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SOME FACTORS INFLUENCING THE BIRTH WEIGHTS OF NORDUZ KIDS

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Abstract

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The present paper was conducted to determine the effects of some environmental factors on Norduz kids raised at Research and Application Farm of Agricultural Faculty, Yuzuncu Yil University, Van, Turkey. For this aim, birth type (single and twin), gender (male and female), dam age at lambing (1, 2, 3, 4, 5, and 6), and birth year (2005, 2006, and 2007), and birth weights (kg) of 155 Norduz kids were recorded. According to results of the present paper, effect of gender factor on birth weight of kids was found to be non-significant, the influences of dam age ($P<0.05$), birth type ($P<0.05$), and birth year ($P<0.001$) on it were found significant. As a result, the birth weight trait provides useful information for early selection criteria in breeding program. Determination and adjustment of the effects of environmental factors influencing it are very important for achieving more accurate genetic parameters and effective application of breeding and selection methods on the trait.

Key words: Norduz kids, birth weight, environmental factors

Introduction

Information on live weight and some body measurements traits at early ages in farm animals is essential in order to improve meat production for breeding purposes (Eyduran et al., 2009; Kucuk and Eyduran, 2009). The evaluation of body weight is one of the most essential characteristics in the goat production (Adeyinka and Mohammed, 2006). Body weights at various growth periods of kids were influenced by two factors, genotype (breed) and environmental factors (gender, birth type, dam age at kidding, and year, etc). Birth weight has high correlation with weight gain until weaning (Mcmanus et al., 2008). Birth weight, one of the different growth periods of the kids, is an extremely fundamental trait influencing their survival rate (%) and growth-development after birth and their lifetime yields due to economical causes (Salah et al., 1989; Pul, 2001). The birth weight trait provides useful information for early selection criteria in breeding program. Determination and adjustment of the effects of environmental factors influencing it are very important for achieving more accurate genetic parameters and effective application of breeding and selection methods on the trait. The present paper aimed to determine the effects of gender, birth type, dam age at kidding, and year factors on birth weights of Norduz Kids, born in 2005-2007 years.

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Material and Method

The data were collected from 155 Norduz kids, born in March 2005-2007 in Research and Application Farm Faculty of Agriculture, University of Yuzuncu Yil, in Van, Turkey. Genders (male and female), birth types (single and twin), dam ages (1, 2, 3, 4, 5, and 6) and dates of birth (2005, 2006, and 2007) and birth weights (kg) of these kids were recorded. Dams of the kids were kept at similar management conditions.

The assumed linear model for analyzing the data is given below:

$$Y_{ijklm} = \mu + y_i + g_j + e_k + t_l + e_{ijklm}$$

Where, Y_{ijklm}: birth weight connected to *m.* lamb with *i.* year, *j.* gender and *l.* birth type of ewe with *k.* age.

μ : Expected mean of birth weight

y_i : *i.* year effect (*i* = 1, 2, 3; 2005, 2006, 2007)

g_j : *j.* gender effect (*j*= 1, 2; male, female)

e_k : *k.* dam age effect (*k*=1, 2, 3, 4, 5, 6)

t_l : *l.* birth type effect (*l*=1, 2; single, twin)

e_{ijklm} : The random error normally distributed with mean zero and variance σ_e^2

Statistical analysis was performed using GLM (General Linear Model) procedure of SAS statistical package program (SAS, 1998). Difference between two means was evaluated using Duncan's Multiple Range Test.

Results and Discussion

Descriptive Statistics for birth weight of Norduz kids were presented in Table 1. As seen from Table 1, the influences of dam age (P<0.05), birth type (P<0.05) and year factors (P<0.001) on birth weight of Norduz kids were found significant, whereas gender factor on the trait was non-significant. General birth weight mean ± SE values of Norduz kids were found as 3.32 ± 0.06.

Birth weight mean ± SE values of the kids born in 2005-2007 were found 2.89 ± 0.09; 3.330.07 and 3.800.11 respectively. As shown in Table 1, birth weight mean of the kids born in 2007 was found to be heavier than those of the kids born in 2005 and 2006. Birth weight mean of the kids born in 2006 was found to heavier than that of the kids born in 2005. Birth weight mean ± SE values of the kids born by dams with 1-6 ages were calculated as 3.030.24; 3.140.09; 3.490.10; 3.430.15; 3.340.13 and 3.410.34 respectively. It is clearly demonstrated in Table 1 that birth weight mean of the kids born by dams with 3 age was found to be heavier than that of the kids born by dams with 1 age (P<0.05).

Birth weight mean ± SE values of single-born and twin-born kids were found as 3.450.08 and 3.210.08 respectively. Birth weight mean of single-born kids was estimated to be higher than that of twin-born kids (P < 0.05).

Birth weight mean ± SE values of male and female kids were calculated as 3.380.08 and 3.250.07 respectively. Difference between these two means was not statistically significant.

General mean birth weight of Norduz kids was found as 3.32 kg (Table 1). This value for Norduz kids was higher than that for Saanen kids but lower than those for Alpine and Toggenburg kids (Mcmanus et al., 2008).

In present paper, the effects year (P<0.001), dam age (P<0.05), and birth type (P<0.05) on birth weight of Norduz Kids were found significantly. These findings were in line with those reported by Gunes and Evrim (1993).

The effect of gender factor on birth weight of Norduz kids was found non-significant. This finding was not in agreement with those reported by some authors, who found to be significant effect on birth weight of various breed kids (Salah et al., 1989; Gunes and Evrim, 1993; Pul, 2001; Sengonca et al., 2003).

Our finding on significant effect of birth type effect on birth weight was in consistent with those reported by some authors (Salah et al., 1989; Gunes and Evrim, 1993; Pul, 2001; Unalan and Cebeci, 2001; Sengonca et al., 2003)

The finding on significant effect of birth year effect on birth weight was in line with those reported by some

Table 1
Descriptive statistics for birth weight of Norduz kids

Factors	N	$\overline{X} \pm S_{\overline{X}}$	Min	Max
Overall mean	155	3.32±0.06	1.5	5.3
Year		***		
2005	46	2.89±0.09c	1.5	4.8
2006	68	3.33±0.07b	1.7	4.9
2007	41	3.8±0.11a	2.6	5.3
Dam age		*		
1	12	3.03±0.24b	2	4.9
2	38	3.14±0.09ab	1.7	4.35
3	32	3.49±0.10a	2.7	4.7
4	35	3.43±0.15ab	1.5	5.3
5	30	3.34±0.13ab	2.2	5.1
6	8	3.41±0.34ab	1.9	4.3
Birth type		*		
Single	71	3.45±0.08a	2	5.1
Twin	84	3.21±0.08b	1.5	5.3
Gender		ns		
Male	84	3.38±0.08	1.5	5.3
Female	71	3.25±0.07	2	4.9

ns: non-significant
* P<0.05; ***P<0.001
[a,b] Difference between column means with the different letters for each factor was significant (P<0.05)

authors (Gunes and Evrim, 1993; Sengonca et al., 2003; Ocak et al., 2006).

In the paper, dam age had significant on it (P<0.05). The finding was in agreement with those of (Gunes and Evrim, 1993; Pul, 2001).

The differences between the present paper and earlier studies on the birth weight may be due to genotype, environment, rearing systems etc.

Conclusion

For farm animals, birth weight is the trait that has significant effects on lifetime yields. Determination of macro environmental factors affecting birth weight that use as early selection criterion in kids is very important for realizing effective breeding program and estimating correct genetic parameters on this trait. In the present paper conducted to examine the effects of environmental factors such as kidding year, birth type, dam age and gender on birth weight of Norduz Kids, it was concluded that,

Kidding year (P<0.001), dam age (P<0.05) and birth type (P<0.05) had significant effects on birth weight. Gender factor was insignificant on it. That is, the year effect on birth weight was more effective than those of other factors studied.

- Average of single kids was higher than that of twin kids.

- The difference between means of male and female kids was statistically insignificant.

- Significant difference between 1 and 3 dam ages in terms of birth weight was found ($P<0.05$).

As a result, the present paper might provide useful information for materializing successful selection program carried out to improve meat production of Norduz kids in subsequent studies.

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