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OBJECTIVE MEASUREMENTS AND SUBJECTIVE ASSESSMENTS OF DOMESTIC WOOL CLIP IN RELATION TO THE CARPET MANUFACTURE

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ABSTRACT

Wool samples from 125 Barki and Ossimi ewes were used to assess some objective and subjective wool traits, which are related to the carpet wool manufacture. The effects of breed and clipping times (once or twice a year) were investigated.

The fine fibres of Barki wool had significantly ($P < 0.05$) less number of scales/100µ (8.03) than those of Ossimi wool (8.36), but no significant difference in number of scales/100 µ was detected in case of the coarse fibres of both breeds (7.14 in Barki vs. 7.00 in Ossimi). Two main types of scales, i.e. coronal and imbricate, were observed in the wool of the two breeds. Wool wax % was significantly ($P< 0.01$) higher in Barki (14.8 %) than Ossimi (8.48 %) fleeces. Barki wool was found to be significantly ($P<0.01$) more bulky (28.2 vs. 24.3 cm^3/g) and resilient (9.74 vs. 8.44 cm^3/g) than Ossimi wool. Barki and Ossimi fleeces did not significantly differ in yellowness and brightness.

Concerning subjective appraisals of wool, kemp score, greasy colour grade, scoured colour grade, and lustre grade showed no significant difference between the two studied breeds, but handle grade and bulk grade were significantly ($P<0.01$) different. Handle of Barki wool was better (average) than that of Ossimi (slight harsher than average-to-average). Barki wool was nearly of medium compressibility, while that of Ossimi wool was less compressible than average-to-medium compressibility.

Once per year - shorn Barki fleeces proved to be significantly ($P<0.01$) more bulky, had more number of scales in fine and coarse fibres, contained higher percentage of coronal scales in fine fibres and less wax content. Twice year - shorn fleeces were brighter ($P<0.01$) and contained ($P<0.01$) more imbricate scales in fine fibres.

Keywords: Barki , Ossimi , wool colour , wool scaliness , wool wax , kemp, bulk, resilience, shearing .

INTRODUCTION

Wool utilized in Egyptian carpet wool industry is mainly imported from abroad since local clip does not entirely suffice the requirements of this industry. Traits of importance to carpet manufacturer such as yellowness, bulk, resilience, number and type of cuticular scales and wax % were rarely examined for the native wool. Meanwhile, subjective assessment of fleeces of the different sheep breeds were seldom undertaken although fleeces of native sheep are completely marketed on subjective basis. Hence, the present work was designed to examine the effect of sheep breed (Barki and

Ossimi) and frequency of shearing (once and twice per year) on some objective wool traits viz., colour, bulkiness, resilience, number of scales/100 micron, type of scales and wax %. Meanwhile, other traits of importance to carpet industry, e.g. fibre diameter, staple length and crimpiness were also determined, along with subjective assessments of kemp, greasy colour , scoured colour, lustre, handle, and bulk were carried out.

MATERIALS AND METHODS

A. Source of data:

Samples used in the present study were taken during the shearing season of April 1996 from 91 Barki ewes and 34 Ossimi ewes. Animals belonged to three flocks at Cairo University (10 Barki and 9 Ossimi), Al-Azhar university (26 Barki and 25 Ossimi) and Mariout Research Station near Alexanderia (55 Barki).

B. Management of the flocks:

At Cairo University and Al-Azhar University farms, ewes were fed *ad libitum* on Egyptian clover (*Trifolium alexandrinum*) from November to April and from May to September, liberal amounts of darawa (*Zea mays*) or sugar corn (*Sorghum bicolor*) as well as clover hay were given to the flocks. Ewes were supplemented daily with 500 grams of concentrates per head. The concentrate mixture consisted of 42 % decorticated cotton seed meal, 25% wheat bran, 22% yellow corn, 5% rice bran, 3% molasses, 2% limestone and 1% common salt. Ewes were shorn twice a year, in April and September. The breeding season usually starts in June. Ewes were kept in semi-open pens, they were kept indoors at night, and in yards during the day.

The flock of Mariout Research Station grazed on Egyptian clover, in addition to crop residues whenever available. A daily ration of 0.5 kg concentrates per head was given. The concentrate mixture consisted of 50% undecorticated cotton seed cake, 18% wheat bran, 15% yellow corn, 11% rice polish, 3% molasses, 2% limestone and 1% common salt. During summer months, the animals received clover hay *ad libitum*. Ewes were mated in July and they were shorn once a year, in April. Ewes were allowed to stay in yards after coming back from grazing areas and they were kept indoors at night.

Ewes used in this study were adults and they were healthy throughout the study.

C. Sampling:

A composite sample (weighed nearly 80g) was taken from different parts of the fleece to represent the entire fleece of each ewe. Samples were kept in a polyethylene bags for further analysis. Wool samples were used to study various objective and subjective wool characteristics.

D. Wool measurements:

1. Objective wool measurements:

The following techniques were adopted to estimate the different traits :

(a) Staple length (STL):-

Ten staples were chosen at random from each sample and measured for length. Average STL was calculated according to Chapman (1960) .

(b) Crimpiness (Cr/2cm):-

It was obtained for fine and coarse fibres. For each wool sample five fibres from the two types were randomly chosen and the average number of crimps/2cm was counted with the aid of a ruler. The fibres were examined on a black velvet without being stretched while being examined.

(c) Fibre diameter (FD): -

Three hundred fibres from each sample were used to measure FD. The fibres were mounted in liquid paraffin oil and spread on a microscopic slide. Fibre diameter was estimated using a microprojector with a built in screen .

(d) Scaliness:-

Twenty five fibres from each fine and coarse fibres were examined to determine the number of scales/100 micron length and type of scaliness by an image analyser. There are two main types of scales, coronal and imbricate scales. The coronal scale completely encircles the cortical cylinder of the wool shaft, whereas the imbricate scales do not individually encircle the cortical cylinder, but are arranged like the scales of a fish , which means that more than one scale is needed to encircle the fibre .

(e) Wax content (W):-

Wax content was determined on only 55 samples (35 Barki and 20 Ossimi) according to the method suggested by I.W.T.O. (1955).

(f) Loose wool bulk (BUL) and resilience (Res):

The bulk and the resilience of samples were measured by a bulkometer as suggested by Dunlop *et al.* (1974).

(g) Wool colour:

Wool colour was measured by using Colorimeter (Lab Scan XE Sp). The reflectance measurements can be used to calculate the tristimulus colour values which are represented by the letters X (red), Y (green) and Z (blue) reflectances. The standard values of the perfectly white colour 80.6, 85.4 and 91.2 for X, Y and Z reflectances, respectively. The brightness value given by Y measure, whereas the yellowness index given by Y-Z. The lower the Y-Z the whiter the wool (Bigham *et al.*, 1984 and El-Gabbas, 1986).

2. Subjective wool measurements:

Greasy colour grade (GCG), scoured colour grade (SCG), lustre grade (LG), handle grade (HG) and bulk grade(BLG) were appraised as recommended by El-Gabbas (1993). Kemp score (KS) was determined as suggested by Dry (1935).

E. Statistical analysis:

Data were analysed using the general linear model (GLM) of SAS (SAS, 1995). Analysis of variance was performed to evaluate the influence of the main effect of sheep breed (Barki vs. Ossimi) and frequency of shearing (once vs. Twice) on objective and subjective wool traits. The comparison was made between Barki and Ossimi breeds on the basis of 6 months wool growth period (36 Barki and 34 Ossimi), whereas frequency of shearing was studied on only Barki ewes (36 ewes from flocks of Cairo and Al-Azhar Universities and 55 ones from Mariout Research Station).

RESULTS AND DISCUSSION

A. Objective wool characteristics:

1. Wool scaliness :

(a) Number of scales/100 micron (Sc / 100μ) :-

Table (1) shows that the average number of Sc / 100 μ of Barki wool was 8.03 in fine fibres , while that in coarse fibres was 7.14. The corresponding values of Ossimi fleeces were 8.36 and 7.00 for fine and coarse wool fibres, respectively . These values are higher than those reported by Mahal *et al.* (1951) who found that the average number of Sc/100 μ was 7.2 on the wool fibres, 5.3 on the hair fibres and 6.8 on the kemp fibres. On the other hand, the present values are less than those suggested by Mathews (1947) who reported that the average Sc / 100 μ ranged from 10 to 12 in fine wool fibres. Breed was found to have a significant ($P<0.05$) effect on number of Sc / 100 μ in fine fibres and a non-significant effect in case of coarse fibres (Table 1).

Table (1): Means (X) and standard errors (SE) of some objective traits of Barki and Ossimi wools.

Traits		Breed						Significance of Difference
		Barki			Ossimi			
		N	$\bar{X}$	SE	N	$\bar{X}$	SE	
1-No.of scales/100μ								
a-fine fibres		36	8.03	0.10	32	8.36	0.10	*
b-coarse fibres		36	7.14	0.09	34	7.00	0.09	
2-Type of scaliness								
a-fine fibres								
(1)coronal	**(%)**	36	76.44	2.65	32	49.75	2.81	**
(2)imbricate	**(%)**	36	23.56	2.65	32	50.25	2.81	**
b-coarse fibres								
(1)coronal	**(%)**	36	4.89	1.41	34	4.82	1.45	
(2)imbricate	**(%)**	36	95.11	1.41	34	95.18	1.45	
3-Wax	**(%)**	15	14.83	1.35	20	9.40	1.17	**
4-Yellowness	**(unit)**	34	7.53	0.47	33	6.86	0.48	
5-Brightness	**(unit)**	34	44.27	1.78	33	41.65	1.81	

6-Bulk	**(cm^3/g)**	33	28.18	0.68	33	24.27	0.68	**
7-Resilience	**(cm^3/g)**	33	9.74	0.27	33	8.44	0.27	**

*** P<0.05 ** P<0.01**

Least squares means of Sc/100 µ of Barki wool were 8.03 and 7.14 for fine and coarse fibres in fleeces representing 6 – month growth period (Table 2). The corresponding values for 12 - month growth period fleeces were 8.58 and 7.80. The difference was found to be highly significant (P<0.01) in both fine and coarse fibres (Table 2). It is apparent that shearing Barki sheep once a year led to an increase in number of scales whether in fine or coarse fibres. One reason for such increase might be the seasonality in growth of fibres as the once shorn fleeces grew during four different seasons.

Table (2): Means (X) and standard errors (SE) of some objective traits of Barki fleeces shorn once or twice a year.

Traits		Frequency of shearing						Significance of Difference
		Twice			Once			
		N	$\bar{X}$	SE	N	$\bar{X}$	SE	
1-No.of scales/100µ								
a-fine fibres		36	8.03	0.11	55	8.58	0.09	**
b-coarse fibres		36	7.14	0.09	54	7.80	0.08	**
2-Type of scaliness								
a-fine fibres								
(1)coronal	**(%)**	36	76.44	2.21	55	88.44	1.79	**
(2)imbricate	**(%)**	36	23.56	2.21	55	11.56	1.79	**
b-coarse fibres								
(1)coronal	**(%)**	36	4.89	1.61	54	5.63	1.31	
(2)imbricate	**(%)**	36	95.11	1.61	54	94.37	1.31	
3-Wax	**(%)**	15	14.83	1.48	20	8.48	1.29	**
4-Yellowness	**(unit)**	34	7.53	0.54	21	8.34	0.68	
5-Brightness	**(unit)**	34	44.27	1.92	21	26.75	2.45	**
6-Bulk	**(cm^3/g)**	33	28.18	0.62	44	30.84	0.53	**
7-Resilience	**(cm^3/g)**	33	9.74	0.26	44	9.28	0.23	

**** P<0.01**

(b) Type of scaliness :-

For Barki wool, nearly three quarter (76.4 %) of the fine fibres had the coronal type of scaliness whereas the majority (95.1 %) of the coarse fibres scales were of the imbricate type (Table 1). While the coronal and imbricate type of scaliness were equally covering the fine fibres of Ossimi (49.8 and 50.3%, respectively), the imbricate type was found to surround the majority (95.2%) of the coarse fibres. It is interesting that the coronal type predominated in the fine fibres of Barki. Meanwhile, the imbricate type in fine fibres of the Ossimi was as twice as those of the Barki fine fibres (Table 1).
Breed exerted a highly significant (P < 0.01) effect on type of scaliness of the fine fibres (Table 1). This might be attributed to differences in fibre thickness of the two breeds. In this context, it was found that the average fibre diameter was 29.9 µ and 32.0 µ in Barki and Ossimi fleeces, respectively. On the other hand, it is apparent that as fibre diameter increased, scale type tended to become imbricate. This result conforms with the findings of Mahal *et al.* (1951) who found that as the diameter increases, the scales become imbricate. Frequency of shearing was found to have highly significant (P <

0.01) effect on type of scaliness in fine fibres and a non-significant effect on type of scaliness of the coarse fibres (Table 2).

2. Wool wax content (W%):

Table (1) shows that the least squares mean of wax content in Barki wool was 14.8 %. Least squares mean of wool wax content in Ossimi fleeces was found to be 9.40 % (Table 1). This estimate is close to those previously reported for the same breed by Latif *et al.* (1972) and Ashmawy *et al.* (1984) (10.7 and 10.8 %, respectively), but is higher than that given by Soltan (1991) (2.52 %). In Rahmani coarse wool, the wax % was found to be 10 % as reported by Latif *et al.* (1972). In the present study, a significant effect of breed on wax content was found (Table 1). The difference between the two breeds in wax content could be attributed to dissimilar densities of sebaceous glands in the skin. The role of wool wax in protection of the fibres from weathering is well established. In view of the attained result, Barki wool fibres are more protected than Ossimi ones from weathering, a matter that contributes significantly to the observed superiority of the Barki fleeces over other domestic breeds fleeces.

Wool wax content of Barki fleeces grown for 6 or 12 months was found to be 14.8 and 8.48 %, respectively (Table 2). The difference in wool wax content of Barki ewes due to frequency of shearing was found to be highly significant (Table 2). This difference could be attributed to seasonality in sebum secretion and/or difference in location and environment specially nutrition of the sheep.

3. Wool colour:

Different wools differ in both yellowness (Y-Z) and brightness (Y), and it could be shown that these two aspects of wool colour are equally important (Edmunds, 1977).

(a) Yellowness (Y-Z):

Table (1) shows that the Y-Z of Barki and Ossimi fleeces had 7.53 and 6.86 units, respectively. The difference between the two breeds in this respect was non-significant (Table 1). Lower estimates of Y-Z (0 to 4 units) were previously recorded for the Australian Merino wool (Thompson, 1989). Meanwhile, Trevor and Osborne (1996) found that the average Y-Z values for the Australian wools ranged from a visually white (0.9 units) to a distinctly cream (5.7 units). Yellowness values for the Australian sale lots have been found to range from –2 units for an extremely white superfine to about 11 units for a really yellow lot, as reported by Thompson (1989). It seems that both Barki and Ossimi wools tend to have a yellow colour at least when compared with the Australian sheep. However, further studies under different environmental conditions should be carried out to gain more understanding of causes of the relatively high Y-Z values of the Barki and Ossimi wools. On the other side, it is obvious that Y-Z was not altered by shearing sheep once or twice a year (Table 2). It seems that wool colour of Barki sheep is not affected by such practice under Egyptian conditions.

(b) Brightness (Y) :

The brightness (Y) can be thought of as the reflected green light. One can have wools of certain degree of Y-Z but with quite different Y (Edmunds , 1977). Table (1) shows that the Y of Barki and Ossimi fleeces was 44.3 and 41.7 units, respectively. The difference was non-significant. Higher estimates were recorded by Trevor and Osborne (1996) using Australian Merino fleeces where the values of Y ranged from a slightly dull (59 units) to a bright wool (68 units). Reid and Botica (1995) reported that the Y of the Merino, Corriedale and Perendale wools were 76.2, 73.6 and 63.1 units, respectively. In view of such results, it seems that the Y of the two Egyptian breeds is comparatively inferior to those of fine or long wools. However, more studies should be carried out in this respect before assessing the Y of the native wools. Regarding the influence of shearing frequency on Y, Table (2) shows that the Y of Barki wool was 44.3 and 26.8 units in fleeces represented 6 and 12 months growth, respectively. The difference due to shearing frequency was found to be highly significant. The less Y of 12 - month growth fleeces could be attributed to longer exposure to solar radiation.

4. Bulk (BUL) and resilience (Res):

The bulk of the sample is normally expressed as the specific volume of the wool (Dunlop *et al.*, 1974). The averages of BUL of Barki and Ossimi fleeces were 28.2 and 24.3 cm^3/g for the two breeds, respectively (Table 1). Higher estimate (31.7 cm^3/g) of bulk for Barki wool was previously reported by El-Gabbas (1999a). Difference between Barki and Ossimi fleeces in BUL value was found to be highly significant ($P<0.01$) (Table 1). In the Egyptian local breeds, El-Gabbas (1999b) indicated that the differences among breeds and between shearing frequencies were highly significant. The difference observed in the present study might be due to difference in staple length (STL) between both breeds, since BUL was found to be negatively correlated with STL (Ross, 1978; Stobart and Sumner, 1991 and Ahtash, 1998). In this context, the average staple length of Barki and Ossimi fleeces measured in this study was 8.10 and 9.49 cm, respectively ($P<0.01$). According to the classification suggested by Elliott and Clare (1980), Barki and Ossimi wools might be classified as high and average bulky wools, respectively.

Concerning the response of Barki wools bulkiness to shearing frequency, Table (2) shows that their bulk values were 28.2 and 30.8 cm^3/g in fleeces representing 6 - and 12 - month growth periods, respectively. The difference between wool bulkiness in the two groups was found to be highly significant ($P<0.01$) (Table 2). The less bulk of the 6 months growth wools might be attributed to less crimpiness. Wool bulk is positively correlated with crimpiness as reported by Elliott and Clare (1980). Meanwhile, the mean of number of crimps/2cm of Barki fleeces shorn after 6 and 12 months growth were 4.93 and 5.82, respectively.

The resilience (Res) of the sample is expressed as the recovery of the fibres from compression (Dunlop *et al.*, 1974). Table (1) shows that the Res of Barki and Ossimi fleeces were 9.74 and 8.44 cm^3/g, respectively. The difference between the two breeds was highly significant ($P<0.01$) (Table 1). This significant difference might be attributed to difference in crimp frequency

between the two breeds, where the wool resilience appears to increase with the increase of crimp frequency (Turpie, 1975). It should be pointed out that the overall average of crimps /2cm for both fine and coarse Barki fibres was 4.93. The corresponding value for Ossimi fibres was found to be 2.00 Cr/2cm. Higher estimate of Res (13.2 cm^3/g) than that obtained in this study was previously reported for Barki wool by El-Gabbas (1999a). The frequency of shearing had non-significant effect on Res of Barki wool, where the least squares means were found to be 9.74 and 9.28 cm^3/g for fleeces representing 6- or 12 – month growth, respectively (Table 2).

B. Subjective wool characteristics:

1. Visually assessed traits :

(a) Kemp score (KS):-

It is clear (Table 3) that the Barki fleece content of kemp (2.22) was moderate (few kemp fibres to plentiful kemp fibres). Lower KS than that found in the present study was reported by El-Gabbas (1993 and 1994) who recorded 2.09 and 1.84 as KS for the same breed. The average KS of Ossimi wool was 2.06 (few kemp fibres) (Table 3). This estimate is close to those previously reported for KS of Barki wool (El-Gabbas, 1993) and Libyan Barbary wool (Ahtash, 1998) which ranged from 2.03 to 2.09. El-Gabbas (1999b) using local breeds reported KS of 2.09, 1.45, 2.23, 1.97 and 1.31 in Barki, Frafra, Ossimi, Saidi and Rahmani fleeces, respectively. Table (3) shows a non-significant difference in KS between Barki and Ossimi fleeces.

Table (3): Means ($\bar{X}$) and standard errors (SE) of some subjective traits of Barki and Ossimi wools.

Traits	Breed						Significance of Difference
	Barki			Ossimi			
	N	$\bar{X}$	SE	N	$\bar{X}$	SE	
1-Visual Assessment:							
a-kemp score	36	2.22	0.12	34	2.06	0.12	
b-greasy colour grade	36	2.42	0.08	34	2.35	0.08	
c-scoured colour grade	34	3.54	0.06	33	3.51	0.06	
d-lustre grade	36	2.82	0.09	34	2.72	0.09	
2-Tactile assessment:							
a-handle grade	36	3.06	0.10	34	2.64	0.11	**
b-bulk grade	36	2.96	0.10	34	2.45	0.11	**

**** P<0.01**

One can easily observe more kemp in the once shorn fleeces (2.87) than in those shorn twice (2.22) (Table 4). The difference due to frequency of shearing was highly significant . It seems that Barki sheep could retain the shed kemp fibres within their fleeces for long period. Such assumption receives confirmity from the results of El-Gabbas (1993) who reported lower value (2.09) for KS of Barki fleeces represented 3 - month growth period. Azzam (1999) (using the same grading system) reportred an estimate of 2.06 for KS of Barki fleeces represented 12 – month growth. Guirgis (1980) and Guirgis *et al.* (1982) who used grading system from 0 to 3 grades, reported

estimates of 0.98 and 1.56 for KS of Barki fleeces represented 12 – month growth period.

Table (4): Means ($\bar{X}$) and standard errors (SE) of some subjective traits of Barki fleeces shorn once or twice a year.

Traits	Frequency of shearing						Significance of Difference
	Twice			Once			
	N	$\bar{X}$	SE	N	$\bar{X}$	SE	
1-Visual Assessment:							
a-kemp score	36	2.22	0.11	55	2.87	0.09	**
b-greasy colour grade	36	2.42	0.06	55	2.12	0.05	**
c-scoured colour grade	34	3.54	0.07	21	2.24	0.09	**
d-lustre grade	36	2.82	0.07	55	2.40	0.06	**
2-Tactile assessment:							
a-handle grade	36	3.06	0.09	55	2.60	0.07	**
b-bulk grade	36	2.96	0.11	55	2.91	0.09	

**** P<0.01**

(b) Greasy colour grade (GCG):-

Least squares mean of greasy colour grade (GCG) for Barki fleeces was found to be slight-to-pronounced yellow (2.42) (Table 3). This estimate is higher than those recorded for the same breed (from 1.81 to 2.14) by El-Gabbas (1993 and 1994) and Azzam (1999) using the same grading system. Table (3) shows that the GCG of Ossimi fleeces was slight-to-pronounced yellow (2.35). This estimate is very close to that (2.42) recorded for Libyan Barbary fleeces by Ahtash (1998). El-Gabbas (1999b) reported GCG of 2.12, 2.50, 2.68 and 2.80 for Barki, Frafra, Ossimi and Saidi local sheep fleeces, respectively. The effect of breed on GCG in the present work was found to be insignificant (Table 3).

Table (4) shows that the GCG of Barki fleeces shorn once a year was more yellower (2.12) than those shorn after 6 months growth (2.42). Azzam (1999) reported a similar estimate (2.14) for GCG of once shorn Barki fleeces. The effect of shearing frequency on GCG was found to be highly significant (Table 4). This difference in GCG might be due to longer exposure of the sheep (shorn once a year) to direct sunlight particularly during summer months. Solar radiation causes breakage of the disulphide bonds of keratin and discolouration of the wool. Besides, discolouration involves the transformation of the phenol group in the amino acid tyrosine in the presence of tyrosinase into di-hydroxy phenyl alanine which is a pre-requisite for colour formation.

(c) Scoured colour grade (SCG):-

Least squares mean of scoured colour grade (SCG) for Barki fleeces was found to be slight yellow-to-slight cream (3.54) (Table 3). El-Gabbas (1993) recorded a SCG of pronounced yellow (2.98) for the same breed. Least squares mean of SCG for Ossimi fleeces was found to be slight yellow to slight cream (3.51) (Table 3). The difference between Barki and Ossimi fleeces in SCG was found to be non-significant (Table 3).

Least squares mean of SCG (Table 4) for Barki wool was found to range from slight yellow-to-slight cream (3.54) and pronounced yellow (2.24) in fleeces representing 6 and 12 months growth period, respectively. The

difference in SCG due to frequency of shearing was highly significant (Table 4). Again, as previously found for GCG, the undesirable discolouration, i.e. more yellowness of the wool exposed for longer periods to sun light, took place. This assumption is supported by El-Gabbas (1993) who reported an estimate of 2.98 for SCG of Barki fleeces represented 3 - month growth.

(d) Lustre grade (LG):-

Table (3) shows that lustre grade (LG) for Barki (2.82) and Ossimi (2.72) fleeces was a medium one. The difference between Barki and Ossimi fleeces in LG was found to be non-significant (Table 3).The observed lustre of Barki fleeces is similar to those previously recorded for the same breed by El-Gabbas (1993 and 1994) who found that their LG ranged from no lustre (1.66) to medium lustre (2.99) . Lower LG (slight lustrous, 2.11) than that found in the present study was reported by Ahtash (1998) using Libyan Barbary wool. El-Gabbas (1999b) reported estimates of 2.99, 2.86, 3.01, 2.63 and 2.31 for LG of Barki, Frafra, Ossimi, Saidi and Rahmani fleeces, respectively.

Concerning the influence of shearing frequency on lustre, it can be observed (Table 4) that wools of the two groups are graded as medium lustre (2.82) and slightly lustrous-to-medium lustre (2.40) for 6 - and 12 – month growth fleeces, respectively. The difference in lustre due to shearing frequency was highly significant (Table 4). The less lustre of the once clipped fleeces compared to those shorn twice a year could be attributed to their higher content of impurities as well as longer exposure to weathering conditions.

2. Tactilly assessed traits:

(a) Handle grade (HG):-

The averages of handle grade (HG) of Barki and Ossimi fleeces were average (3.06) and slightly harsher than average-to-average (2.64) for the two breeds, respectively (Table 3). Difference between Barki and Ossimi fleeces in HG was found to be highly significant (Table 3). The difference in HG between the two breeds could be attributed to the finer and more crimpy appearance of the Barki fleeces. Similar estimates were reported for Barki wool by El-Gabbas (1993 and 1994) who found that HG ranged from 2.42 to 2.89. Higher estimate (2.93) for HG of Ossimi fleeces than that found in the present work was previously reported by El-Gabbas (1999b). The average HG of Barki fleeces in this study is close to that reported by Ahtash (1998) (2.82) using Libyan Barbary wool.

Regarding the influence of shearing frequency on handle, it can be observed that Barki fleeces representing 12 months growth were slightly harsher than average-to-average handle (2.64), while fleeces representing 6 - month growth were of average handle (3.06) (Table 4). The difference was highly significant (Table 4). Such difference could be attributed to the higher content of wax in fleeces representing 6 months growth. In addition, the thicker fibre diameter of the once shorn fleeces might have given them harsher handle.

(b) Bulk grade (BLG):-

Table (3) shows that the bulk grade (BLG) of Barki fleeces was nearly of medium compressibility (2.96). This is somewhat higher than those previously reported for Barki wool (2.32 to 2.76) by El-Gabbas (1993 and 1994) and Azzam (1999), whereas Ahtash (1998) supported the obtained result as he recorded a BLG of 2.95 for Libyan Barbary fleeces. The average of BLG of Ossimi fleeces (Table 3) was "less compressible than average-to-medium compressibility" (2.45). El-Gabbas (1999b) reported an estimate of 2.77 for BLG of Ossimi fleeces. The difference between Barki and Ossimi fleeces in BLG was found to be highly significant (Table 3). The high BLG of Barki fleeces could be attributed to higher crimp frequency in its fibres. High bulky wools have high crimp frequency than low bulky wools as reported by Turpie (1975) and Elliott and Clare (1980).

The averages of BLG (Table 4) in Barki fleeces representing 6 and 12 months growth were 2.96 and 2.91, respectively (nearly of medium compressibility). Frequency of shearing was found to have a non-significant effect on the BLG of Barki wool (Table 4). Ahtash (1998) using Libyan Barbary wool and Azzam (1999) working on Barki wool recorded 2.95 and 2.72, respectively for BLG of 12 – month growth fleeces.

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قياسات معملية وتقديرات مظهرية للصوف المحلى بالنسبة لصناعة السجاد

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استخدمت عينات صوف من ١٢٥ نعجة برقى واوسيمى لتقييم بعض خصائص الصوف معملياً ومظهرياً والتى لها علاقة بصناعة صوف السجاد ، ودراسة تأثيرات السلالة وعدد مرات الجز فى السنة (مرة أو مرتين).

كانت الألياف الناعمة لصوف البرقى أقل معنوياً (احتمال أقل من ٠,٠٥) فى عدد الحراشيف/ ١٠٠ ميكرون (٨,٠٣) عن تلك فى صوف الأوسيمى (٨,٣٦). ولم يكن هناك اختلاف معنوى فى عدد الحراشيف /١٠٠ ميكرون الموجودة فى الألياف الخشنة لكل من السلالتين (٧,١٤ فى البرقى مقابل ٧,٠٠ فى الأوسيمى). تبين وجود نوعين رئيسين من الحراشيف ، هما الحلقية والشبكية ، فى جزات السلالتين. كانت النسبة المئوية للدهن فى جزات البرقى (١٤,٨%) أعلى معنوياً (احتمال أقل من ٠,٠١) منها فى جزات الأوسيمى (٨,٤٨%). وجد أن صوف البرقى اكثر معنوياً (احتمال أقل من ٠,٠١) فى مقاومة الضغط (٢٨,٢ مقابل ٢٤,٣ سم٣/جم) وفى المرونة (قدرة الصوف على استعادة حجمه الأصلى بعد الضغط) (٩,٧٤ مقابل ٨,٤٤ سم٣/جم) عن صوف الأوسيمى. ولم تختلف معنوياً جزات البرقى والأوسيمى فى درجتى الاصفرار والبريق.

فيما يتعلق بالتقييم المظهرى للصوف ، لم يوجد اختلاف معنوى بين السلالتين فى درجة الكمب ودرجة لون الصوف الخام ودرجة لون الصوف المغسول ودرجة اللمعان. كان الاختلاف معنوياً فى درجتى الملمس ومقاومة الضغط (احتمال أقل من ٠,٠١) بين جزات البرقى والأسيمى. كان ملمس صوف البرقى انعم (متوسطاً) من تلك لصوف الاوسيمى (أخشن قليلاً عن المتوسط). كان لصوف البرقى درجة متوسطة تقريباً فى مقاومة الضغط ،بينما كانت درجة مقاومة الضغط لصوف الأوسيمى تقع ما بين أقل من المتوسط الى الدرجة المتوسطة.

تميزت جزات البرقى المجزوزة مرة واحدة فى السنة معنوياً (احتمال أقل من ٠,٠١) ، حيث كانت أكثر قيمة فى مقاومة الضغط ولها عدد حراشيف أكثر فى الألياف الناعمة والخشنة واحتوت على نسبة مئوية أعلى من الألياف الناعمة ذات الحراشيف الحلقية ومحتوى دهن أقل. بينما كانت الجزات المجزوزة مرتين فى السنة أكثر بريقاً (احتمال أقل من ٠,٠١) ومحتوية على نسبة أعلى من الألياف الناعمة شبكية التحرشف (احتمال أقل من ٠,٠١) مقارنة بتلك فى جزات المرة الواحدة.

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