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Research Article

EFFECT OF CROSSBREEDING ON WOOL TRAITS IN BANNUR SHEEP BY USING CORRIEDALE RAMS

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ABSTRACT
Wool samples were collected from Bannur sheep (137), Corriedale X Bannur (76) reared in breeding tract of Bannur sheep in two seasons. Wool parameters such as Total Greasy Fleece yield, Staple length, Number of crimps per inch, Clean Fleece Weight, Shrinkage Percentage, Mean Fiber Diameter and Medullation Percentage were recorded for each breed group. The wool parameters of Bannur sheep were 228 ± 11.19 g, 3.17 ± 0.06c.m, 2.12 ± 0.14, 165.46 ± 4.17 g, 27.43 ± 0.43, 57.13 ± 0.30 µ and 44.25 ± 0.21 respectively. These values were significantly different from the values obtained from the other crossbred group i.e. Corriedale X Bannur viz., 194 ± 6.08g, 2.87 ± 0.06 c.m, 3.12 ± 0.05, 133.51 ± 9.16g, 31.18 ±0.64, 38.87 ± 0.23µ and 41.68 ± 0.14. This study suggested that cross breeding of Bannur with Corriedale improved the wool quality of the native breeds.

Key Words: *Bannur, Corriedale X Bannur, Wool Traits, Cross Breeding*

INTRODUCTION
Development of superior breeds of sheep for wool and mutton will play a significant role in improving rural economy of developing countries like India. India possesses 51.68 million sheep ranking fifth in the world which contribute about 30,000 MT wool, 1,53,000 MT mutton and 17 million pieces of skin annually.

Crossbreeding of native sheep with selected exotic breeds of sheep superior in body weight, growth rate, wool yield and multiple births seems to be the quickest way of improving native breeds and their production potentials.

The indigenous breed of Karnataka, Bannur is known for quality mutton production but are lacking in production of superior quality wool. Therefore, crossbreeding with superior exotic wool breed of sheep like Corriedale was taken up as breeding policy to improve wool traits as well as other economic traits. The present study was undertaken with the objective of measuring the crossbreeding effect in the Bannur population.

MATERIALS AND METHODS
Wool samples were collected from Bannur (137) and Corriedale X Bannur (76) reared in Bannur sheep's native tract in two seasons. Samples were collected from one square inch area in left mid side region using curved scissors. The samples collected were packed in labelled plastic bags.

Greasy fleece weight of each animal was recorded immediately after shearing, to the nearest gram. The staple length of un-scoured wool samples was measured by placing staple un-stretched on a black velvet board using forceps. The measurement was taken from the base of the staple of the fibres to the tip, where the majority of fibres end. An average of 10 random staples represented the mean staple length and expressed to the nearest fraction of 0.1 cm. A suitable sub-sample was taken from the un-scoured samples for measuring the number of crimps per inch. One hundred fibres from each sample were measured for estimating the mean number of crimps per inch. The mean figures of 100 fibres represented the mean number of crimps in a sample. Clean fleece weight was estimated by weighing the samples after scouring as per the technique of Johnston (1934) as described here under.

Four scouring units with scouring solutions of the following concentration and temperature were used.

Tub 1: One per cent soap solution and 0.5 per cent washing soda at 48 to 50˚C. Tub 2: 0.5 per cent soap solution at 45 to 47˚C.Tub 3: Clean tap water at 42 to 43˚C.Tub 4: Clean tap water at 40˚C.

The samples were kept in each scouring unit. The samples when transferred from one tub to the next were squeezed manually. The samples were passed sequentially from first to fourth tub. After removal from the last tub the samples were squeezed completely and dried by placing it in an incubator for 24 hours at 37˚C. After ensuring complete drying of the samples, other extraneous materials like burr were removed from the sample manually. The samples were then weighed and clean fleece weight of the samples recorded. The difference between greasy fleece weight and clean fleece weight of the sample was expressed in terms of percentage i.e. shrinkage percentage. The scoured samples were hand-corded for proper blending. The fibres were placed lengthwise, twisted to form a cord and held tightly in the left hand. The cord was cut with the help of two razor blades, kept tightly between thumb and the index finger of the right hand. The fibre bits were obtained in the form of wool dust between the edges of the blades. These fibre bits were then transferred on to a micro slide, thoroughly mixed with cedor-wood oil with the help of needle and rectangular cover slip was placed over it. The diameter was measured directly on the scale of the microscope. The diameter of 300 fibres was taken in microns for each sample and their mean fibre diameter was estimated. The fibres were counted in different fields by successive movements of the slide. The same apparatus and technique described for determination of fibre diameter were employed for the estimation of medullation percentage. A total number of 300 fibre units were examined in each sample and percentage of medullated fibres worked out for each sample.

The Least squares analysis of variance technique was adapted to detect the significant sources of genetic and non-genetic variation if any (Harvey,1987) in all the genetic groups.

The following mathematical model was adapted.

$Y_{ijklmn} = \mu + G_i + A_j + Y_k + S_l + X_m + e_{ijklmn}$

Where, Y_{ijklmn} is the record of the n^{th} individual belonging to i^{th} genetic group, j^{th} age group, k^{th} period of birth, shorn at l^{th} season belonging to m^{th} sex.

μ is the population mean

G_i is the fixed effect of i^{th} genetic group (i=1,2,3 … 6)

A_j is the fixed effect of j^{th} age group (j=1,2,3 … 7)

Y_k is the fixed effect of k^{th} period of birth (k=1,2)

S_l is the fixed effect of l^{th} season of shearing (l=1,2)

X_m is the fixed effect of m^{th} sex group (m=1,2)

e_{ijklmn} is the random error associated with Y_{ijklmn} and assumed to be identically, independently and normally distributed with mean zero and unit variance and interaction between various effects was assumed to be zero.

The Least Square means of different groups within each of the factors were compared by computing the Least Significant Difference (LSD) (Snedecor and Cochran, 1968).

RESULTS

Wool parameters such as Total Greasy Fleece yield, Staple length, Number of crimps per inch, Clean

Table 1: Mean values of wool traits of different breed groups with standard error

Wool traits	Bannur	Corriedale X Bannur
Total Greasy Fleece Yield in grams	$228.00^{a} \pm 11.19$	$194.00^{b} \pm 6.08$
Staple length	$3.17^{a} \pm 0.06$	$2.87^{a} \pm 0.06$
Number of crimps per inch	$2.12^{a} \pm 0.04$	$3.12^{b} \pm 0.05$
Clean Fleece Weight in grams	$165.46^{a} \pm 4.17$	$133.51^{b} \pm 9.16$
Shrinkage percentage	$27.43^{a} \pm 0.43$	$31.18^{b} \pm 0.64$
Mean Fibre diameter (µ)	$57.13^{a} \pm 0.30$	$38.87^{b} \pm 0.23$
Medullation percentage	$44.25^{a} \pm 0.21$	$41.68^{b} \pm 0.14$

Column-wise means with at least one common superscript do not differ significantly

Fleece Weight, Shrinkage Percentage, Mean Fiber Diameter and Medullation Percentage were recorded from the Bannur (137) and Corriedale X Bannur (76) wool samples.The mean values of different wool traits are depicted in the Table 1.

DISCUSSION

Significant difference due to crossbreeding was noticed with respect to total greasy fleece yield, staple length, number of crimps, clean fleece weight, shrinkage percentage, fibre diameter and medullation percentage.Differences in Total Greasy Fleece yield and staple length due to genetic groups have been reported by Umrikar *et al.*, (1992), Malik and Singh, (2006) and Singh *et al.*, (2008) in different native and crossbred sheep.

Deccani had significantly lower values as compared to other indigenous breeds like Nali, Bikaneri, Chokla and their crosses with Merino, Corriedale and Rambouillet (Krishnamurthy *et al.*, 1975; Gupta *et al.*, 1976; Krishnappa, 1979 and Singh *et al.*, 2008).Differences in clean fleece weight among these genetic groups were significant. Such genetic groups differences in clean fleece weight were also reported by Chougule *et al.*, (1988) but, Singh *et al.*, (2008) reported no significant effect of breed on clean fleece weight in Corriedale and South Down breed.

Differences in shrinkage percentage due to genetic groups were found to be significant ($P \leq 0.01$) Similarly differences due to genetic groups with respect to fibre diameter were also reported by Umrikar *et al.*, (1992) and Singh *et al.*, (2008). Differences due to genetic groups were found to be significant ($P \leq 0.01$) with respect to medullation percentage.

Effect of non-genetic factors like age, sex, period of birth and season of shearing were analysed for each parameter. Age significantly affected Total Greasy Fleece yield, Staple length, Number of crimps per inch and Fiber Diameter. Period of birth significantly affected Staple length, Clean Fleece Weight and Fiber Diameter. Season of shearing affected significantly the Staple length, Number of crimps, Clean Fleece Weight and Fiber Diameter. Sex significantly affected Total Greasy Fleece yield, Staple length, Number of crimps per inch, Clean Fleece Weight, Mean Fiber Diameter and Medullation Percentage.

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