PHYSICAL PROPERTIES OF WOOL OF DIFFERENT BREEDS OF SHEEP

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ABSTRACT

The studies on physical properties of wool of six breeds of sheep of Punjab, Jammu and Kashmir. Sixty wool samples, 10 from such of the six breeds were selected to study the physical properties of wool. The study revealed that Dorset (exotic) had maximum staple length followed by Rambouillet (exotic) had maximum staple length followed by Rambouillet (exotic), i.e. 6.03 cm and 5.74 cm respectively. The minimum staple length was in case of Kashmir Merino (cross bred), i.e. 4.94 cm. The other parameters, viz., fibre diameter, crimp, medullation percentage were also studied and the study revealed that Rambouillet (exotic) had the minimum fibre diameter, i.e. 17.63 μm whereas the maximum fibre diameter was in case of Kajli (local) i.e. 43.77 μm. These studies showed a lot of improvement in all the physical properties of local breeds after cross breeding.

INTRODUCTION

India with a population of 45 million sheep produce 38 million kg of wool per year. Only about 15 per cent of this wool is suitable for apparel manufacture and 55 per cent for manufacture of moderate to superior carpets, rugs, blankets etc. and rest 30 per cent for remaining purposes. This wool which comes from several breeds and cross breeds varies in its physical, mechanical and chemical properties and fleece composition. These properties of wool have important bearings on the performance of wool during processing and use. Hence, in order to making best use of Indian wools, attempts have been made to improve the quality of wool.

These different wools should be assessed for their proper utilization in different textile industries. Therefore, physical properties of wool obtained from different breeds of sheep of two climatically different states of India were evaluated.

MATERIAL AND METHODS

The wool samples for studies were collected from the states of Jammu and Kashmir and Punjab. These breeds, namely exotic, crossbreed and local were selected from two states of Punjab and Jammu and Kashmir.

TABLE 1. The details of three breeds are given as under

<table>
<thead>
<tr>
<th>Breed</th>
<th>Punjab</th>
<th>Jammu and Kashmir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exotic</td>
<td>Dorset (Australian)</td>
<td>Rambouillet (USA)</td>
</tr>
<tr>
<td>Crossbreed</td>
<td>Kajli and Dorset</td>
<td>Kashmir Merino</td>
</tr>
<tr>
<td>Local</td>
<td>Kajli</td>
<td>Kashmir Valley</td>
</tr>
</tbody>
</table>

Ten wool samples from each of six breeds of two states totaling to 60 wool samples were selected to study physical properties. The sample length and crimp were calculated according to ISI specification number, 6656-1972 (4) and fibre diameter and medullation were calculated according of ISI specification number 744-1977 (6).

RESULTS AND DISCUSSION

Different physical properties of sheep breeds of Punjab, Jammu and Kashmir are given (Table 2).

1. Staple length: Staple lengths of wools of 6 breeds of sheep of Punjab and Kashmir are given
It can be seen from the table out of all the breeds of two states the maximum staple length was of exotic breed, Dorset, i.e. 6.03 cms whereas the minimum staple length was of the Kashmir Merino, i.e. 4.94 cms. The cross breeding caused the reduction in staple length of local breed in both the states Punjab and Jammu and Kashmir by 0.71 per cent.

2. **Fibre diameter**: Fibre diameter of wools of 6 breeds are given in Table 2. It can be seen from the table that the exotic breed Rambouillet had the finest wool with minimum fibre diameter of 17.63 micron whereas the maximum fibre diameter was 43.77 micron in case of local Punjab breed Kajli. The crossbreeding reduced the fibre diameter of local breed in both the states Punjab and Jammu Kashmir by 6.08 and 5.65 per cent respectively.

3. **Crimp**: On comparing the crimps of 6 breeds of sheep of Punjab and Jammu and Kashmir, Rambouillet (exotic) has the highest number of crimp, i.e. 4.25/cm and the minimum number of crimp was in the case of local Punjab breed Kajli, i.e. 1.14/cm.

Thus it can be seen that in case of Kashmir breeds the crossing had improved numbers of crimp of local breed from 1.22 crimp/cm to 3.56/cm, i.e. by 2.35/cm per cent. On the other hand, the crimp has improved number of crimp from 1.14/cm to 1.32, i.e. by 0.18 per cent in case of cross breed of Punjab.

Results of this study are similar with the results of Mirajkar and Patil (1970) and with those of Gupta et al (1976) who made a statistical study of Rambouillet crossbreeds and indicated a significant improvement in fibre fitness and increase in crimp number in cross breed over local.

4. **Medullation**: Medullation percentages of 6 breeds of sheep are given in Table 2. As shown in the table in overall comparison the local Kajli breed of Punjab had the highest percentage of medullation, i.e. 63.16 per cent and it was nil in the case of Rambouillet, Dorset and Kashmir.

### Table 2. Summary of physical properties of wool of different breeds of sheep of Punjab and Jammu and Kashmir.

<table>
<thead>
<tr>
<th>Breeds</th>
<th>Staple length (cm)</th>
<th>Fibre diameter (μm)</th>
<th>Crimp/cm</th>
<th>Medullation (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUNJAB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorset (exotic)</td>
<td>6.03</td>
<td>27.90</td>
<td>2.95</td>
<td>NIL</td>
</tr>
<tr>
<td>Kajli × Dorset (crossbred)</td>
<td>4.99</td>
<td>37.75</td>
<td>1.32</td>
<td></td>
</tr>
<tr>
<td>Kajli (local)</td>
<td>5.71</td>
<td>43.77</td>
<td>1.14</td>
<td>63.16</td>
</tr>
<tr>
<td><strong>JAMMU AND KASHMIR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rambouillet (exotic)</td>
<td>5.74</td>
<td>17.63</td>
<td>4.25</td>
<td>NIL</td>
</tr>
<tr>
<td>Kashmir merino (crossbred)</td>
<td>4.94</td>
<td>37.95</td>
<td>3.56</td>
<td></td>
</tr>
<tr>
<td>Kashmir valley (local)</td>
<td>5.01</td>
<td>25.64</td>
<td>1.22</td>
<td>6.99</td>
</tr>
</tbody>
</table>

Results of this study are similar with the results of Mirajkar and Patil (1970) and with those of Gupta et al (1976) who made a statistical study of Rambouillet crossbreeds and indicated a significant improvement in fibre fitness and increase in crimp number in cross breed over local.
both the states. The fibre diameter of exotic breeds was minimum in both the states which shows fineness of wool. Rambouillet (exotic) had finest wool with minimum fibre diameter of 17.63μ whereas maximum fibre diameter was in case of Kajli (local), i.e. 43.77μ Kashmir merino stood second followed by Kashmir valley i.e. 17.63μ and 17.95μ respectively. Whereas in case of Punjab breeds sequence was same but values were higher than Jammu and Kashmir breeds. Thus crossbreeding had reduced fibre diameter of local breeds in both the states.

The highest number of crimp, i.e. 4.25/cm was in case of Rambouillet (exotic) and minimum number of crimp was in case of Kajli (local), i.e. 1.14/cm. Thus it was found in case of Kashmir breeds that crossing had improved number of crimp of local breed from 122 crimp/cm to 3.56/cm i.e. by 2.35 cm per cent. On the other hand in case of Punjab crossbreeds, the number of crimp improved from 1.14/cm to 1.32/cm by 0.18 per cent.

Medullation percentage was highest in case of Kajli (local), i.e. 63.16 per cent and it was nil in the case of Rambouillet (exotic), Dorset (exotic) and Kashmir merino (crossbreed). Kashmir valley (local) had minimum medullation percentage of 6.99 whereas it was nil in the cases of Kashmir merino and Rambouillet. Thus crossbreeding had reduced the medullation percentage of local breed by 100 per cent. The results found in present study are in accordance with the findings of Acharya and Batra (1978), Johri and Agarwal (1970) and Pant et al (1980).

Acharya and Batra (1978) who worked on cross-breeds of Rambouillet with Chokta, Malpur and Jaisalmeri, found that there was a decrease of staple length, fibre diameter and medullation percentage with the increase of exotic inheritance, as compared with the local breeds. Johri and Agarwal (1970) and Pant et al (1980) who conducted similar study with Bikaneru and Polworth and Chokla and Nali crosses also found progressive decrease in staple length, fibre diameter and medullation percentage with the increase of exotic inheritance.

CONCLUSION

The study revealed that the maximum staple length was in case of exotic breeds in both the states (Punjab and Jammu and Kashmir). The maximum staple length was increase of Dorset (exotic) followed by Rambouillet (exotic), i.e. 6.03 cm and 5.74 cm respectively. The minimum was in case of crossbreeds in both the states, Kashmir merino (crossbreed) had minimum, i.e. 4.94 and Kajli Dorset (crossbreed) had 4.99. Thus the staple length of local breeds decreased after crossing, i.e. by 0.71 per cent in both the states. The fibre diameter of exotic breeds was minimum in both the states which shows fineness of wool. Rambouillet (exotic) had finest wool with minimum fibre diameter of 17.63μ whereas maximum fibre diameter was in case of Kajli (local), i.e. 43.77μ Kashmir merino stood second followed by Kashmir valley i.e. 17.63μ and 17.95μ respectively. Whereas in case of Punjab breeds sequence was same but values were higher than Jammu and Kashmir breeds. Thus crossbreeding had reduced fibre diameter of local breeds in both the states.

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Medullation percentage was highest in case of Kajli (local), i.e. 63.16 per cent and it was nil in the case of Rambouillet (exotic), Dorset (exotic) and Kashmir merino (crossbreed). Kashmir valley (local) had minimum medullation percentage of 6.99 whereas it was nil in the cases of Kashmir merino and Rambouillet. Thus crossbreeding had reduced the medullation percentage of local breeds in both the states.

Thus it can be seen that by crossbreeding, local breed with exotic breeds, all the physical properties, i.e. crimp, fibre diameter and medullation percentage of local breed improved, except in case of staple length.

REFERENCES