

GROWTH PERFORMANCE IN LORI-BAKHTIARI LAMBS. 1. ESTIMATION OF NON-GENETIC PARAMETERS

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INTRODUCTION

Lori-Bakhtiari sheep is a fat-tailed and relatively large-sized. It is distributed in the south western part of Iran. The typical sheep belong to the Bakhtiari tribe and are white, but black and brown animals are also found among the sheep. A large portion of the phenotypic expression of a lamb's body weight is due to environmental factors. Consequently, estimates of these non-genetic factors will enable a breeder to make adjustments for them and improve the accuracy of selection. The significant effect of age of dam on birth weight and weaning weight of lambs have been reported by some researchers (Eltawil *et al.* 1970; Boujenane *et al.* 1991; Yamaki and Sagae 1991; Saeid Bathaei and Leroy 1998; Dixit *et al.* 2001). Many results have been reported that indicate significant effects year, sex and type of birth lambs on preweaning traits (Eltawil *et al.* 1970; Farid and Makarechian 1976; Saoud *et al.* 1984; Yamaki and Sagae 1991; Burfening and Carpio 1993. Saeid Bathaei and Leroy. 1998; Dixit *et al.* 2001). The objective of this study was to evaluate the effect of non-genetic parameters on birth weight, weaning weight and daily gain from birth to weaning of Lori-Bakhtiari lambs.

MATERIALS AND METHODS

The data used in this study were obtained from Lori-Bakhtiari sheep breeding station in Charmahal and Bakhtiari province during eleven years from 1990 to 2000. These sheep were kept generally from December to May at the station and in this period were fed with alfalfa, barley and wheat stubbles. They were grazed on range and cereal pasture in the other month of the year. The breeding period extended from late August to late October. Ewes were assigned randomly to the rams. Birth weight (BW) and weaning weight (WW) were recorded on 3972 and 3705 lambs, respectively. About 15 days after parturition, the lambs were creep-fed during the suckling period. The creep-ration consisted of 50% barley, 10% cotton seed meal, 20% wheat barn, 18% dried sugar beet pulp, 1% bone meal, 0.5% salt, 0.5% vitamin, mineral and antibiotic supplements. The ration ground, mixed and fed *ad libitum*. Alfalfa was fed free choice. The lambs were weaned at 90±5 days of age. Data were analysed using least-squares procedure (SAS, 1996). For analysing the data on birth weight, weaning weight and daily gain (DG) from birth to weaning, a linear model including the effects of age of dam, year, sex, type of birth lamb and interactions between age of dam and year, sex and year, type of birth and year for BW trait and type of birth × year for weaning weight trait and age of dam × year and type of birth × year for DG trait were used. For WW and DG traits birth weight was added in the model as covariable.

RESULTS AND DISCUSSION

The Least-squares means and standard errors by lambing year, age of dam, type of birth, sex of lamb on preweaning traits are presented in Table 1.

Table 1. Least-squares means and standard errors of environmental factors for traits

Class	No.	Birth wt (kg)	No.	weaning wt (kg)	Daily Gain (gr)
Overall mean	3972	4.85±0.01	3705	27.55±0.09	251.2±0.9
Year					
1990	158	4.83±0.12 ^{abc*}	136	27.97±0.49 ^b	267.9±9.5 ^{ac}
1991	351	4.88±0.07 ^{ab}	329	29.37±0.24 ^a	251.7±5.8 ^{bc}
1992	391	4.56±0.03 ^e	342	25.81±0.24 ^{ef}	228.1±2.9 ^e
1993	418	4.68±0.03 ^{cd}	381	25.47±0.22 ^f	232.5±2.5 ^e
1994	363	4.58±0.04 ^e	346	24.04±0.26 ^{fh}	212.8±2.9 ^f
1995	326	4.85±0.04 ^a	308	26.66±0.26 ^d	242.3±3.1 ^{dc}
1996	409	4.73±0.03 ^{bc}	383	25.61±0.22 ^{ef}	231.3±2.5 ^e
1997	366	4.72±0.04 ^{bcd}	347	27.93±0.25 ^c	260.8±2.9 ^{ab}
1998	461	4.53±0.04 ^e	428	27.57±0.26 ^c	250.2±3.5 ^c
1999	360	4.62±0.04 ^{de}	348	26.23±0.29 ^{de}	236.6±3.5 ^{de}
2000	369	4.91±0.03 ^e	357	28.94±0.22 ^{ab}	265.9±2.7 ^a
Dam age (yr)					
2	1020	4.36±0.02 ^a	953	26.22±0.16 ^c	238.3±1.9 ^b
3	831	4.68±0.02 ^b	779	26.99±0.15 ^{ab}	244.9±1.7 ^a
4	789	4.77±0.02 ^c	733	27.03±0.16 ^{ab}	244.5±1.8 ^a
5	619	4.79±0.03 ^c	586	27.22±0.17 ^a	248.1±2.0 ^a
6	414	4.89±0.07 ^c	382	27.18±0.21 ^{ab}	244.0±4.6 ^{ab}
7	299	4.83±0.05 ^c	272	26.60±0.25 ^{bc}	241.4±4.1 ^{ab}
Birth type					
Single	2833	5.18±0.02 ^a	2688	28.62±0.10 ^a	262.3±1.3 ^a
Twin	1139	4.26±0.02 ^b	1017	25.13±0.16 ^b	224.9±2.0 ^b
Sex					
Male	1996	4.87±0.02 ^a	1849	28.07±0.11 ^a	257.3±1.5 ^a
Female	1976	4.57±0.02 ^b	1856	25.68±0.12 ^b	229.9±1.5 ^b

*All means within a particular subclass differ significant ($P < 0.05$) except those follow by the same letter.

BW, WW and DG traits were significantly influenced by the age of dam. The birth weight lambs born from 2-yr-old ewes as compared with lambs born from the other age groups (3 to 7-yr-old) were significantly lighter. The significant effect of age of dam on birth weight and/or weaning weight of lambs are reported by Eltawil *et al.* (1970), Farid and Makarechian (1976), Boujenane *et al.* (1991), Yamaki and Sagae (1991), Saeid Bathaei and Leroy. (1998) and Dixit *et al.* (2001). Dams 4 or more years of age had lambs that were heavier at birth than all other groups. This could be due to better intra-uterine environment. The weaning weight

lambs born from 2 and 7 or more years of age were lighter than all other groups. This could be due to lower milk production.

Lambing year was significant ($P < 0.01$) for all traits studied. Weaning weight was more affected than birth weight. This is to be expected since WW will fluctuate with such environmental factors as among of forage and milk, but BW will be affected only indirectly through the condition of the mother. Also, year to year changes were very relatively different. These fluctuations probably were due to general weather conditions which the quality and quantity of the feed supply and either directly or indirectly affected the flock's general state of health. Eltawil *et al.* (1970), Burfening and Caprio (1993), Saeid Bathaei and Leroy (1998) and Dixit *et al.* (2001) found that year of birth has been significant effect on the preweaning traits. Also, significant effect of lambing year only on birth weight was reported by Farid and Makarechian (1976), Saoud *et al.* (1984), Yamaki and Sagae (1991).

Single lambs were 0.92 and 3.49 kg heavier than twin lambs at BW and WW, respectively. The effect of type of birth on BW, WW found in this study are in agreement with previous reports (Eltawil *et al.*, 1970, Boujenane *et al.*, 1990, Yamaki and Sagae, 1991, Saeid Bathaei and Leroy, 1998, Dixit *et al.*, 2001). The effect of sex was significant, and male lambs were heavier than females at birth and weaning. Eltawil *et al.* (1970), Farid and Makarechian (1976) and Burfening and Caprio (1993), Saeid Bathaei and Leroy (1998), Dixit *et al.* (2001) reported similar results. Such a trend in the effect of sex on body weights might be attributable to different physiological functions in the two sexes, mainly of a hormonal nature that tend to become more pronounced as animals approach maturity (Eltawil *et al.* 1970). The regressions of weaning weight and daily gain from birth to weaning on birth weight were highly significant. The regressions and standard errors of WW and DG on BW were 4.17 ± 0.10 kg and 35.07 ± 1.15 gr, respectively. These results indicate that the environmental variance of growth traits before weaning were usually large part of the phenotypic one.

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