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Comparative Study on Characteristic of Wool Follicles of Marwadi and Patanwadi Sheep*

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ABSTRACT

Follicle depth (F_d), follicle chord (F_c) and follicle curvature index (F_{ci}) of 30 males and 44 females of Marwadi and 55 males and 45 females of Patanwadi sheep were studied from the skin biopsies, taken from the same animals at the age of 4-6 and 16-18 months. These were stained with 0.25% Nile blue sulphate aqueous solution and mounted in Kaiser's aqueous solution. Age and sex had no significant effects on these characteristics. Breed and type of follicle had significant effects. The mean values of F_d and F_c of the medullated follicles were significantly higher than those of the non-medullated follicles in both the breeds. The mean F_{ci} values of the non-medullated follicles were significantly lower than those of the non-medullated follicles in both the breeds. Marwadi had significantly lower values of F_{ci} and higher values of F_d and F_c than those of Patanwadi for the same type of the follicles.

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INTRODUCTION

Assessment of breeding values of an individual of early age has great significance in any selection programme. Follicle traits like follicle depth (F_d), follicle chord (F_c) and follicle curvature index (F_{ci}) provide good source of early information (Nay, 1973 and Jackson, 1973; Jackson *et al.*, 1975; Vyas *et al.*, 1983 and Shukla *et al.*, 1985). Though these traits are not affected by the age and sex of the animals (Qureshi, 1987), they are much affected by the genetic makeup of the animals and the type of follicles (Anonymous, 1985; Shukla *et al.*, 1985 ; Anonymous 1987 and Shukla *et al.*, 1987). There are few reports about the effect of medulation of the follicle on these traits of Marwadi and Patanwadi sheep.

MATERIALS AND METHODS

The skin biopsies of about 1.5 cm in diameter were obtained with the help of an ordinary razor blade from the left mid-side region of 30 male and 44 female Marwadi and 55 male and 45 female Patanwadi sheep. All the antiseptic precautions were followed and the subsequent healing of the wounds was uneventful. The samples were collected first at the age of 4-6 months and again at the age of 16-18 months from the same animals and were preserved in 10 per cent neutral buffered formalin. All the animals were reared at the

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Government Sheep Breeding Farm, Patan (Gujarat), under identical conditions of feeding and management.

Vertical sections of about 1/3 mm were cut with the help of an ordinary razor blade under a hand lens. These sections were stained with 0.25 per cent aqueous solution of the Nile blue sulphate and were mounted in Kaiser's aqueous mountant (Nay, 1973). The follicle depth (F_d), follicle chord (F_c) and follicle bending (F_h) i.e. the greatest height of the follicle arch over the chord, were measured over a projection microscope. Follicle curvature index (F_{ci}) was calculated by dividing the follicle bending (F_h) with the follicle chord (F_c) and multiplying the same with 100 to express F_{ci} in percentage ($F_{ci}=\frac{Fh}{Fc} \times 100$)

The data were analysed for studying the statistical significance of effect of breed, age and sex of the animal (Snedecor and Cochran, 1980).

RESULTS AND DISCUSSION

The mean values of the follicle traits are presented in Table 1 and 2. The effects of sex and age of the animals on the F_d, F_c and F_{ci} were non-significant in both the breeds. However, the type of follicles (medullated or non-medullated) and the breeds affected significantly the follicle triats in the present study. Similar findings have been reported by Anonymous (1985) and Qureshi (1987) in Marwadi and Patanwadi sheep, Shukla *et al.* (1985) in Marwadi, Rambouillet x Patanwadi and Russian Merino x Patanwadi sheep.

The medullated follicles were significantly deep-seated than those of the non-medullated follicles in both the breeds. Also medullated follicles of Marwadi were significantly more deep-rooted than those of Patanwadi sheep. Similarly the non-medullated follicles of Marwadi were significantly more deep-rooted than those of Patanwadi sheep as also reported by Anonymous, 1987 and Shukla *et al.*, 1987.

Nay and Jackson (1973) pointed out that the thinner skin was likely to have lesser F_d in comparison to the thicker skin.

The mean values of the F_c of the medullated follicles, were significantly higher than those of the non-medullated follicles in both the breeds. The mean F_c values of the medullated follicles of Marwadi (2.331 ± 0.045 mm) were significantly higher than those of Patanwadi (2.090 ± 0.035). Also the mean F_c values of the non-medullated follicles of Marwadi (2.105 ± 0.003 mm) were significantly higher than those of Patanwadi sheep (1.818 ± 0.030 mm). The report of Anonymous(1985) are in favour of these findings.

The mean values of the F_{ci} of medullated follicles were significantly lower than those of the non-medullated follicles in both the breeds. The mean value of F_{ci} of the medullated follicles in Marwadi (12.161 ± 0.383) was significantly lower than that of Patanwadi sheep (13.566 ± 0.198) . Similarly, the mean F_{ci} value of the non-medullated follicles in Marwadi (13.52 ± 0.023) was significantly lower than that of Patanwadi (14.620 ± 0.304) as reported by Anonymous, 1985; Anonymous, 1987 and Shukla *et al.*, 1987.

Nay and Jackson (1973) reported that though F_d is a single and easy measurement, it is of limited value owing to its low repeatability under conditions of variable nutrition. They further stated that the follicle curvature index on the other hand appears to be a reliable character, highly repeatable and not much affected by change in nutrition.

It can be stated that the selection of the animal based on the nature of follicle traits, should also take into consideration the type of the follicles, since, the medullation affected the follicle traits significantly. However, the age and sex did not significantly affect the follicle characteristics.

TEBLE 1

Showing mean ± SE and CV% of follicle depth (Fd), follicle chord (FC) im mm and follicle curvature index (Fci) inpercentage for Marwadi sheep.

Estimate	*Lambs*						*Adults*					
	Medullated			*Non-medullated*			*Medullated*			*Non-medullated*		
Sex	F_d	F_c	F_{ci}	F_d	F_c	F_{ci}	F_d	F_c	F_{ci}	F_d	F_c	F_{ci}
Male												
Mean	2.060^a	2.332^a	12.163^a	1.840^b	2.100^b	13.510^b	2.250^c	2.663^c	12.537^a	2.150^d	2.225^d	12.680^d
± SE	0.038	0.005	0.0438	0.034	0.004	0.486	0.044	0.053	0.458	0.041	0.045	0.430
C V %	10.15	11.81	19.75	10.10	11.68	19.70	11.11	10.98	20.01	10.50	11.16	18.56
Female												
Mean	2.040^a	2.330^a	12.159^a	1.830^b	2.110^b	13.530^b	2.240^c	2.659^c	12.540^a	2.120^d	2.220^d	12.670^b
± SE	0.003	0.004	0.328	0.028	0.003	0.355	0.003	0.396	0.332	0.030	0.033	0.312
CV%	11.00	10.78	20.01	11.14	10.86	19.45	10.69	11.05	19.67	10.45	10.98	18.24
Pooled												
	2.050^a	2.331^a	12.161^a	1.835^b	2.105^b	13.520^b	2.245^c	2.661^c	12.538^a	2.135^d	2.222^d	12.675^b
	0.020	0.045	0.383	0.031	0.003	0.020	0.023	0.224	0.395	0.035	0.039	0.371

Figures with different superscripts differ significantly at $P < 0.05$ level.

TEBLE 2

Showing mean ± SE and CV% of follicle depth (Fd), follicle chord (Fc) in mm and follicle curvature index (Fci) in percentage for Patanwadi sheep.

Estimate	Lambs (4-6 months)						Adults (15-18 months)					
	Medullated			Non-medullated			Medullated			Non-medullated		
Sex	F_d	F_c	F_{ci}	F_d	F_c	F_{ci}	F_d	F_c	F_{ci}	F_d	F_c	F_{ci}
Male												
Mean	1.850^a	2.201^a	13.581^a	1.770^b	1.837^b	14.678^b	1.950^c	2.291^c	13.220^a	1.870^d	2.145^d	14.270^d
±SE	0.025	0.033	0.357	0.028	0.030	0.381	0.028	0.037	0.351	0.025	0.030	0.377
CV%	10.10	11.20	19.50	11.59	11.96	19.27	10.50	12.01	19.72	9.885	10.50	19.60
Female												
Mean	1.820^a	1.980^a	13.552^a	1.741^b	1.800^b	14.562^b	1.960^c	2.285^c	13.240^a	1.880^d	2.149^d	14.269^b
±SE	0.030	0.035	0.040	0.031	0.031	0.228	0.028	0.042	0.386	0.026	0.030	0.377
CV%	11.02	12.02	19.82	12.14	11.54	20.01	10.50	12.25	19.55	10.00	10.45	19.70
Pooled												
	1.835^a	2.090^a	13.566^a	1.755^b	1.818^b	14.620^b	1.955^c	2.288^c	13.230^a	1.875^d	2.147^d	14.270^b
	0.027	0.035	0.198	0.029	0.030	0.304	0.027	0.039	0.368	0.025	0.030	0.377

Figures with different superscripts differ significantly at $P < 0.05$ level.

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