

**A STUDY ON WOOL CHARACTERISTICS OF FINE  
AND COARSE WOOL CROSSBREDS**

*By*

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The Caucasian Merino and the Fleisch Merino were used in crossbreeding with the indigenous Ossimi coarse wool sheep. Some of the wool characteristics of the crossbreds were studied at the ages of 6, 12, 18 and 24 months.

The overall average greasy fleece weight per six months wool growth were 0.804 and 0.798 kg. for the Caucasian and Fleisch Merino sired crossbreds respectively. Corresponding figures for clean wool percentages were 77.72 and 76.80 in the same order. The Caucasian Merino sired sheep had higher greasy fleece weight than the Fleisch Merino sired ones only at the first shearing at the age of 12 months and a reversed trend was observed at subsequent shearings. At all the studied ages except at 6 months the Caucasian Merino sired crossbred tended to have higher clean wool percentages than the Fleisch Merino crossbreds.

The overall average staple and fibre lengths per six months wool growth were 78.28 and 73.76 mm for the Caucasian Merino crossbred and 91.71 and 88.34 mm for the Fleisch Merino crossbreds. There were no significant differences between the two crossbreds in both traits except at the age of 12 months as the former crossbreds had higher staple and fibre lengths.

The Caucasian Merino crossbreds had an overall average fibre diameter of 25.76 and the Fleisch Merino crossbreds of 24.80 microns. The two crossbreds had 3.21 and 3.16 crimps per 2 cm. respectively. The two crossbreds did not differ significantly in fibre diameter and crimps number except with the former trait at the age of 24 months as the Fleisch Merino crossbreds had finer fibres.

The mean kemp and medullated fibres percentages of all studied ages were 0.42 and 3.58 for the Caucasian Merino crossbred and 0.33 and 5.62 for the Fleisch Merino crossbreds respectively. There were no significant differences between the two crossbreds in the kemp percentage. The Fleisch Merino crossbred had higher medullated fibre percentages at all ages.

During the last decade, many Fine-wool breeds of sheep were introduced to Egypt in an attempt to build up a fine wool industry. The establishment of such an industry could be realized by keeping the fine wool breeds as pure ones and also by diverting the coarse wool production of the native breeds gradually to the fine wool through crossbreeding and grading up with fine wool sheep.

The objective of this investigation was to study the wool characteristics of Caucasian Merino × Ossimi and the Fleisch Merino × Ossimi crossbreds.

### Material and Methods

The Caucasian Merino which was imported from U.S.S.R. and the Fleisch Merino from G.D.R. have been kept in Egypt as pure breeds and were also used in crossbreeding the indigenous Ossimi coarse wool breed.

Only female sheep were used in this investigation and were shorn for the first time in September at the age of 12 months and thereafter every 6 months at the ages of 18 (in March) and 24 months (in September), and the fleeces were weighed to the nearest 0.1 kg.

A wool sample of about 20 g, on which the various wool tests were to be made was taken from the right shoulder of each sheep. For the estimation of clean wool percentage, a 10 g. sample was weighed and scoured after Hind (1948). The staple length and the number of crimps per 2 cm were determined by the methods of Chapman (1960) and Hunt et al (1952). In order to measure fibre length, samples were washed in xylene and air dried and 200 fibres were randomly drawn and measured on a Matrimpex semi automatic fibre length tester. Fibre diameter was determined as the average of 100 fibre magnified 500 times by means of a Zeiss Lanameter. While measuring the fibre diameter histological distinction was made between different fibres in order to estimate the percentages of the kemp and medullated fibres. Methods given by Snedecor (1961) were used for the statistical analysis of the results.

### Results and Discussion

#### [ Greasy fleece weight and clean wool percentage.

The Caucasian Merino sired sheep had higher greasy fleece weight than the Fleisch Merino crossbreds only at the first shearing at the age of 12 months and a reversed trend was observed at subsequent shearings (Table 1).

Comparing the greasy-fleece weight of the first 12 months wool growth with those of the second year together (Shorn at the ages of 18 and 24 months), no significant differences could be found as far as the Caucasian crossbreds are concerned. However, the Fleisch Merino crossbreds had higher greasy fleece weight at their second than their first year of age and production. The increase in fleece weight with advance in age has also been reported by Karam and Ragab (1959) and Sharafeldin and Ghoneim (1963) and could be attributed to a synonymous increase in body surface area (Maymone *et al.* (1956).

The two crossbreds had heavier greasy fleece weights at the age of 18 months than at the age of 24 months (Table 1) which may reflect the adverse effect of the summer high environmental temperature and relatively lower nutritional conditions (Coop 1953) on wool production, together with the effect of pregnancy (Doney, 1964) which corresponded to the wool growth prior to the shearing at the age of 24 months.

At all studied ages, except at the age of 6 months; the Caucasian Merino sired crossbreds tended to have a higher clean wool percentages than the Fleisch Merino crossbreds (Table 1).

TABLE 1.—MEAN GREASY FLEECE WEIGHTS AND CLEAN WOOL PERCENTAGES AT DIFFERENT AGES

Age in Months	Breed	Greasy-fleece weight		Clean wool percentage	
		No.	$\bar{x} \pm S.E.$	No.	$\bar{x} \pm S.E.$
6	C.M. × Oss.	—	—	24	64.55 ± 1.59
	FL.M. × Oss.	—	—	29	68.24 ± 1.07
12	C.M. × Oss.	35	1.63 ± 0.07	35	81.91 ± 0.54
	FL.M. × Oss.	46	1.43 ± 0.06	46	78.11 ± 0.62
18	C.M. × Oss.	31	0.91 ± 0.04	31	78.27 ± 0.95
	FL.M. × Oss.	35	1.02 ± 0.04	35	77.08 ± 1.27
24	C.M. × Oss.	29	0.68 ± 0.03	29	87.15 ± 0.94
	FL.M. × Oss.	36	0.74 ± 0.04	36	83.78 ± 1.21

C. M. × Oss. = Caucasian Merino × Ossimi crossbreds.

FL. M. × Oss. = Fleisch Merino × Ossimi crossbreds.

Within each age group, the clean wool percentages of the two studied crossbreds showed no consistent trend. It could be observed that the wool grown during summer months (shorn at the ages of 12 and 24 months) had higher yields than the winter grown wool (shorn at the ages of 6 and 18 months) which could be due to the seasonal differences in the percentage of imperities.

*Staple Length and Fibre Length :*

The Caucasian Merino and the Fleisch Merino sired crossbreds differed in their staple and fibre lengths. However, they did not show a definite pattern and also the differences were not significant at all ages except at the age of 12 months as the Caucasian Merino sired crossbreds had significantly longer staple and fibre lengths than the Fleisch Merino crossbreds (Table 2) which could be due to genetic environmental interaction.

The two studied crossbreds had higher staple and fibre lengths at the age of 12 months than at the age of 6 months. This could be due to a confounded effect of age and season. The increase of wool growth with advance in age may be due to the increase in the number and size of the capillaries

supplying the wool follicles the matter that stimulates the follicles to produce longer fibres. However, the effect of age on these traits was not clearly demonstrated at later ages than 12 months which may indicate that these wool characters are relatively early maturing.

TABLE 2.—MEAN STAPLE LENGTH AND FIBRE LENGTH AT DIFFERENT AGES

Age Months	Breed	Staple Length (C.M.)		Fibre Length (C.M.)	
		No.	$\bar{X} \pm S.E.$	No.	$\bar{X} \pm S.E.$
6	C.M. × Oss. . . .	24	63.96 ± 2.33	24	74.61 ± 2.11
	FL.M. × Oss. . . .	29	62.24 ± 1.91	29	70.64 ± 1.78
12	C.M. × Oss. . . .	22	99.09 ± 4.37	22	113.56 ± 4.55
	FL.M. × Oss. . . .	28	83.72 ± 2.79	28	98.43 ± 2.90
18	C.M. × Oss. . . .	31	76.39 ± 3.35	31	90.65 ± 2.7
	FL.M. × Oss. . . .	35	78.51 ± 3.95	35	98.56 ± 4.62
24	C.M. × Oss. . . .	29	73.69 ± 3.14	29	88.02 ± 2.60
	FL.M. × Oss. . . .	36	70.53 ± 2.23	36	85.74 ± 1.62

Both crossbreds had longer staple and fibre lengths at the age of 18 than at 24 months. However, the differences were significant only in the case of the Fleisch Merino sired crossbreds pregnancy and season could be contributing factors to this difference. In agreement with this explanation were the findings reported by Doney (1964).

*Fibre Diameter and Crimp Number :*

The two crossbreds did not differ significantly in fibre diameter and crimp number at all studied ages except in the case of the former trait at the age of 24 months as the Fleisch Merino sired crossbreds had less fibre diameters (Table 3).

The fibre diameter of both crossbreds significantly decreased from 6 to 12 months of age, thereafter varied within narrow limits. These results are contradictory to those reported by Sliwa et al (1952) and Sharafeldin and Ghoneim (1963).

Comparing the overall fibre diameter of the two crossbreds with the 35 microns which was the average fibre diameter of the Ossimi breeds as reported by Badreldin et al (1952); it could be concluded that crossing the Ossimi coarse wool breed with either Caucasian or Fleisch Merino breeds improved the fibre diameter of the resulting crossbreds up to the standard of the medium wool. However, the crimp number was improved to a lower extent which would rank the wool quality of the crossbreds at the lower limit of the medium wool kimp and medullated fibres.

TABLE 3.—FIBRE DIAMETER AND CRIMPS NUMBER AT DIFFERENT AGES

Age in Months	Breed	Fibre diameter microns		Crimps number 2 cm	
		No.	$\bar{x} \pm S.E.$	No.	$\bar{x} \pm S.E.$
6	C.M. × Oss. . .	24	27.12 ± 0.62	24	3.24 ± 0.28
	FL.M. × Oss. . .	29	27.18 ± 0.47	29	3.41 ± 0.12
12	C.M. × Oss. . .	35	23.39 ± 0.39	35	3.19 ± 0.61
	FL.M. × Oss. . .	46	23.78 ± 0.42	46	2.97 ± 0.14
18	C.M. × Oss. . .	31	25.72 ± 0.73	31	3.23 ± 0.32
	FL.M. × Oss. . .	35	24.08 ± 0.62	35	3.06 ± 0.22
24	C.M. × Oss. . .	29	26.80 ± 0.59	29	3.17 ± 0.33
	FL.M. × Oss. . .	36	24.19 ± 0.39	36	3.19 ± 0.24

Both crossbreds had the highest kemp percentages at the age of 6 months, thereafter fluctuated non-significantly with advance in age (Table 4). This is probably due to that the shedding of kemp fibres takes place early in life. Nawara (1961) also found that kemp percentage of lambs was higher at the first than subsequent shearings.

TABLE 4.—KEMP AND MEDULLATED FIBRES PERCENTAGES AT DIFFERENT AGES

Age in Months	Breed	Kemp %		Medullated % fibres	
		No.	$\bar{x} \pm S.E.$	No.	$\bar{x} \pm S.E.$
6	C.M. × Oss. . .	24	1.17 ± 0.27	24	10.50 ± 1.20
	FL.M. × Oss. . .	29	0.83 ± 0.25	29	16.14 ± 2.39
12	C.M. × Oss. . .	35	0.17 ± 0.10	35	2.49 ± 0.47
	FL.M. × Oss. . .	46	0.17 ± 0.14	46	4.04 ± 0.80
18	C.M. × Oss. . .	31	0.13 ± 0.09	31	0.90 ± 0.31
	FL.M. × Oss. . .	35	0.03 ± 0.18	35	1.46 ± 0.46
24	C.M. × Oss. . .	29	0.21 ± 0.12	29	0.55 ± 0.22
	FL.M. × Oss. . .	36	0.25 ± 0.11	36	0.83 ± 0.28

There were no significant differences between the two crossbreds in the incidence of kemp fibres. It could be inferred that crossbreeding the Ossimi with either Merino breeds decreased the kemp percentage of the resulting crossbreds. Similar findings were rereported by Ghoneim (1959) working with Merino  $\times$  Bakri crossbreds.

The percentages of medullated fibres followed a similar trend as that of kemp fibres, decreasing sharply from 6 to 12 months and gradually thereafter. The Fleisch Merinosired crossbreds had higher medullated fibre percentages than the Caucasian Merino crossbreds at all studied ages. However, the differences were more pronounced at earlier ages (Table 4). The decreasing percentages of medullated fibres with advance in age is most probably brought about through the shedding of medullated fibres and could also be due to that some medullated fibres lose the medullar channel and become, on the base of the staple, real wool fibres (Leroy, 1948).

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## دراسة خواص الصوف لخليط اغنام صوف ناعم × اغنام صوف خشن

### الملخص

استعملت سلالات نوعى المرينو القوقازى واللحم الالمانى فى خليط الاغنام الأوسيمى المحلية ذات الصوف الخشن . ولقد درست بعض خواص الصوف للخليط الناتجة عند أعمار ٦ ، ١٢ ، ١٨ ، ٢٤ شهرا .

كان المتوسط العام لوزن الجزء الخام لنمو الصوف لسته أشهر هو ٨.٠٤ ر. ، ٧٩٨ ر. كجم لخليط المرينو القوقازى ومرينو اللحم الالمانى على التوالى . وكانت الأرقام المماثلة فى حالة النسبة المئوية للصوف النظيف ٧٧٧٢ ، ٧٦٨٠ بنفس الترتيب السابق . ولقد أعطت اغنام خليط القوقازى وزن جزء خام أعلى من خليط المرينو الالمانى فقط عند الجزء الأولى فى عمر ١٢ شهرا . وعند كل الأعمار التى درست باستثناء عند عمر ٦ شهور فان خليط المرينو القوقازى كان أميل لاعطاء نسب مئوية أعلى للصوف النظيف عن خليط مرينو اللحم الالمانى .

وكان المتوسط الإجمالى لطول الخصلة والليفة ( فى ستة شهور نمو صوف ) ٧٨٢٨ ، ٧٣٧٦ ملليمتر لخليط القوقازى ، ٩١٧١ ، ٨٨٣٤ ملليمتر لخليط المرينو الالمانى . ولم تكن هناك اختلافات معنوية بين الخليطين فى كلا الصفتين فيما عدا عند عمر ١٢ شهرا حيث كان طول الخصلة والليفة أعلى فى الخليط الأول .

وكان المتوسط العام لقطر الليفة لخليط المرينو القوقازى ٧٥٧٦ ميكرونا وخليط المرينو الالمانى ٢٤٨٠ ميكرونا ، كما كان عدد التموجات ٣٢١ ، ٣١٦ فى طول ٢ سم من الخليطين على التوالى ، ولم يختلف كلا الخليطين معنويا فى قطر الليفة وعدد التشنيات باستثناء الصفة الأولى عند عمر ٢٤ شهرا حيث كانت ألياف خليط المرينو الالمانى أكثر نعومة .

وكانت النسب المئوية لمتوسط الكعب والألياف النخاعية فى جميع الأعمار التى درست هى ٤٢ ر. ، ٣٥٨ ر. لخليط المرينو القوقازى ، ٣٣ ر. ، ٦٢ ر. لخليط المرينو الالمانى على التوالى . ولم يكن هناك فروق معنوية بين كلا الخليطين فيما يختص بالنسبة المئوية للكعب ، فى حين أعطى خليط المرينو الالمانى نسبة مئوية أعلى من الألياف النخاعية عند جميع الأعمار .