

## **Abstract:**

The aim of current study was to evaluate the estimation of non-additive genetic variance components for growth and composite reproductive traits and determination of the importance of these variance components in genetic evaluations of Lori-Bakhtiari sheep using 4574 records from 1994 to 2010 (Institute of Genetic Improvement of Bakhtiari sheep, ADD CITY, Iran). The performance traits including birth weight (BW) and weaning weight (WW), composite reproductive traits including average birth weight of lambs from each ewe in each litter (ABWL), total birth weight of lambs from each ewe in each birth (TBWL), average weight of weaned lambs from each ewe in each litter (AWWL), total weight of weaned lambs from each ewe in each litter (TWWL) were studied throughout the experiment. Variance components and genetic parameters for growth and composite reproductive traits were estimated either by average information algorithm (AI) or restricted maximum likelihood (REML). Eight animal models were fitted to analyze growth and composite reproductive traits and the most appropriate model was chosen using likelihood ratio test. The complete model having additive, permanent environmental, dominance and epistasis (additive by dominance) variance components was the most appropriate model for BW, WW, and TWWL. Using this model, the additive, permanent environmental, dominance and epistasis (additive by dominance) variances as a proportion of the total variance were respectively estimated at 0.267, 0.111, 0.188, 0.053 for BW; 0.096, 0.174, 0.141, and 0.036 for WW; and 0.075, 0.035, 0.0002, 0.0001 for TWWL. The model No.4 having additive, dominance and Epistasis (additive by dominance) variance components For ABWL, TBWL and AWWL a model including (model 4) was the most appropriate model for ABWL, TBWL, and AWWL. Using this model, the additive, permanent environmental, dominance and epistasis (additive by dominance) variances as a proportion of the total variance were respectively

estimated at 0.108, 0.052, and 0.004 for ABWL; 0.077, 0.051, and 0.004 for TBWL; and 0.107, 0.021, and 0.005 for TWWL. These results indicate that the considerable dominance and epistasis (additive by dominance) variances may exist for the studied traits. Including non-additive genetic parameters in the model generally resulted in decreasing the estimates of additive and permanent environmental variances. Increasing of individual inbreeding by the 10% significantly decreased BW ( $-0/008 \pm 0/004$ ) and WW ( $-0/100 \pm 0/034$ ). Correlations between breeding values estimated by different models were very high in all cases approaching to 1. , This study showed that the no change may be occurred in animal ranking by the use of breeding values of the selection candidates estimated by different models.

**Key words:** Genetic variance; dominance; epistasis; Lori Bakhtyari sheep



University of Zabol  
Faculty of Agriculture  
Department of Animal science

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**Estimation of non-additive genetic  
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important traits in Lori Bakhtyari sheep**

**Supervisor:**  
Dr. M. Rokouei

**Advisors:**  
Dr. M. Vafaei Vale  
E.Sadeghian Bozorgi

**By:**  
M. Karami Zalani

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