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Physical and chemical studies on fine and coarse wool

I. Fleece components as affected by breed and body region

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The weights of the fleece components of the Fliesch Merino breed were compared with those of the carpet wool Ossimi and Rahmani breeds. Wool samples were taken from the shoulders, back-side and rump regions of the body of the animal.

Breed differences in wool wax weights were found to be highly significant, while there were no significant differences between the four studied body regions. Breeds differed significantly in suint weights. However, the body regions differed significantly in the dry clean wool weights but unsignificantly between the breeds studied.

The wool fibre, being the most important industrial product among the fleece components, has been the subject of most of the research work carried out in the field of wool production. However, the wool wax and suint, which are the other two biological components of the fleece, need more study.

The amount of wax in wool varies with body region (Onion, 1962) and with the various regions of the fleece ; the back and the rump have the highest wax percentage (Elbe, 1927 ; Mager, 1927 ; Bonsma and Starke, (1934) and Freney, (1940). While according to Lockart (1954) the shoulder wool contained the least amount of wax.

Suint ; the secretion of the sweat glands, varies between and within breeds and also with the different body regions (Hill, 1922 ; Bonsma and Starke, 1934 ; Freney, 1940 and Warth, 1960).

Dry clean wool also varies with breed as stated by Terill *et al* (1950), Price *et al* (1953), Ragab *et al* (1956a and b), Ragab and Ghoneim (1961), Slen and Banky (1961), Sharafeldin And Ghoneim (1963), and Sharafeldin (1966). Moreover, Bonsma and Starke (1934), Freney (1940) and Ghoneim and El-Mekkawy (1963) found an increase in the percentage of dry clean wool from the shoulder to the rump.

Materials and Methods

The study was carried out on the fine-wool Fliesch Merino breed and the indigenous Coarse-Wool Ossimi and Rahmani breeds (Mason, 1951). These animals were chosen from the Experimental Station of the Faculty of Agriculture, Cairo University.

The study comprised twelve male and female animals of each of the Fliesch Merino and Rahmani breeds and ten of each sex of the Ossimi breed. The animals were randomly taken out of a flock kept under the conventional system of management. Wool samples were clipped from an area of sixteen-inches square of the skin of the shoulder, back-side and rump regions of each animal. Wool samples were taken at shearing time in April 1964 and represent 6 months of wool growth.

Raw wool was separted into its main components according to the method described by Bell (1955) and that of the "I.W.T.O." Method for determination of ether soluble extract of wool tops (1955).

Methods given by Senedecor (1961) were used for the statistical analysis of the results.

Results and Discussion

The Merino breed had the highest weights of wool wax respectively foollowed by the Ossimi and Rahmani breeds (table 1). The breed differences in the weight of wool wax were highly significant (Table 3). However the Merino breed differed more widely in this respect than the other two breeds.

The differences in the weight of wool wax of the three studied breeds were found highly significant. These results are concordant to those reported by Wright (1909, Elbe (1927), Mager (1927). Lipson and Black (1945) and Sweeten (1949). The differences between the three studied breeds in the weights of wool wax can either be attributed to their different numbers of sebaceous glands which are determined to a great extent by heredity or to the differences in the secretory activity of these glands which are controlled by genetical and non-genetical factors. These differences may be due to both factors i.e. number and activity of the sebaceous glands.

Moreover, there were no significant differences between the studied body regions in the weights of wool wax (Table 4). This might indicate that the number and activity of the sebaceous glands are of almost the same magnitude in all regions of the body. This result disagrees with what was found by Mager (1927), Bonsma and Starke (1934) and Freney (1940).

The difference between the three studied breeds in their suint weight was highly significant (Tables 3 & 4). This is in agreement with the results reached by Hill (1922) Bonsma and Starke (1934), Freney (1940) and Warth (1960). The logic behind the breed differences in the suint weights lies in that the different breeds have different S/P ratios as stated by Carter and Clark (1957 a, b) and consequently have different numbers of sudorifierous gland area of their skin. Besides the activity of the sudoriferous glands might per unit differ with breed.

The weights of the suint differed significantly with different studied body regions (Tables 2 & 4) These results are concordant with the findings reported by Bonsma and Starke (1934) and Freney (1940).

The different suint weights of the different body regions (Table 1) reflect the different degrees of activity of the sweat glands. The exposed body regions to direct solar radiation or reflected radiation are supposed to secrete higher amount of suint.

The differences in the dry clean wool weights between the three studied breeds as shown in (Table 1) were found nonsignificant (Table 3). This is rather unexpected since the three studied breeds belong to two distinct sheep categories as far as wool production is concerned. However, taking into consideration that the dry clean wool weight per unit area of the skin is a function of three factors, i.e. fibre density, length and fineness; the non-significant difference found betweeen these breeds could be due to that the effect of each of the previously mentioned factors might have neutralised the other.

TABLE 1.—FLEECE COMPONENTS OF DIFFERENT BREEDS
(G./16 INCH^2)

Breed Component	Merino $\bar{X} \pm$ S. E.	Ossimi $\bar{X} \pm$ S. E.	Rahmani $\bar{X} \pm$ S. E.
Wool fibre			
Wt. of raw wool	33.2±0.94	26.1±0.81	25.1±0.77
wt. of dry clean wool	16.1±0.73	14.7±0.67	14.1±0.60
yield %	48.5	56.2	58.3
Wool wax			
weight in grams	2.51±0.22	1.59±0.09	1.41±0.05
index	15.6	10.8	10.0
Suint			
weight	4.23±0.22	3.89±0.26	5.08±0.31
index	26.9	26.4	36.0

TABLE 2.—FLEECE COMPONENTS OF DIFFERENT BODY REGIONS OF DIFFERENT BREEDS (g) . . . .

Breed	Component (g)	No of sheep	Shoulder $\bar{X}$ ± S.E.	Back $\bar{X}$ ± S.E.	Side $\bar{X}$ ± S.E.	Rump $\bar{X}$ ± S.E.
Merino	dry clean wool	12	13.9 ±1.37	16.1±1.63	15 9±1.42	18 4±1.61
	wool wax	12	1.93±0.27	2.58±0.47	2 44±0.47	3.10±0.47
	suint	12	3.94±0.22	4.35±0.22	4 19 ±0.38	4.44±0.37
Ossimi	dry clean wool	10	12.3±1.06	16.8±0.95	13.4±0.83	16.2±1.57
	wool wax	10	1.25±0.18	1.73±0.21	1.55±0.15	1.82±0.27
	suint	10	3.88±0.61	3.93±0.59	4.43±0.54	3.12±0.27
Rahmani	dry clean wool	12	13.0±1.28	15.4±1.11	13.6±1.24	14.3±0.50
	wool wax	12	1.25±0.12	1.49±0.14	1.44±0.19	1.45±0.27
	suint	12	5.27±0.68	4.59±0.48	4.91±0.36	5.52±0.56

TABLE 3.—ANALYSIS OF VARIANCE FOR THE EFFECT OF BREED ON FLEECE COMPONENTS

Source of Variance	Wool wax		Suint		Dry clean wool	
	D. F.	M. S.	D. F.	M. S.	D F.	M. S.
between breeds . .	2	16.59	2	16.85	2	50.92
within breeds . .	133	0.95	133	2.54	132	20.18

TABLE 4.—ANALYSIS OF VARIANCE FOR THE EFFECT OF BODY REGION ON THE FLEECE COMPONENTS

Source of Variance	Wool wax		Suint		Dry clean wool	
	D. F.	M. S.	D. F.	M. S.	D. F.	M. S.
between regions . .	3	2.58	3	0.28	3	74.46
within regions . .	132	1.15	132	2.80	132	19.41

D.F. degrees of freedom

M.S. Mean Squares

The dry clean wool weights differed significantly with different body regions (Table 4). The shoulder or region had the lowest estimate in all studied breeds while, the rump had the highest in the Merino and the back in the two other breeds (Table 2). The different dry clean wool weight at the different regions of the body agrees with the results obtained by Bonsma and Starke (1934), Frency (1940), Gaylin (1947), Badreldin *et al* (1952) and Beattie and Champon (1956). This might be due to the physical wool characteristics i.e. density, fineness and length differ within certain limits in the different body regions of the individual animal as reported by Pohle and Scott (1943), Berge *et al* (1944), Pohle *et al* (1944), Kammlade (1947), Badreldin *et al* (1952) and Makled (1965).

The lower wool weight of the shoulder region could be due to that the fibres grown in this region are usually the most fine of all the fleece and consequently are the most light in weight as found by Badreldin *et al* (1952) and Ragab *et al* (1956a and b).

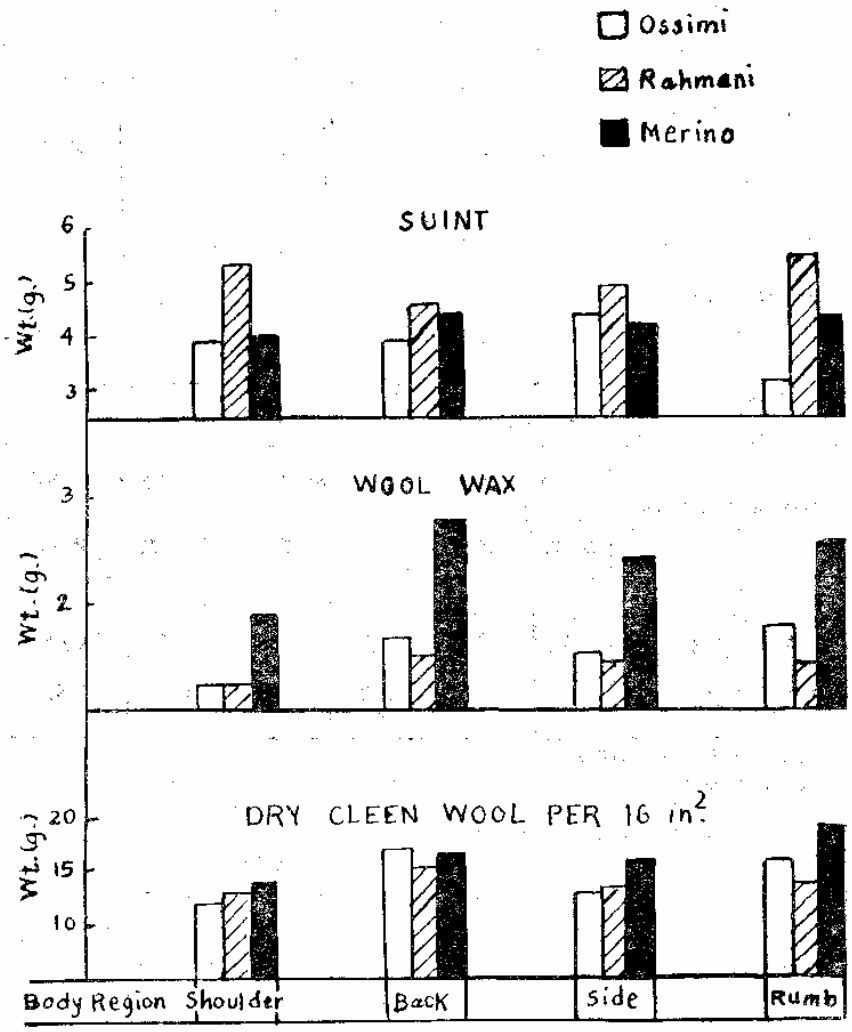

Fig. 1 Effect of body region on the fleece components

Fig. 1.—Summarizes diagramatically the effect of body region on the fleece components of the three breeds under investigation.

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اثر النوع ومنطقة الجسم فى الأغنام على مكونات جزة الصوف

البرت لطيف ، ممدوح عبد الوهاب شرف الدين ومحى الدين على عثمان
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قورن وزن مكونات الجـزة المـأخوذة من أغنام المرينو (فليش) بنظيرتهـا المـأخوذة من كل من أغنام الرحمانى والأوسيمى . ولقد أخذت عينات صوف من كل من مناطق الكتفين ـ الظهـر ـ الجانبين وذيل أجسـام حيوانات التجربة ووضحت النتائج الآتية :

١ ـ ظهرت فروق معنوية فى أوزان شمع الصوف بين الأنواع المختلفة بينما لم توجد فروق معنوية بين أوزان الشمع المـأخوذة من أماكن الجسم المختلفة والنوع الواحد .

٢ ـ وجدت فروق معنوية مؤكدة بين الأنواع المختلفة من حيث كميـة المواد العرقية الناتجة بين مناطق الجسم المختلفة فى النوع الواحد .

هذا ولا توجد فروق معنوية بين أوزان الصـوف النظيف الناتج من مساحة معينة فى الأنواع الثلاثة ويعزى ذلك الى الاختلاف فى كثافة الصوف ودرجة النعومة وطول الليفة بينما وجدت فروق معنوية بين مناطق الجسم المختلفة فى النوع الواحد .