

ESTIMATION OF HERITABILITY OF WOOL YIELD OF AWASSI SHEEP IN PAKISTAN

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The wool yield records of Awassi sheep maintained at the Livestock Experiment Station, Bahadurnagar, Okara during 1965-84 were used to determine the heritability of wool yield. The mean wool yield at first, second and third shearings and the combined yield of three shearings and life time yield in single born ewes were 2.79 ± 0.048 , 2.93 ± 0.015 , 2.91 ± 0.066 , 8.43 ± 0.130 and 10.47 ± 0.290 kg, respectively. Similarly, wool yield at first and second shearings and life time yield was 2.82 ± 0.073 , 2.61 ± 0.084 and 8.93 ± 0.410 kg, respectively in twin born ewes. The heritability estimates of wool yield at first, second and third shearings and the combined yield of three shearings and life time yield in single born ewes was 0.524 ± 0.291 , 0.369 ± 0.260 , 0.280 ± 0.28 , 0.068 ± 0.02 and 0.632 ± 0.310 , respectively. The heritability at first and second shearings and life time yield was 0.904 ± 0.65 , 0.228 ± 0.44 and 0.512 ± 0.54 , respectively in twin born ewes.

INTRODUCTION

Sheep possess prime importance in the livestock set up and are the major source of livelihood of thousands of people in agricultural countries like Pakistan. They are mainly kept for wool and meat while milk and skins are regarded as their secondary by-products.

Pakistan possesses about 29.2 million head of sheep comprising 28 indigenous breeds which supply annually 21.9% of the total meat produced and nearly 50.0 thousand tonnes of carpet wool (Anonymous, 1991). However, the production of meat and wool is comparatively low which renders the sheep industry uneconomical. Turner (1982) recommended that improvement in quality and quantity of mutton and wool can only be accomplished either through selective breeding or through crossbreeding with exotic breeds such as Awassi or Australian Corriedale.

A flock of 50 ewes and 10 rams of Awassi sheep native to Middle East, famous

for meat, wool and milk production was imported from Lebanon in 1965 for crossbreeding with local breeds. Since then the animals are kept at the Livestock Production Research Institute, Bahadurnagar and data on various productive and reproductive traits have been recorded. This study pertains to estimation of heritability of the wool yield of Awassi sheep in Pakistan.

MATERIALS AND METHODS

The wool yield records of Awassi sheep maintained at the Livestock Production Research Institute, Bahadurnagar, Okara during 1965-84, were used for this study. The conditions regarding feeding, management and disease control remained more or less similar during the study period. Flushing of breeding ewes was practised during breeding season which was restricted to autumn and lambs were received during spring season. The shearing was done once a year during 1965-73 whereafter it was resorted to twice a year. Biannual records of wool yield

were standardized to annual basis by multiplying with 1.11394 factor. The significant effect of the year was minimized by deviating the adjusted records from respective yearly means. The wool yield records of sheep having different types of birth were used separately for the estimation of heritability. The following heritabilities were estimated:

For single born lambs

- Wool yield at first shearing
- Wool yield at second shearing
- Wool yield at third shearing
- Combined wool yield for three shearings
- Life time wool yield

For twin born lambs

- Wool yield at first shearing
- Wool yield at second shearing
- Life time wool yield

The heritability for both birth types was worked out by paternal half-sibs correlation method. In this case, each observed value was regarded as having the components described by the following statistical model:

$$Y_{ij} = u + R_i + e_{ij}$$

where

- i = 1, 2, 3, n (number of rams),
- j = 1, 2, 3, n_i (number of offsprings of i_{th} ram),
- Y_{ij} = Observation on j_{th} daughter of the i_{th} ram,
- u = Population mean,
- e_{ij} = Random error associated with the records of j_{th} daughter of i_{th} ram.

The heritability was calculated by using half-sib correlation method (Becker, 1984). Average number of progeny was worked out by the method described by Becker (1984). The standard error of heritability was calculated by the formula as described by Swiger *et al.* (1964).

RESULTS AND DISCUSSION

The average wool yield of 155 single and 56 twin born ewes at first, second and third shearings, the combined yield of three shearings and life time yield is given in Table 1. Comparatively higher estimates of wool yield have been reported by Kozal *et al.* (1991). They reported that in 1110 Wielkopolska ewes, fleece weight averaged at 6 months of age was 3.56 kg for single born lambs and 3.46 kg for twin born lambs. The corresponding figures at 12 months in 990 ewes were 6.13 and 6.21 kg.

Heritability Estimates

Single born sheep: The heritability estimates of wool yield at first, second and third shearings and life time yield are given in Table 2.

The heritability estimate calculated from 162 half-sibs of 14 sires was 0.524 ± 0.291 . Very low estimates (0.011 ± 0.017) in Awassi sheep have been reported by Yarkin and Tuncel (1973). Qureshi and Shukla (1990) reported a high heritability (0.840 ± 0.240). The heritability of wool yield at second shearing estimated from the data of 154 half-sibs from 14 sires was 0.364 ± 0.26 . High estimates (0.50) in Polish mountain sheep and relatively low estimates (0.15 ± 0.046) in Awassi sheep have been reported by various workers.

The heritability estimate from 116 half-sibs from 12 sires at the time of third shearing 0.280 ± 0.28 . The heritability for life time wool yield was estimated to be 0.532 ± 0.31 from 154 half-sibs belonging to 14 sires (Table 2). High estimates of heritability for first, second, third shearing and life time wool yield for single born sheep indicated that most of the phenotypic variation was

Table 1. Mean values and coefficient of variation of wool in single and twin born Awassi sheep

Trait	Number of observations	Mean \pm S.E.	Range	C.V. (%)
Single born sheep				
Wool yield at first shearing	162	2.79 \pm 0.048	0.93 - 5.17	22.08
Wool yield at second shearing	154	2.93 \pm 0.015	1.16 - 4.81	22.01
Wool yield at third shearing	116	2.91 \pm 0.066	1.17 - 5.43	25.38
Combined wool yield of three shearings	116	8.43 \pm 0.130	3.31 - 12.92	16.37
Life time wool yield	154	10.47 \pm 0.290	3.31 - 18.92	33.78
Twin born sheep				
Wool yield at first shearing	55	2.82 \pm 0.073	1.35 - 4.11	19.26
Wool yield at second shearing	53	2.61 \pm 0.084	1.16 - 4.43	23.52
Life time wool yield	53	8.93 \pm 0.410	2.72 - 18.33	33.58

Table 2. Estimates of heritability of wool yield by paternal half-sib correlation method in single and twin born Awassi sheep

Traits	Number of sires	Number of half-sibs	Heritability \pm S.E.
Single born sheep			
Wool yield at first shearing	14	162	0.524 \pm 0.29
Wool yield at second shearing	14	154	0.369 \pm 0.26
Wool yield at third shearing	12	116	0.280 \pm 0.28
Combined wool yield of three shearings	12	116	0.068 \pm 0.02
Life time wool yield	14	154	0.632 \pm 0.31
Twin born sheep			
Wool yield at first shearing	6	55	0.904 \pm 0.65
Wool yield at second shearing	6	53	0.228 \pm 0.44
Life time wool yield	6	53	0.512 \pm 0.54

due to heredity. It means that additive genetic variance is quite high as compared to environmental variance, indicating thereby a substantial improvement in ewes as well as rams by the use of superior sires.

Twin born sheep: The heritability estimates of wool yield based on 53 half-sibs of six sires at first and second shearings along with

life time wool yield of six sires were 0.904 \pm 0.65, 0.228 \pm 0.44 and 0.512 \pm 0.54, respectively (Table 2). These high estimates of heritability in twin born Awassi sheep suggest that selection of females for better wool yield would be advantageous because most of the observed variation seems to be due to additive genetic effect.

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