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# Effect of Age, Locality and System of Husbandry on Fleece Characteristics in Arabi Sheep

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Fleece characteristics of Arabi sheep (2.5million heads) of Iraq were investigated using 64 midside samples taken at random from ewes belonged to four age groups (1 to 4 years of age), two locations (Mesan and Thi— Qar), and two husbandry systems (intensive and extensive). Age proved to have a non —significant effect on any of the traits studied. Significantly heaver, cleaner fleeces with more inner —coat fibres were attained from ewes kept in the Mesan region. Under the extensive system, the fleeces were significantly less in clean wool yield, outer — coat fibres, kemp fibres and medullated fibres %. Fleeces produced under the intensive system were significantly coarser, longer with less inner— coat fibres content.

Although the greasy — fleece wieght (1.86 kg), fibre length (17.39±0.74 cm),fibre type ratio (68.45±7.91, 28.70±5.82 and 2.85±3. 36% for inner, outer and kemp fibres) class the Arabi sheep within the carpet wool breeds, yet their obviously fine fibres (26.16±0.76) suggest its improvement towards finer wool production.

Arabi sheep are a fat-tail carpet wool producing animals. They dominate the southern region of Iraq and the northern areas of Saudi Arabia. The Arabi population in Iraq is 2-5 million heads (Dogaily, 1971). It is the hardiest and the smallest Iraqi breed of sheep. Although its wool is generally known to be the finest Iraqi wool, yet little attention, if any, has been given to its traits. This work was designed to cast light on the physical attributes of the Arabi fleeces at four ages, in two localities and under two systems of husbandry.

## Material and Methods

The Arabi sheep are usually white in colour with black, brown or white head. Asker and El-Khalisi (1965) recorded some 12.3% completely black or brown animals. They also estimated that the mature body weight of the breed ranges from 61 to 85 Ibs for females. The majozity of the Arabis consist of migrating flocks. But there are few thousands kept in three governmental stations namely, Masen, Thiqar and Waset.

At shearing time in April 1976, 64 right mid-side samples were equally collected from Arabi ewes living at Mesan and Thiqar locations. Although these two locations do not differ significantly in their environmental conditions, yet it is usually claimed that wool produced in one location is better than that of the other. Half of the samples obtained within each location (*i.e.* 16) was gathered from ewes kept under the stationary system (intensive production) while the other half was clipped from migrating animals (extensive production). Each of the sixteen samples were equally taken from individuals of 1,2,3 and 4 years old. Care was given to shear the samples represent a whole year growth. Greasy-fleece weight was only recorded for the stationary flocks as the owner of the migrating sheep refused such procedure.

For estimating fibre diameter, medullated fibres %, fibre length and fibre type ratio a subsample of 4-5 staples of each mid-side sample were decreased in xylol. The rest of the sample which averaged nearly 20 g was used for evaluating clean fleece weight.

The snippet method suggested by Chapman (1960) and alanameter (a microprojectoscope) apparatus were used for determining the average diameter of 300 fibres per sample. Number of medullated fibres occurring along fibre diameter were recorded. A fibre length apparatus was used for measuring the length of 300 fibres drawn at random from each subsample. To assess the weight of each type of fiberes some 0.2-0.3 g of the subsample was separated to innercoat, outer-coat, and kemp fibres. Each type was weighed to the fifth decimal. The method reported by Chapman (1960) was adopted to determine the shrinkage %. The bone-dry weight of the scoured samples was obtained applying the A.S.T.M. (1965) method.

Three way analysis of variance was carried out according to Snedecor and Cochran (1973). All factors studied were considered to have random effect.

The following linear model was assumed to explain the influence of various factors on fleece chracteristics.

$$Y_{iyjkm} = U + A_i + H_j + L_k + (AH)_{ij} + (AL)_{ik} + (HL)_{jk} + e_{ijkm}$$

Where :

$Y_{ijkm}$ is the observation on the *mth* ewe at *ith* age under *jth* husbandry system and *kth* location.

u is overall effects;

$A_i$, $H_j$ and $L_k$ denote the effects due to age, husbandry system and location respectively;

$(AH)_{ij}$, $(AL)_{ik}$ and $(HL)_{jk}$ refer the interaction effects due to age X husbandry system, age X location, and husbandry system X location respectively, and $e_{iikm}$ is the random error.

## Results and Discussion

(a) *Age effect*

It is clear from data presented in Table 1 that the greasy-fleece weight, fibre diameter, outer - coat fibres %, and medullated fibres% gradually decreased with advance in age . Percentage of kemp fibres exhibited a reversal trend as it increased gradually from first to fourth year of age. Fibre length reached its maximum when the ewes were two years old. No particular trend can be detected as for the effect of age on either shrinkage % or inner-coat fibres%.

The significant effect of age on wool attributes studied (Table 2) is not in accordance with many results previously reported (Karam and Ragab, 1959) and Sans Arias *et al.*, 1975; on greasy fleece weight, Slen and Banky 1961, and Sharafeldin and Ghoneim, 1963 dealing with clean wool %,Oznacar, 1973, studying fibre diameter, Ashmawy 1965 and Papovici, 1970 on fibre length, and Belic, 1962 dealing with fibre type ratio). But it was also recorded on some wool characteres of Iraqi Awassi sheep and on wool fineness of Moretta and Tsigai sheep by Sharafeldin (1965), Montememurro *et al.* (1966) and Petrovic (1976) respectively.

The stability in wool attributes at different ages studied means that selection for such attributes might be practised at one year of age. Moreover, it could be interpreted to mean that fleece structure and follical characteristics are determined at an early age. It should be pointed out that the period from birth to one year of age deserves particular attention to fine out the stage at which such stability in wool parameters may be established.

(b) *Locality effect*

At Mesan region, heavier, thicker and longer fleeces containing more inner-coat fibres and kemp fibres were obtained (Table 1). Values in the same table also indicate that fleeces of Thiqar location shrank more, contained more outer coat fibre and meduallated fibres. Analysis of variance (Table 2), however, revealed that, with exception of greasy fleece weight, shrinkage %, kemp fibres %, and innercoat fibres% there were no significant difference among wool attributes of the fleeces of the two localities. Higher greasy fleece weight inner-coat fibres % and lower shrinkage % were also obtained from Awassi sheep reared in Baghdad than their contemporaries kept in either Mosul or Rutba locations (G.M. Ashmawy and W. El-Azzawi, unpublished).

In view of the present findings, it may be recommended to raise Arabi sheep in Mesan area rather than in Thiqar region as greater and cleaner wool with more inner coat fibres was obtained. Such increment in wool yield could be attributed to the better nutritional and climatic conditions generally prevailing in Mesan compared with those of Thiqar.

TABLE 1. Averages for wool attributes of Arabi under different environmental conditions.

| Attribute | Age "years" | | | | Locality | | Husbandry system | | Overall |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | Thiqar | Mesan | Stationary | Migrating | |
| Greasy-fleece weight (kg) | 1.95±0.64 | 1.94±0.65 | 1.86±0.05 | 1.83±0.21 | 1.71±0.30 | 2.01±0.48 | 1.86±0.21 | — | 1.86±0.21 |
| Shrinkage % | 45.10±14.30 | 40.10±14.68 | 40.20±15.45 | 44.55±13.92 | 44.52±23.29 | 40.45±8.70 | 37.33±13.12 | 47.64±18.88 | 42.38±14.59 |
| Fibre diameter(u) | 36.33±1.95 | 26.86±2.38 | 26.12±1.70 | 25.33±3.06 | 25.64±0.12 | 26.58±0.78 | 26.48±1.07 | 25.84±0.40 | 26.16±0.76 |
| Fibre length (cm) | 16.19±3.01 | 18.81±1.83 | 17.85±2.11 | 16.70±1.77 | 17.36±1.27 | 17.41±0.07 | 17.81±0.64 | 16.96±0.71 | 17.39±0.74 |
| Innercoat fibres | 67.19±8.69 | 66.57±17.68 | 69.68±10.96 | 70.36±8.73 | 66.70±6.10 | 70.20±11.75 | 62.14±0.35 | 74.76±5.30 | 68.45±7.91 |
| Outercoat fibres | 32.00±8.57 | 31.55±16.34 | 27.32±12.42 | 23.94±3.14 | 31.64±4.74 | 25.77±6.68 | 32.74±3.18 | 24.66±5.12 | 28.70±5.82 |
| Kemp fibres | 0.82±0.34 | 1.87±2.54 | 3.00±3.63 | 5.73±6.99 | 1.66±1.34 | 4.05±5.01 | 5.10±3.53 | 0.61±0.14 | 2.85±3.30 |
| Medullated fibres% | 12.52±6.09 | 11.96±7.08 | 9.20±4.33 | 9.89±4.97 | 11.68±2.06 | 10.11±2.62 | 12.55±0.83 | 9.24±1.39 | 10.89±2.13 |

TABLE 2. Analysis of variance for wool attributes of Arabi sheep.

| Wool attribute / Source of variance | Greasy fleece weight | | Shrinkage % | | Fibre diameter | | Fibre length | | Innercoat fibres | | Outer-cota fibres | | Kemp fibres | | Medullated fibres | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | D.F. | M.S | D.F | M.S | D.F | M.S | D.F | M.S | D.F | M.S. | D.F | M.S | D.F | M.S | D.F | M.S |
| Between ages (A) | 3 | 0.02 | 3 | 42.61 | 3 | 6.18 | 3 | 22.15 | 3 | 21.91 | 3 | 105.95 | 3 | 94.57 | 3 | 38.11 |
| Between husbandry systems (H) | — | — | 1 | 592.74** | 1 | 5.90 | 1 | 11.68 | 1 | 1100.06** | 1 | 458.23** | 1 | 667.58** | 1 | 98.63 |
| Between localities (L) | 1 | 0.69* | 1 | 82.83** | 1 | 16.34 | 1 | 0.04 | 1 | 157.77** | 1 | 308.92 | 1 | 125.44* | 1 | 26.33 |
| A×H | — | — | 3 | 2.76 | 3 | 21.96 | 3 | 9.23 | 3 | 169.14* | 3 | 233.08 | 3 | 48.50 | 3 | 104.10 |
| A×L | 3 | 0.67** | 3 | 1.37 | 3 | 41.91* | 3 | 22.64 | 3 | 1302.08** | 3 | 173.94 | 3 | 32.73 | 3 | 511.65** |
| H×L | — | — | 1 | 2871.49** | 1 | 4.09 | 1 | 14.42 | 1 | 170.87** | 1 | 23.44 | 1 | 121.94* | 1 | 1.20 |
| Residual | 24 | 0.11 | 51 | 12.42 | 51 | 10.12 | 51 | 8.80 | 51 | 28.72 | 51 | 96.85 | 51 | 41.02 | 51 | 39.90 |

The average fibre length of the Arabi sheep class them within the carpet wool breeds which range in fibre length from 11.6 to 24.0 cm (Ryder and Stephenson, 1968). Arabi fleece has nearly the same length of 17.37 cm estimated by Sharafeldin (1965) for the Iraqi Awassis. Meanwhile, it is shorter than the 23.5 cm recorded on Karadi sheep of Iraq (Ghoneim, 1973).

As far as the fibre type ratio is concerned, it may be stated that the Arabi fleeces contain a comparatively higher % of innter coat fibres than the 41.38, 55.6 and 66.4% reported for the Syrian Awassis (Ashmawy, 1965; Erokhin 1973 and Mohamed, 1973). Its kept content (ranging from 0.82 to 5.73%) is much less than those of Ossimi, Karakul, Turki, Schottish Black face, and Barki carpet wool sheep (Badreldin *et al.*, 1952; Demiruren 1960; Doney and Smith, 1961; Chaudhary, 1965).

The Arabi wool seems to be less medullated than that of the Syrian Awassi and Karadi fleeces which contained 54.8 and 19.5, medullated fibres as estimated by Ghoneim and Ashmawy (1968), and Ghoneim *et al.* (1974). Meanwhile, it is more medullated than the Turkish Awassi with only 3.9% medullated fibres (Imeryuz *et al.*, 1970).

Due to the comparatively better characteristics of Arabi fleeces, it may be possible to utilize them in producing superior blankets or in blending purposes.

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## تأثير العمر ومنطقة التربية ونمط الرعاية على خصائص الجزة فى الأغنام العربى

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درست خصائص الجزة لأغنام العرابى العراقية ( ٢ر٢ مليون رأس ) باستخدام ٦٤ عينة أخذت من منتصف الجانب من نعاج تنتمى الى أربعة مجاميع عمرية ( ١ الى ٤ سنوات ) ومنطقتى تربية ( ميسان وذى قار ) ونمطى رعاية ( كثيفة وخفيفة ) .

لم يكن للعمر تأثير معنوى على أى من الصفات التى درست بينما كانت الجزات الناتجة فى منطقة ميسان أثقل وأنظف وأكثر محتوى من ألياف الغطاء الداخلى وكانت الجزات التى تمت تحت ظروف الرعاية الخفيفة أقل فى محصول الصوف النظيف وألياف الغطاء الخارجى وألياف الكمب ونسبة الألياف النخاعية أما الجزات الناتجة تحت ظروف الرعاية الكثيفة فقد كانت أليافها أكثر سمكا وطولا وأقل محتوى من ألياف الغطاء الداخلى .

بينت الدراسة أيضا أنه رغم انتماء أغنام العرابى الى قسم الأغنام المنتجة لصوف السجاد حيث كان وزن جزتها ١ر٨٦ كجم وطول أليافها ١٧ر٣٩ سم ونسبة ألياف الغطاء الداخلى والخارجى والكمب ٦٨ر٤٥ ، ٢٨ر٧٠ ، ٢ر٨٥٪ على التوالى ، فان رفع أليافها الواضح ( ٢٦ر١٦ ميكرون ) يدعو الى الاهتمام بتحسينها نحو انتاج صوف أميل للنعومة .