

EFFECT OF AGE AND MANAGEMENT SYSTEM ON SOME WOOL  
CHARACTERISTICS OF EGYPTIAN OSSIMI SHEEP

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تأثير العمر ونظام الرعاية على بعض صفات صوف أغنام الأوسيمي المصرية

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ملخص البحث

تم جمع عينات صوف من منتصف الجانب الأيمن لعدد ٩٩ نعجة أوسيمي -  
٢٩ عينة من قطيع مزرعة الأبحاث بجامعة المنوفية ، شبين الكوم ، مصر -  
٦٠ عينة من القطعان التجارية (والتي تمثل تلك التي تحت نظام الرعاية  
التقليدية) والموجودة في المنطقة المجاورة لمزرعة الأبحاث . تمثل جميع  
النعاج خمس مجاميع عمرية ١ - ١,٥ ، ١,٥ - ٢ ، ٢ - ٢ ، ٢ - ٣ ، ٣ - ٤ ،  
أكبر من ٤ سنوات من العمر . وقد تم دراسة الصفات التالية : النسبة المئوية  
للفقد ، قطر الليفة ، النسبة المئوية للألياف النخاعية ، النسبة المئوية  
لألياف الكمب ، طول الليفة .

وقد ظهر أن للعمر تأثير معنوي فقط على طول الليفة . فكانت أطول  
الألياف تلك المتحصل عليها من نعاج ١,٥ - ٢ سنة من العمر . وقد كانت  
أكبر قيمة لقطر الألياف في جزات نعاج ١,٥ - ٢ سنة من العمر ثم قلت بعد  
ذلك بتقدم العمر ، وبالرغم من ذلك فلم تكن الفروق معنوية . وقد تناقصت  
النسبة المئوية للألياف النخاعية تناقصا غير معنويا بتقدم العمر . لم يظهر  
اتجاه محدد لتأثير العمر على كل من النسبة المئوية للفقد وكذلك النسبة المئوية  
لألياف الكمب .

وقد ثبت أن لنظام الرعاية تأثير معنوي فقط على النسبة المئوية للفقد  
وكذلك النسبة المئوية لألياف الكمب ، فقد فقدت جزات أغنام القطعان  
التجارية أكثر كما احتوت أكثر أيضا على ألياف الكمب . لم تظهر فروق معنوية

بين نظامى الرعاية فيما يختص بقطر الليفة ، طول الليفة ، النسبة المئوية  
للألياف النخاعية . لم يكن لتداخل نظام الرعاية X عمر النعجة تأثير معنوى  
على أى من صفات الصوف المدروسة .

#### ABSTRACT

Right mid-side wool samples were collected from 99 Ossimi ewes; 39 samples from a flock raised at the Experimental Farm of Minufiya University, Shebin El-Kom, Egypt and 60 samples from village flocks representing the traditionally managed commercial flocks present in the neighbouring area of the experimental farm. Ewes represented five age groups 1-1.5, 1.5-2, 2-3, 3-4 and above 4 years of age. Wool characteristics dealt with were shrinkage %, fibre diameter, medullated fibres %, kemp fibres % and fibre length.

Age had a significant effect only on fibre length. The longest fibres were attained when ewes were 1.5-2 years of age. Although not significant, fibre diameter was largest in 1.5-2 years old ewes and decreased gradually thereafter with advancing age. Medullated fibres % was non-significantly decreased with advancing age. No particular trend was detected for the effect of age on neither shrinkage % nor kemp fibres %.

System of management had a significant influence only on shrinkage % and kemp fibres %. Fleeces of commercial flocks shrank more and contained more kemp fibres %. No significant differences were detected between the two systems of management regarding the fibre diameter, fibre length and medullated fibres %. The management system X age of ewe interaction was of no-significant effect on any of the wool characteristics studied.

#### INTRODUCTION

Although the man-made fibres represent a source of competition to wool fibres, the unique and desirable properties of wool give it distinct advantages over the man-made fibres in the manufacture and therefore demand for wool seems unlikely to be decreased in the future.

Information on wool characteristics of local sheep is available from a considerable studies (Sidky, 1948; Badreldin et al., 1952; Kassab and Karam, 1961; Labban et al., 1971; Aboul-Naga and Afifi, 1977). Much of these studies have been conducted on flocks given a high input of managerial skill and under controlled conditions at research stations. This conditions could differ from that of the farmer's where the large percentage of sheep population of Egypt is being raised. Moreover, attempts have been made to increase wool production by introducing some foreign breeds into Egypt and their wool characteristics as well as that of their crosses with local breeds were studied (Ragab and Ghoneim, 1961<sup>a</sup>; Seoudy, 1966; El-Sherbiny et al., 1970 and El-Sherbiny et al., 1979). On the other hand, Ragab and Ghoneim (1963) drew attention to the difficulties of climatic adaptation of some foreign breeds of sheep that imported into Egypt. However, Galal and Ghanem (1970) working with local Barki and the imported Merino and Awassi sheep and their different crosses, with regard to body growth and some aspects of meat production, reported an interaction between breed of sheep and pattern of production and management.

Studies on flock productivity, including study on grease fleece weight and staple length of Ossimi sheep raised under farmer's condition at different districts of Minufiya province have been carried out (Saddick, 1979). To this end knowledge on these flocks concerning the wool quality and the factors that may influence it are required.

The present work was carried out to study some wool characteristics of Ossimi sheep at different ages and raised under different practicable systems of management available. Such information are necessary in planning scheme for improvement the wool characteristics of Ossimi sheep.



## MATERIALS AND METHODS

Right mid-side wool samples were collected from 99 Ossimi ewes; 39 samples from a flock raised at the Experimental Farm of Minufiya University, Shebin El-Kom, Egypt and 60 samples from village flocks representing the traditionally managed commercial flocks present in the neighbouring area of the experimental farm. Sampling took place just prior to shearing time in March 1987. Care was given to clip the samples from the non-pregnant and the non-lactating ewes. Although previously reported (Saddick, 1979) that sheep owners in Minufiya province are used to shear their sheep twice yearly at unequal intervals 7 and 5 months, yet in the present work attention was given to arrange shearings at the same time; so wool samples collected from both experimental and commercial flocks were of the same 6-months wool growth period.

In the experimental farm, during the period from December to May, sheep were fed on concentrate mixture, wheat straw, and allowed to graze Egyptian clover for about 4 hr/day. During the rest of the year, sheep were fed clover hay, concentrate mixture and wheat straw and sometimes were permitted to graze on the remainders of different crops available. Sheep were sheltered in semi-open sheds. Fresh water was available all the time. The hygienic routine was practised regularly. Sheep of commercial flocks depend mainly on grazing all the year round. They grazed on Egyptian clover during the period from December to May. The summer and autumn grazing system followed movement of flocks from field to field according to grass or remainders of the different crops availability. No hand feeding was applied to ewes. No hygienic routine was practised.

The age of individuals of commercial flocks was estimated by examining the permanent incisors according to that reported by many authors (Diggins and Bundy, 1958 and Owen, 1976). Ewes of both

commercial and Experimental flocks were classified into five age groups 1-1.5, 1.5-2, 2-3, 3-4 and above 4 years of age. The number of ewes in the five age groups were 12, 8, 8, 19 and 13 for the commercial flocks and 9, 6, 7, 10 and 7 for the experimental farm, respectively.

Wool samples were scoured according to Ryder and Stephenson (1968) and the shrinkage percentage was estimated. Fibre diameter was measured microscopically according to Nicolaev (1962). The number of medullated fibres was estimated, while examining the diameter. Kemp fibres were estimated using representative subsamples of about 700 fibres. Fibre length was measured from subsamples against a ruler. Statistical analyses were made according to Snedecor and Cochran (1979).

## RESULTS AND DISCUSSION

Wool characteristics of Ossimi ewes at different age groups are shown in Table (1). No particular trend was detected for the effect of age on neither shrinkage % nor kemp fibres %. Similar results were found for shrinkage % of Awassi and Arabi fleeces, but in case of Karadi and Hamadani breeds there was a tendency for higher shrinkage % with advance in age as reported by Ashmawy and Al-Azzawi (1982<sup>a</sup>). Fibre diameter was largest in 1.5-2 years old ewes and decreased gradually thereafter with advancing age (Table 1). Ashmawy and Al-Azzawi (1982<sup>b</sup>) found that the thickest wool fibres were given at the 2<sup>nd</sup> year of age for Awassi and Arabi sheep and at the 3<sup>rd</sup> year of age for Karadi and Hamadani sheep. Medullated fibres % was slightly decreased with age (Table 1). Ashmawy and Al-Azzawi (1982<sup>b</sup>) stated that medullated fibres % were least when the ewes were four years old (Awassi), three years old (Arabi), two years old (Hamadani) and one year old (Karadi). With regard to fibre



Table (1): The average shrinkage %, fibre diameter (micron), medullated fibres %, kemp fibres % and fibre length (cm) at different age groups. (Mean  $\pm$  SE)

Character	Age groups (years)				
	1-1.5	1.5-2	2-3	3-4	above 4
Shrinkage (%)	41.36 $\pm$ 2.01	40.11 $\pm$ 1.77	40.12 $\pm$ 1.97	37.93 $\pm$ 1.99	39.80 $\pm$ 1.55
Fibre diameter (micron)	32.89 $\pm$ 0.98	35.00 $\pm$ 1.40	34.73 $\pm$ 1.43	33.04 $\pm$ 1.11	32.52 $\pm$ 1.18
Medullated fibres (%)	4.48 $\pm$ 0.72	4.10 $\pm$ 0.73	4.03 $\pm$ 0.45	3.99 $\pm$ 0.53	3.80 $\pm$ 0.36
Kemp fibres (%)	1.69 $\pm$ 0.26	1.75 $\pm$ 0.27	1.67 $\pm$ 0.24	1.83 $\pm$ 0.23	1.72 $\pm$ 0.24
Fibre length (cm)	9.50 $\pm$ 0.78	10.14 $\pm$ 0.38	9.81 $\pm$ 0.41	7.98 $\pm$ 0.29	7.11 $\pm$ 0.33

A, B

Values not sharing the same superscript within each row are significantly different (P < 0.01).

length (Table 1), the longest fibres were attained when ewes were 1.5-2 years of age. Similar results were reported by Ashmawy and Al-Azzawy (1982<sup>b</sup>). They found that the longest fibres of Awassi, Arabi and Hamadani fleeces were produced at the second year of age. On the other hand, fibre length was reported to increase with advance in age (Ghoneim et al., 1974 and Ashmawy and Al-Azzawy, 1982<sup>b</sup> with Karadi sheep). Meanwhile, from the present work, age proved to have a significant effect ( $P < 0.01$ ) on fibre length while a non-significant effect on shrinkage %, kemp fibres %, fibre diameter and medullated fibres % (Table 2), which is in agreement with those reported by Ashmawy and Al-Azzawy (1982<sup>a&b</sup>) on different Iraqi breeds of sheep.

Wool characteristics of Ossimi ewes raised under two different systems of management are presented in Table (3). Fleeces of commercial flocks shrank more compared to that of the experimental farm flock. System of management proved to have significant effect ( $P < 0.01$ ) on shrinkage percentage (Table 2). Ashmawy and Al-Azzawi (1982<sup>a</sup>) found that husbandry system had a significant effect on shrinkage % in fleeces of Iraqi breeds. The higher shrinkage % found in the present work with commercial flocks fleeces could be expected and reasons for this may be many: 1) The traditionally managed commercial flocks are left in the open as long as possible while grazing, hence subjected to more extraneous impurities in wool. 2) The more open fleeces of relatively poorly fed sheep of commercial flocks may allow greater dust penetration. 3) Since sheep of commercial flocks are outdoors for a longer time, their fleeces are often wet, and even when housed at night, sheep are often held in an enclosed, crowded and poorly ventilated houses which cause them to sweat and moistens the fibres. Support for these suggestion has been arisen from the fault "fleece coting" that actually observed and recorded for traditionally

Table (2): Analysis of variance for wool characteristics of Ossimi sheep.

Source of variance	d.f.	M.S.					
		shrinkage %	fibre diameter	medullated fibres %	kemp fibres %	fibre length	
Between ages (A)	4	38.37	21.79	1.31	0.10	31.78**	
Between management systems(S)	1	1967.99**	1.43	5.70	32.03**	1.80	
A X S	4	26.69	0.09	0.53	0.04	1.49	
Residual	89	57.64	30.49	7.03	0.97	2.21	

\*\* Highly significant (P < 0.01).



Table (3): The average shrinkage %, fibre diameter (micron), medullated fibres %, kemp fibres % and fibre length (cm) at different systems of management. (Mean  $\pm$  SE)

Character	System of management			Overall average
	T	C		
Shrinkage (%)	A 43.27 $\pm$ 1.20	B 34.15 $\pm$ 0.44		39.68 $\pm$ 0.87
Fibre diameter (micron)	33.34 $\pm$ 0.87	33.58 $\pm$ 0.29		33.44 $\pm$ 0.54
Medullated fibres (%)	4.27 $\pm$ 0.38	3.78 $\pm$ 0.27		4.08 $\pm$ 0.26
Kemp fibres (%)	<sup>A</sup> 2.20 $\pm$ 0.14	<sup>B</sup> 1.04 $\pm$ 0.10		1.74 $\pm$ 0.11
Fibre length (cm)	8.60 $\pm$ 0.23	8.87 $\pm$ 0.30		8.71 $\pm$ 0.18

T = Fleeces of traditionally managed commercial flocks.

C = Fleeces of the experimental farm flock.

<sup>A,B</sup>

Values not sharing the same superscript within each row are significantly different ( $P < 0.01$ ).

managed commercial flocks. This could be confirmed by the findings of some workers. Joyce (1961) reported that the incidence of coting was increased by poor nutrition. Ryder and Stephenson (1968) stated that one of the causes of fleece coting is wetness. The results of the present work revealed non-significant differences between the two systems of management regarding the fibre diameter, fibre length and medullated fibres %. On the other hand, the fleeces of commercial flocks contained significantly ( $P < 0.01$ ) more kemp fibres % than that of the experimental farm flock. The management system X age of ewe interaction was of no-significant effect on any of the wool characteristics studied (Table 2).

The overall average of wool characteristics studied (Table 3) of Ossimi sheep showed that shrinkage % was higher than that reported by Ragab et al. (1956) on Egyptian Ossimi and Rahmani sheep, while it was lower than that obtained by Ashmawy and Al-Azzawy (1982<sup>a</sup>) on various Iraqi coarse-wool breeds. The present value of fibre diameter were not far from those found on Egyptian sheep (Ragab et al., 1956; Ragab and Ghoneim, 1961<sup>b</sup> and El-Sherbiny et al., 1979), but larger than that reported on some coarse-wool Iraqi breeds (Ashmawy and Al-Azzawy, 1982<sup>b</sup>), while smaller than that of Karadi breed (Ghoneim et al., 1974). Medullated fibres % and kemp fibres % obtained in the present study were very close to those found in Ossimi wools, but were higher than those in Barki wools as stated by El-Sherbiny et al. (1979). The present results revealed that the average gain in fibre length was 1.45 cm/month which was in the range of that calculated for Egyptian breeds (e.g. El-Sherbiny et al., 1979). Meanwhile, the averages wool characteristics obtained in this work indicate that Ossimi wool is suitable for carpet manufacture as defined by Von Bergen (1970).

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The results obtained showed that the highest values of wool characteristics particularly fibre length and, though not significant, the fibre diameter were produced when ewes were of 1.5-2 years of age and decreased gradually thereafter. Fleece weight of Ossimi ewes was found to be at its maximum when ewes were 2 years old (Labban et al., 1971 and Aboul-Naga and Afifi, 1977). Guirgis et al. (1982) with Barki sheep reported that selection for staple length or fleece weight could be carried out at the age of the first fleece, 15-16 months, whereas that of kemp (Guirgis et al., 1979) could be done at a very early age, 4 weeks at the birthcoat level. It may be suggested that the results of the present work could help to complete the picture, accordingly planning for maximum wool production from a flock of different age structure without altering the various characteristics of the fleece. It could be suggested also that sheltering animals in a crowded and poorly ventilated houses, year-round grazing on relatively low nutritional level without hand feeding and the mis-management by farmers themselves no doubt contributes to the higher shrinkage %, higher kemp fibres % and the incidence of fleece cotting that obtained in traditionally managed flocks. Ryder and Stephenson (1968) reported that cotted fleeces have to undergo an extra opening process during manufacture, and apart from increasing the cost, this causes much fibre breakage. Cockrem (1963) mentioned some evidence that poor nutrition increased medullation. It can be, therefore, concluded that improving wool quality could be achieved by improving the management practice. Grandstaff and Wolf (1947) concluded that the average amount of kemp and other medullated fibres in the fleece can be reduced through selection. Yeates et al. (1975) stated that medullation is a highly heritable character in sheep and hence the producer may exercise a considerable degree of control over its incidence within a flock. Accordingly, it may be suggested that breeding programmes can be designed to reduce the medullation and kemp fibres %. Finally, it could be therefore, pointed out that the



genetic and management approaches should not be regarded as alternatives but as two complementary techniques.

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