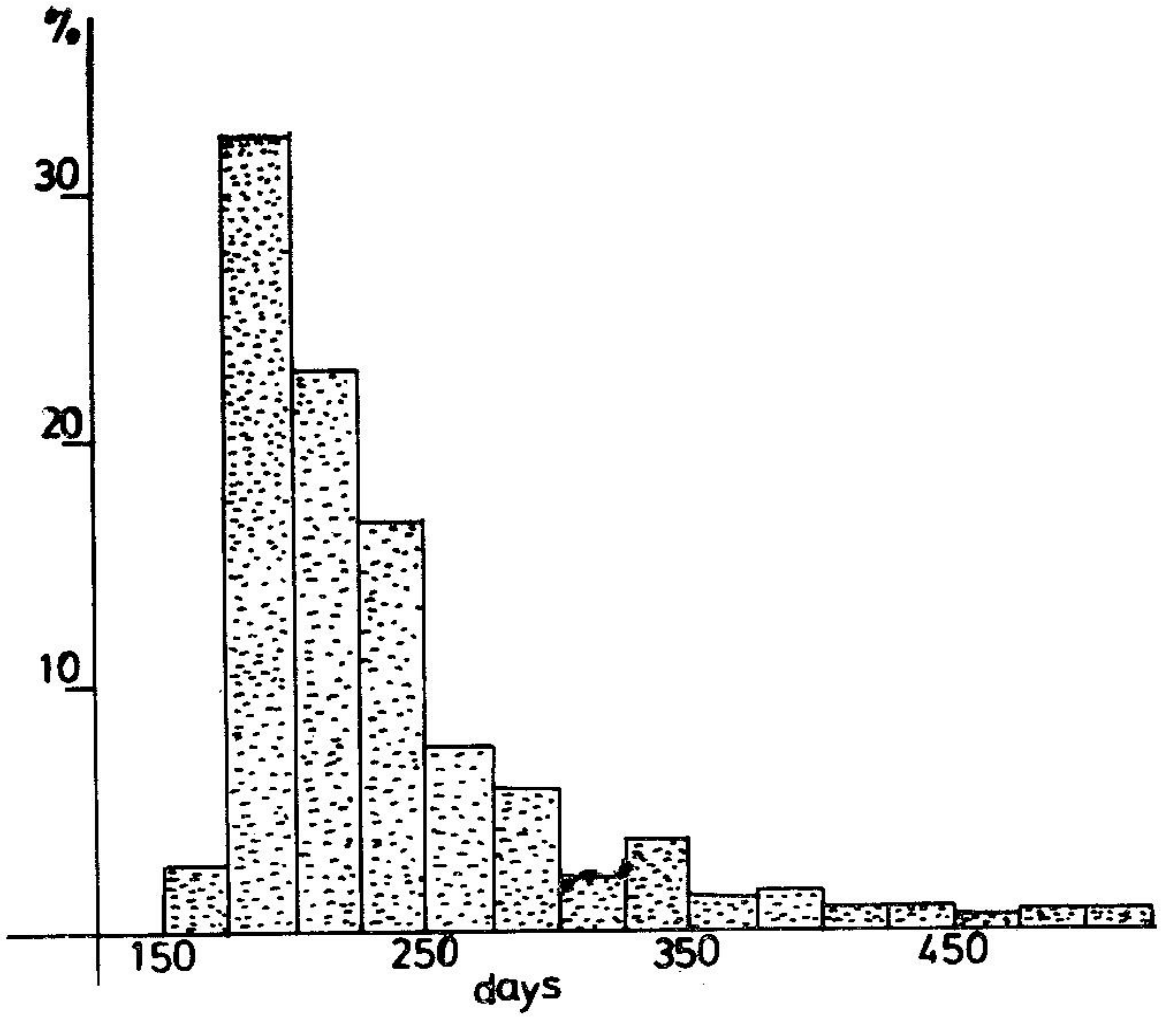

Figure 2 : **Frequency Distribution of the Lambing interval**

Interval between lambings

The summary of the distribution of the lambing is illustrated in figure 2. The overall mean of the lambing interval was 234·4–6·8 days, range 151–571 days. This mean value is within the range of values obtained for the other Nigerian breeds of sheep-276 and 270 days for the Yankassa and Ouda breeds respectively (Ferguson 1964). However because 86 percent of all the lambing intervals lie between 175 -300 days at a mean of 216·78±3·5 days, it would be probably safe to assume that this is the normal value for the lambing interval of this breed. This would therefore mean that the Nigerian Dwarf sheep in this environment has a shorter lambing interval than the other Nigerian breeds.

The interval between lambings decreased with the number of lambings completed ($r=0{\cdot}45$ $P < 0{\cdot}05$). The mean decreased from 232 days between the first and second lambings to 208 days between the fourth and fifth lambings. This reduction with lambings is in agreement with the overall improvement in the efficiency of the reproductive performance of sheep with successive lambings, observed by several workers (Terrill 1968, Asdell 1964, Yalcin & Bichard 1964). The repeatability value for the lambing interval is 0·036. This is low and therefore suggests that the expected gain by selection for shorter lambing interval would be small.

The performance at lambings

The overall mean of the number of lambs born per lambing completed in the flock was 1·46±0·04 lambs, range 1–3 lambs. Differences in lambing performance (expressed as lambs born per lambing) between the months and between the years were not significant ($P < 0.05$ F-test). It could therefore be seen that apart from lambing all through the year, there are no significant differences in the performance at lambings of the Nigerian Dwarf sheep from one part of the year to the other.

The lamb crop per lambing completed varied with the stage of lambing. This is illustrated in figure 3. There is a positive and a highly significant correlation between the stage of lambing and the lamb crop per lambing (R=0·81). The equation of the lamb crop (Y) per lambing on the stage of lambing(X) is ($Y=1.09+0.18X-0.0098X^2$). The 123·7 mean lambing percentage obtained for the first lambing though below the overall mean for all lambings, agrees with the value obtained for early breeding in some other

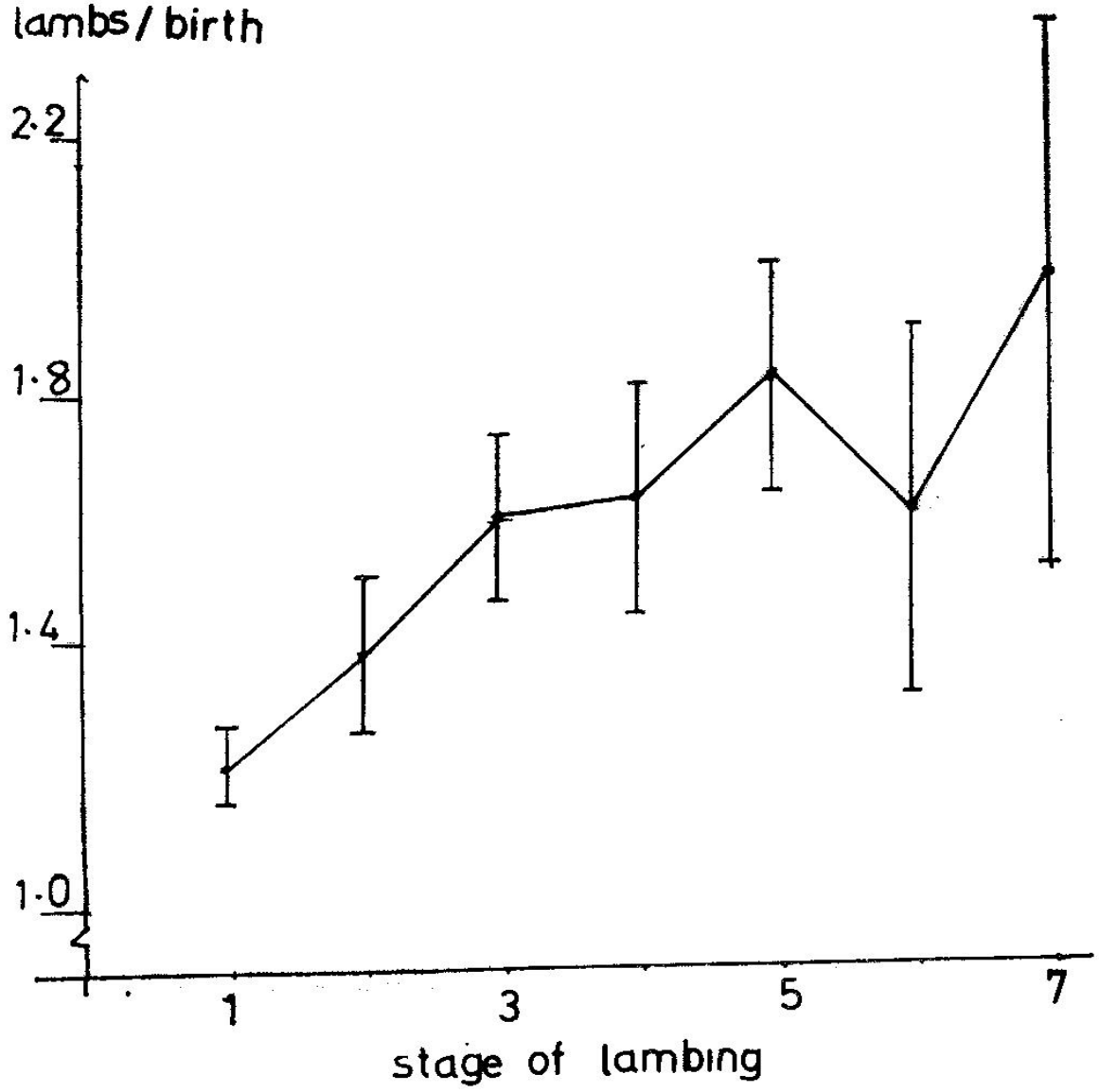

Figure 3 : **The effect of the stage of lambing on the performance at Lambing**

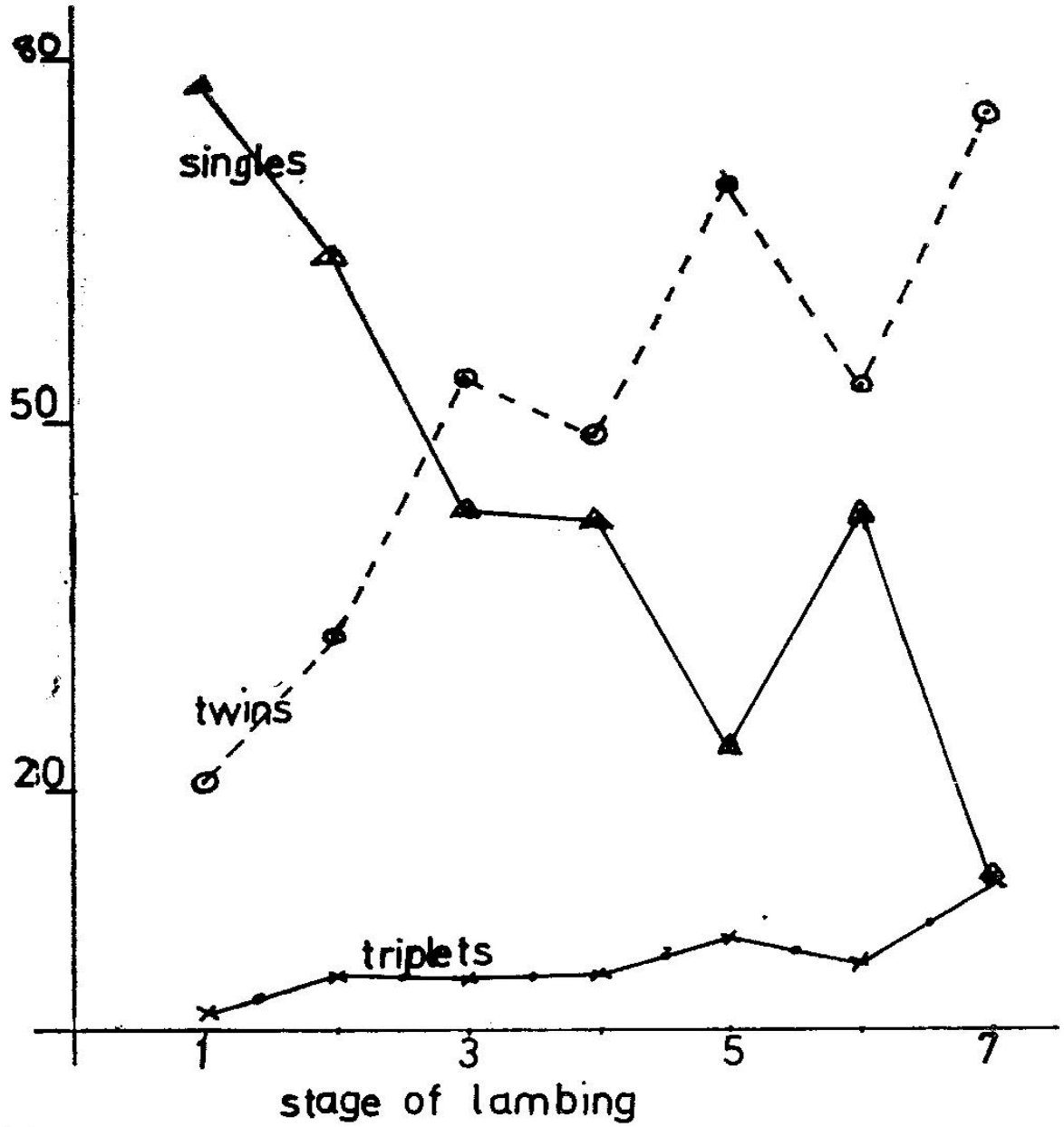

Figure 4: **The effect of the stage of Lambing on the type of birth** (%)

breeds of sheep - (100–124% for Iceland sheep, Dyrmundsson 1969; 100% for the Scottish Blackface X Merino, Donald *et al* 1968; 128% for Border Leicester X Cheviot, Yalcin and Bichard 1964).

41·9% of all the lambings were multiple births while 58·1% were singles. Of the multiple births, 90·7% were twins and 9·3% triplets. Small and non-significant monthly differences exist in the ratio of multiple/single lambs born per lambing. The overall percentage of twin births increased with lambings, that of singles declined. There were only slight increases in triplet births as lambing progressed (figure 4). By comparing these results with figures available for other Nigerian breeds of sheep we are inclined to conclude that the Nigerian Dwarf sheep is highly prolific. The mean of 41·9% for multiple births increasing to 87% by the 7th lambing is much higher than 25·5% and 14·08% reported by Ferguson (1964) for the Yankassa and Ouda breeds respec-

tively. These figures compare favourably with 49·1%, 46·6%, 49·1% and 51·0% for Cheviot, Shropshire, Landrace and Oxford Down breeds respectively (Rendel 1956) and 63% for the Blackface sheep (Jones 1959). There is a positive and a highly significant correlation between the stage of lambing and the proportion of multiple births recorded (R = 0·85).

The repeatability values for the number of lambs born per ewe at lambing are 0·04 ± 0·02 using the analysis of variance method; but 0·13 and 0·18 using the regression method between the first and subsequent lambings; and between the second and subsequent lambings respectively. The higher value obtained with the regression method agree with the results published by Young, Turner and Dolling (1963) on Australian Merinos and Forrest and Maurice (1974) on lowland sheep. For predicting future lambing performance, these workers are agreed that the regression method is particularly useful. According to Young *et al* (1963) the record at the second lambing is a better predictor of the future performance than the record at the first lambing. However, because of the low values obtained by either method, the improvement in the reproductive potential of the flock through selection would be small. The results in figure 3 show that the reproductive performance of the ewes increases with the age and the stage of lambing of the ewes, however Table 1 shows that whatever improvement one would get from selection for twinning and older ewes would be masked by the relatively poor performance of the younger ewes entering the flock.

Ewes born as twins appear to be more disadvantaged than the singles at the first 3 lambings.

The distribution of the sex of the lambs at birth was in the proportion of 49 males to 51 females. This agrees with the general values reported by other workers for sheep (Rae 1956, Asdeli 1964). When the type of birth was considered, the proportion was unchanged for the singles but with the multiples the proportion was 48 males to 52 females. There was no significant monthly or seasonal influence on the sex of the lambs born.

In conclusion, this study has shown that there is plenty of room for improvement in the flock; the average ewe by the age of four years would have had at least 6 lambs, while the best and below average would have produced 10 and 3 lambs respectively. Because the repeatability values for these parameters are low, any anticipated improvement in the reproductive potential of the flock through selection would only be moderate. Besides, any gains following selection would be masked by the relatively poor performance of the ewes in their first few lambings. Proper management and general improvement in the environment of the flock would therefore play a greater role in the improvement of the flock reproductive performance.

TABLE 1

The relationship between an ewe's form of birth and her subsequent performance

Ewes born as	*Average number of lambs from the ewes based on all ewes that had completed at least:-*			
	1 lambing:	*2 lambings:*	*3 lambings:*	*4 lambings:*
Singles	1·397 (156) +	1·425 (134)	1·541 (98)	1·431 (65)
Twins	1·376 (178)	1·407 (150)	1·539 (102)	1·646 (65)
Triplets	1·273 (14)	1·333 (9)	1·333 (1)	nil

+Number in brackets represent the lambings used in the calculations.

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