

ESTIMATION OF GENETIC PARAMETERS AND BREEDING VALUES FOR ZARAIBI GOATS TRAITS USING SINGLE- AND MULTI-TRAIT ANIMAL MODEL

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ABSTRACT

A total of 820 Zaraibi goats in the first parity were collected from El-Serw Experimental Station (North Nile Delta) belonging to Animal Production Research Institute, Ministry of Agriculture, Egypt, during the period from 1990 to 2000.

Genetic parameters and breeding values for total milk yield (TMY, Kg), lactation length (LL, days), age at first kidding (AFK, months), number of kids born (NKB, kids), number of kids weaned (NKW, kids), litter weight at birth (LWB, Kg) and litter weight at weaning (LWW, Kg) in the first kidding were investigated. The statistical analyzes were performed using the MTDFREML (multivariate derivative free restricted maximum likelihood, Boldman *et al.*, 1995). Firstly, single trait animal models were fitted for all traits to obtain heritability estimates. In the second approach, a multi-trait animal model (four traits model) was used to consider NKB, LWB, LWW and TMY traits.

The overall means for number of kids born, weaned, litter weight at birth and litter weight at weaning per doe in the first kidding were 1.97, 1.77 kid, 3.6 and 17.67 Kg, respectively. The average of age at first kidding, total milk yield and lactation length were 22.66 months, 269.8 kg and 258.9 days, respectively. The estimates of coefficient of variations of studied traits ranged between 12.88% for age at first kidding and 50.71% for milk production.

Heritability estimates and their standard errors obtained from single-trait of NKB, LWB, LWW, TMY, LL, NKW and AFK were 0.18 ± 0.05 , 0.09 ± 0.06 , 0.06 ± 0.05 , 0.24 ± 0.10 , 0.12 ± 0.09 , 0.15 ± 0.07 and 0.09 ± 0.06 , respectively. While, the obtained estimates from multi-trait animal model analysis of NKB, LWB, LWW and TMY were 0.22 ± 0.08 , 0.16 ± 0.04 , 0.14 ± 0.07 and 0.28 ± 0.10 , respectively. The heritabilities obtained from multi-trait animal model analysis were higher than those obtained from single-trait animal model analyses. All genetic and phenotypic correlations among production and reproduction traits in the first kidding of Zaraibi goats obtained from multi-trait animal model analyzes (four traits) were positive. The genetic correlations ranged between 0.21 and 0.82, while the phenotypic correlations ranged between 0.13 and 0.71. The estimates of genetic correlations between milk yield and each of NKB, LWB and LWW were 0.21 ± 0.10 , 0.23 ± 0.08 and 0.82 ± 0.09 , respectively.

The ranges of estimated breeding values (EBVs) obtained from multi-trait animal model analysis for NKB, LWB, LWW and TMY were 0.84 kid, 1.21, 7.44 and 164.8 kg, respectively. While, the corresponding values obtained from single-trait analysis 0.65 kid, 0.73, 2.64 and 151.61 kg, respectively. The obtained higher estimates of coefficients of variation, heritability estimates of low to moderate values and wider range of animals breeding values of the Zaraibi goats traits in the first kidding, indicating that potential genetic improvement through selection can be achieved in this flock, especially with multi-trait animal model analysis.

Keywords: Egypt, Zaraibi goats, production and reproduction traits, animal model, genetic parameters, breeding values.