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ESTIMATION OF REPEATABILITY OF BIRTH WEIGHT AND WEANING WEIGHT IN TEDDY GOAT

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The recorded data on 946 progenies from 301 does of teddy goat maintained at Livestock Production Research Institute, Bahadurnagar, Okara during 1975-1990 were used. The estimated mean birth and weaning weight was 1.67 ± 0.31 and 8.50 ± 2.18 kg, respectively. The recorded birth and weaning weights were analyzed for between and within dam's sources of variation. Repeatability estimates of birth weight and weaning weights were found to be 0.2089 ± 0.0315 and 0.1381 ± 0.0315, respectively. The moderate estimates indicate that selection on the basis of first record will be effective to improve birth weight. But the low estimates for weaning weight indicate that selection should be based on multiple records.

INTRODUCTION

Of all the domestic animals, the goat probably has the widest ecological range, This species perform best in the dry tropics when compared with wet and humid tropics. This is a multipurpose animal producing meat, milk, skin, mohair and hair. Their primary purpose is meat production but in temperate countries milk has become a greater importance, Goat meat is preferred and skins are very valuable byproduct in Pakistan. The goat population of the world is about 526.40 million heads (Anonymous, 1990) out of which 36.67 million are reared here.

During the last two decades goats has emerged as an efficient meat supplier especially "the Teddy goat", One teddy goat can produce 30 kg mutton annually in the form of her kids (Hash mat, 1987). Moreover they are an important component of mixed farming (Agriculture and Livestock) in canal irrigated areas. The knowledge of its production potential under local environmental conditions is a vital spring board to embark upon its improvement. Inspite of its significant role in fulfilling the meat shortage, no systematic work has been under-taken to study its genetic potential. This project was under taken to study the repeatability of birth and weaning weights. This information will be of primary importance in selection and future planning for its improvement.

MATERIALS AND METHODS

Data comprising of 946 pedigree and performance records of 301 does of Teddy goats kept at Livestock Experiment Station, Bahadurnagar, Okara during 1975-90 were used. The feeding and managemental practices during the experimental period remained in general the same and breeding of does was practiced throughout the year. The bucks were selected on the basis of their phenotype and pedigree, whereas no attention was given for the selection of females. After parturition birth weight of

kids was recorded before they were allowed to suckle their mothers. All prophylactic measures against contagious endo and ecto parasitic infestations were taken. The weaning age varied between 60 to 152 days and kids having less than 60 days weaning age were not included in the study. The females having at least two records were included. The following data were recorded.

1. Data of birth
2. Birth weight
3. Birth type
4. Sex of kid
5. Date of weaning
6. Weaning weight

In computing rcpcatability, the records of birth and weaning weights of every kid were assumed to follow the following statistical model (Bcckcr, 1984).

$$Y_{km} = \mu + A_k + \Sigma_{km}$$

Where:

- μ = is common mean
- A_k = is the effect of km individual (dam)
- Σ = is random error of mth measurement within k1hdam.

Table 1. Analysis or variance

Source of variation	Degree of freedom	Sum of Squares	Means Squares	Error Mean Squares
Between individuals (dams)	N-l	SSw	M.S$_w$	$\sigma^2_e + K_1\sigma^2_w$
Between Measurements (winthin dams)	N(M-l)	*SS,*	M.S,	(J_e^2

where:

M = number of observations on each dam

N = number of individuals

K = average number of measurements per dam

The K was calculated with the following formula

$$K = \frac{1}{S-I}\left[N - \frac{\text{Ln2l}}{N}\right.$$

where:

S = number of sires

N = total number of observations used

Σ = sum of

n, = number of observation on the ith sire.

Estimation of Repearability

$$0: = MS_e$$

$$\sigma^2_w = \frac{MS_w + MS_e}{1\ K,}$$

$$R = \frac{OIJ}{0",,+0:'},$$

RESULTS AND DISCUSSION

Birth Weight: The average birth weight of 946 kids was found to be 1.67 ± 0,31 kg. The comparable mean birth weight was reported by Kumar and Singh (1983), Mukherjee *et al.* (1983) and Jagtap *et al. (1988).*

The recorded data on birth weight were analyzed for between and within dam's sources of variation to estimate repeatability. The average number of progeny per dam were estimated to be 3.0779. The estimated repeatability was 0.2089 ± 0.0305 (Table 2). These estimates were very close to the estimated reported by Ali (1981) and Garcia Betancourt (1982).

Weaning weight: The mean weight of 946 progenies was estimated to be 8.50

± 2.18 kg. The comparable weaning weight estimates were reported by Mukherjee *et al.* (1983), Kanaujia *et al.* (1985) and Mittal (1987).

Table 2. Analysis of variance for Bouth weillht

Source of variation	Degree of freedom	Sum of Squares	Means Squares	Error Mean Squares
Between D individuals (dams)	300	47.3400	0.1578	$0^{1}_{w} + 3.07790^{1}_{0}$
Between Measurements (winthin dams)	M5	56.1795	0.0871	σ^2_w

$a: = 0.0871$

$$\sigma^2_D = \frac{0.1578-0.0871}{3.0779} = 0.023$$

$$R = \frac{\sigma^2_D}{\sigma^2_D + \sigma^2_w} = \frac{0.023}{0.023+0.0871} = 0.208lJ$$

The recorded data on weaning weight were analyzed for between and within dam's sources of variation for estimation of repeatability. The average number of progeny per dam (K) were estimated to be 3.0779. The component of variance were worked out which yielded repeatability estimate of 0.1381 ± 0.0291. The comparable estimates were reported by Garcia Betancourt (1982), Waleed *et al.* (1986) and Constantinou and Mavrogenis (1987).

The ability of an individual to repeat any trait is sum of genetic and environmental factors. The low estimate indicate that temporary environmental conditions have a marked influence on weaning weight. Thus in any selection programme to improve weaning weight, emphasis should be given to multiple records because the selection/culling on the basis of single record will not be effective. It is also emphasized that to mean heavier kids, attention must be given to environmental factors affecting this trait.

Table J. Analyxis of variance for weaning weight

Source of variation	Degree of freedom	Means Squares	Error Mean Squares
Between D individuals (dams)	JOO	25.76	$\sigma^2_w + 3.0779\sigma^2_D$
Between Measurements (winthin dams)	465	17.27	σ^2_w

$\sigma^2_w = 17.27$

$$al) = \frac{25.79 - 17.27}{3.077lJ} = 2.681$$

$$R = \frac{\sigma^2_D}{\sigma^2_D + \sigma^2_w} = \frac{2.76XI}{2.7681 + 17.27} = 0.1381$$

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