

Quantitative Genetic Studies of Some Economic Traits of Sheep Breeds of Gujarat.

Submitted to Gujarat Agricultural University,
1973

R. K. Shukla

Dept. of Animal Genetics and Breeding, College
of Veterinary Science and Animal Husbandry,
Anand-388 110.

The knowledge about genetic architecture of base population is very essential for the planning of genetic improvement of a population. With this object in view, quantitative genetic studies of some growth and wool traits of Marwadi and Patanwadi sheep breeds were carried out.

The records available at sheep breeding farms at Morvi and Patan in Gujarat State from 1959-1968 and 1954-1970 respectively have been utilised in the present study. The results are summarised very briefly.

Least squares analysis of the records were carried out as suggested by Harvey (1966) to study the effect and contribution of farms, periods, age of dam and sex to the variation of various growth traits of both the breeds.

Farm effect was found to be significant for all the growth traits in Patanwadi, but its contribution to total variance ranged from 0.006% to 3.59% only. Periods were found to have highly significant effect on all growth traits in both the breeds and accounted for about 25.0 to 61.0% of variation in various growth traits in Marwadi and about 4.0 to 33.0% of variation in growth traits in Patanwadi. Age of dam and sex of the animal were found to be of very little importance as sources of variation in various growth traits of both the breeds.

Heritability estimates have been obtained for all the growth traits by paternal half sib correlation method. Sires were nested within periods so as to eliminate period effects.

Large estimate of heritability for all the growth traits in Patanwadi is suggestive of large proportion of additive genetic variance in total variance of all these traits, indicating feasibility of improvement through mass selection. In Marwadi, only BW or TGY can be used as criterion for selection.

Correlations between various growth traits suggested very high and positive genetic associations between all the growth traits in Marwadi. But in Patanwadi BW was found to have and positive genetic correlations with WW and ADGW. However, genetic correlations of BW, WW and ADGW with other yearling traits were negative but small.

Least squares analysis results suggested that farms significantly affected all wool traits in Patanwadi and accounted for about 1.0 to 20.0 % of variation in wool traits. Periods were found to affect wool yield traits significantly in both the breeds. But in Marwadi, wool quality traits showed contribution of periods ranging from 1.22 to 12.24% as against 4.0 to 20.0% in Patanwadi. Age of dam and sex of animal were found to be very little importance as sources of variation in various wool traits of both the breeds. The results of heritability are suggestive for feasibility of improvement in wool quality and wool yield through mass selection in Patanwadi. However, in Marwadi, wool yield can be increased through selection, but improvement of wool quality may not be a successful venture in this population through intra population selection programme.

Genetic and phenotypic correlations between various wool traits in Patanwadi and Marwadi showed different trends. In Marwadi, FWY, AWY and TWY showed high and negative genetic associations with FL and SL but showed high and positive genetic correlations with FD and Med. These relationships were indicative of genetic impediment in improving wool yield and wool quality simultaneously. As against this, Patanwadi showed very desirable set of genetic associations of FWY, AWY and TWY with FD, Den. and Med. These results suggested that increase in wool yield will simultaneously decrease medullation percentages, decrease fibre diameter and increase fibre population density. Only undesirable feature was that FL and SL were also negatively genetically associated with wool yield traits. However, they were small to be of any real practical significance.

Practically all the growth traits were found to have very high positive genetic associations with FWY, AWY, TWY and Med., moderate to high positive correlations with FL and SL in Marwadi. In Patanwadi, body weights at birth and weaning traits showed low but positive genetic correlations with wool yield, but yearling body weights showed very high and positive genetic correlations with wool yield. These results suggested feasibilities of improving body weights and wool yields simul-

taneously, depending upon the heritabilities of the traits involved. Genetic associations of yearling traits with FL and SL were small or negative. Genetic correlations of BW, WW and ADGW with FD and Med. were large and positive but those of yearling traits with FD and Med. were small to moderate but negative, suggesting there by that selection for increased YW reduce FD and Med. in Patanwadi breed. Except for WW and ADGW, other growth traits did not show significant genetic associations with Den.

Based on all these sets of results, it can be concluded that in Marwadi, increase in body weights is likely to lead to increase wool yield, decrease staple length and produce wool of larger diameter and more hairy fibres. As against this, selection based on YW in Patanwadi will not only increase wool yield but also simultaneously reduce FD and decrease Med. Selection based on FWY in Patanwadi as selection differential of one standard deviation unit, will increase FWY by 231 g, YW by 2.44 kg, TWY by 256 g, Den. by 95 no/sq. cm and simultaneously decrease FL by 0.42 cm, FD by 1.93 μ by and Med. by 7.66% per generation. Response to direct selection for YW, FWY, TWY, FD and Med. and correlated responses for the same in other characters indicated usefulness of FWY as ideal trait for selection in Patanwadi.