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# Some Aspects of the Inheritance of Fertility in Sheep

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## SUMMARY

THE data which have been analysed in this investigation were derived from lambing records of a Romney experimental flock covering the years 1946 to 1953 inclusive. During this period, no selection was practised in this flock for increased reproductive rate. In most years, seven rams were used, each ram being mated to 60 ewes. These ewes were selected at random except for the restriction that each ram had approximately the same number of ewes of each age group.

Two measures of reproductive performance were analysed: (i) The number of lambs born (either alive or dead) per ewe; and (ii) the number of lambs weaned per ewe. Age of ewe and year were found to have important effects on these two measures. Hence these two factors were controlled by doing the analyses on a within-year basis for each age.

Repeatability of lamb production as measured by the correlations between records of the ewes at successive ages was found to be low. The estimates obtained varied from 0.12 to 0.25. Heritability was calculated by two methods, viz., doubling the regression of daughter's record on dam's record and by multiplying by four the correlation between the records of paternal half-sibs. In general, the results showed heritability to be low, the estimates ranging from 0.00 to 0.15. The difference between the lambing percentage of ewes which were born as twins and ewes which were born as singles averaged 9.45%. This result gives further evidence that the heritability of reproductive rate is low.

Some consideration has been given to the investigation of the genetic correlations between fertility and other characteristics of the sheep. Preliminary results indicate the presence of a negative genetic correlation between fertility and fleece weight.

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## Discussion

Dr. HENDERSON: A ewe raised as a twin may grow a lighter fleece as a two-tooth than a ewe raised as a single. Could this influence the size of the estimate of the genetic correlation between fleece weight and fertility?

Professor RAE: If this effect were not corrected for, it would have an influence if the genetic correlation were estimated from the correlation of dam's fertility on daughter's fleece weight.

Dr. CARTER: Has any investigation been made on the problems of scale involved in the use of the variate "number of lambs born or reared per ewe"?

Professor RAE: The fact that the phenotypic expression of reproductive performance of the ewe is limited to zero, one, two or three lambs born or reared does raise a problem. Several approaches to this problem have been made. One is the attempt to find a scale which maximises the heritability of this trait. Another is to regard the phenotypic expression as a series of thresholds, the underlying genetic mechanism being for practical purposes continuously distributed. In general, however, the various methods tried did not give markedly different estimates of repeatability and heritability.