

Research Article

EXPECTED RESPONSE IN BODY WEIGHTS TO SELECTION FOR AVERAGE DAILY GAINS AT VARIOUS AGE INTERVALS IN MECHERI SHEEP

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ABSTRACT

The growth data of 1763 Mecheri sheep maintained at Mecheri Sheep Research Station, Pottaneri, Salem over a period of sixteen years (1991 to 2006) were analysed. Expected response in body weights at various ages were estimated to selection for average daily gains (ADG) at various ages. Selection based on 3 to 9 months ADG would result in favourable increased correlated responses of 0.417, 1.342, 2.764 and 2.848 kg per generation in 3, 6, 9 and 12 months body weights respectively

Key Words: Mecheri, Sheep, Expected response

INTRODUCTION

Mecheri is a well known mutton breed of Tamil Nadu distributed in Salem, Erode, Karur, Namakkal and parts of Dharmapuri districts. The breed is well adapted to the local conditions and there is a good demand for its meat. The present study was undertaken to estimate the expected and correlated response in body weight to selection for average daily gain in Mecheri sheep under farm conditions.

MATERIALS AND METHODS

Data were collected from 1763 Mecheri lambs born during the years 1991 to 2006 at the Mecheri Sheep Research Station, Pottaneri – 636 453, Tamilnadu. The research station is situated at a longitude of 77° 56' E, latitude of 11° 45' N and altitude of about 200 m above mean sea level. The average maximum and minimum temperatures are 34.3° and 21.9°C with an average annual rainfall of 975 mm. Mecheri sheep is characterized as medium-sized, compact body covered with very short hairs, light brown colour and medium sized head. The lambs were weaned around 90 days of age. The sheep were grazed for about eight hours daily. In poor grazing condition (*i.e.*, during summer), the animals were supplemented with concentrate mixture depending on the physiological needs.

The estimates of heritability coefficients were obtained by paternal half-sib correlation method for all the growth traits (Becker, 1975). The expected direct and correlated responses for single trait selection were estimated following the procedure described by Falconer (1989). Expected direct response (R) = $ih\sigma_A$, where, i is the intensity of selection, h is the square-root of heritability of the trait and σ_A is the standard deviation of breeding value (square-root of the additive genetic variance). Correlated response in trait 'y' when trait 'x' was selected (CR_y) = $ih_x r_G \sigma_{Ay}$ where, CR_y is the correlated response in trait 'y' when trait 'x' was selected, i is the intensity of selection, h_x is the square-root of heritability of the trait 'x', r_G is the genetic correlation between the traits 'x' and 'y' and σ_{Ay} is the square-root of the additive genetic variance of the trait 'y'. In this study, for a static flock size, the proportions of males and females selected were fixed at 4 and 55 per cent respectively (Lush, 1945). The intensity of selection pooled over sexes was estimated as $(i_m + i_f)/2$ as per Falconer (1989), which was 1.437. This particular intensity of selection was chosen as the response obtained will indicate the gain more realistically. The selection criteria considered were average daily gains (ADG) at various age intervals viz 0-3, 3-6, 3-9, 3-12, 6-9 and 9-12. Their correlated responses were estimated on body weights viz. 3, 6, 9 and 12 months weights.

RESULTS AND DISCUSSION

The estimates of heritability obtained by paternal half-sib correlation method for ADG 0-3, 3-6, 3-9, 3-12, 6-9 and 9-12 months intervals were 0.273, 0.513, 0.670, 0.815, 0.707 and 0.255 respectively.

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Expected responses in body weights to selection for ADG at various age intervals

The estimated correlated responses in body weights at different ages to selection for ADG at various age intervals are presented in Table 1. The selection criteria considered were average daily gains (ADG) at various age intervals viz 0-3, 3-6, 3-9, 3-12, 6-9 and 9-12 with a standardized selection differential of 1.437.

Selection based on 3 to 12 months ADG would result in increased correlated responses of 0.293, 1.235, 3.014, 3.464 and 2.538 kg per generation in 3, 6, 9, 12 and 18 months body weights respectively. Selection based on 0-3 months ADG would result in the low correlated responses ranging from 0.837 to 1.389 kg per generation. Selection based on 3 to 9 months ADG would result in favourable increased correlated responses of 0.417, 1.342, 2.764 and 2.848 kg per generation in 3, 6, 9 and 12 months body weights respectively. This is in agreement with the results of Panneerselvam (1993).

Among several selection criteria proposed for improving market weight, 3-12 months ADG was more suitable because of high correlated responses for 3-6, 3-9, 3-12 and 9-12 months age intervals. However, this cannot be used as a selection criterion under practical situations due to the age of marketing (which, by itself is 12 months) and higher overhead costs of maintenance, particularly for the males. Hence, an equally better selection criterion is 3-9 months due to high correlated responses in 3-6 months ADG.

Table 1: Expected responses in body weights (kg) at various ages to selection for absolute growth rates in Mecheri sheep^a

Selection criterion	Responses in body weights (kg)			
	3	6	9	12
Birth-3 months	0.837	1.055	1.448	1.389
3-6 months	0.221	1.464	1.859	1.870
3-9 months	0.417	1.342	2.764	2.848
6-9 months	0.217	0.341	2.024	1.637
3-12 months	0.293	1.235	3.014	3.464
9-12 months	0.406	0.819	1.527	1.896

^aResponses per generation if selection intensity equals to 1.437 standard deviation. Correlations were restricted from -1 to +1

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