

Reproductive Performance and Lamb Growth Characteristics of Ramliç Sheep

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Summary

This study was carried out to investigate some reproductive and lamb growth performance of Ramliç sheep in 2005, 2006, 2007 and 2008 years. The effect of year was found significant on fecundity and litter size of the ewes. The average fecundity, litter size and lamb survival rate of Ramliç ewes were 0.79, 1.13 and, 94.9%, respectively. The birth weight (BW), weaning weight (WW) and six month live weight (SMLW) for male and female lambs were 4.63 kg and 4.20 kg, 30.92 and 26.94 kg, 37.40 and 33.21 kg, respectively. The effect of age of dam, year, birth type and sex were significant on BW, WW and ADWG of lambs. The average daily weight gain of lambs at weaning was 286.88 g and male and female lambs were 303.62 g and 270.13 g, respectively.

Keywords: : *Ramliç sheep, Reproduction performance, Lamb, growth, Survival rate*

Ramliç Koyunlarının Üreme Performansı ve Kuzuların Büyüme Özellikleri

Özet

Bu araştırma, Ramliç koyunlarının, 2005, 2006, 2007 ve 2008 yıllarına ait bazı döl verimi ve büyüme özellikleri araştırmak için yürütülmüştür. Ramliç koyunlarında koçaltı koyun ve doğuran koyuna göre kuzu verimi üzerine yılların etkisi önemli bulunmuştur. Ramliç koyunlarında koçaltı koyun başına doğan kuzu sayısı 0.79, doğuran koyun başına doğan kuzu sayısı 1.13 ve kuzularda yaşama gücü oranı da ortalama %94.9'dur. Erkek ve dişi kuzularda doğum ağırlığı, sütten kesim ağırlığı ve altıncı ay canlı ağırlıkları sırasıyla; 4.63 kg ve 4.20 kg; 30.92 ve 26.94 kg; 37.40 ve 33.21 kg'dır. Kuzuların doğum ağırlığı, sütten kesim ağırlığı ve sütten kesime kadar günlük canlı ağırlık artışı üzerine yaş yıl, doğum tipi ve cinsiyet etkisi önemli bulunmuştur. Ramliç kuzularda doğum ile sütten kesim arası günlük canlı ağırlık kazancı ortalama 286.88 g'dır. Erkek ve dişi kuzularda ise günlük canlı ağırlık kazancı ortalaması sırasıyla; 303.62 g ve 270.13 g'dır.

Anahtar sözcükler: *Ramliç koyunu, Üreme performansı, Kuzu, büyüme, Yaşama gücü*

INTRODUCTION

Sheep breeding have played an important role in the Turkish agricultural economy and rural society. Indigenous sheep breeds, adapted to the natural environmental conditions of different regions of the country and have low production levels, form 95.75% of the total sheep population (23.974.591 million) of Turkey¹. The left 4.24% of the population is composed of Merino type sheep and other crossbred genotypes. Although the sheep population in Turkey is high in number, the

production characteristics of sheep breeds are inadequate. In recent years, incomes obtained from sheep have increased significantly thanks to the production of lambs with high meat quality and quantity. In order to improve meat and wool quality and prolificacy traits, the local sheep breeds were crossed with meat and prolific sheep breeds in different region in Turkey². The Ramliç sheep is the one of these crossbred sheep. In several studies conducted on the Ramliç sheep

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and litter size were reported as 1.00-1.18 lambs^{3,4}. The survival rates of lambs until weaning were reported as 86-99%^{5,6}. Average birth weight and weaning weight (120th day) of various crossbred lambs were ranged from 3.59 to 4.40 kg and from 24.16 to 28.62 kg, respectively^{3,4}.

The objectives of this study were to determine reproductive performance of the Ramlıç ewes and lamb growth characteristics (birth weight, weaning weight and 6th month weight) to investigate the effects of some of the measurable environmental factors on these traits.

MATERIAL and METHODS

Location and management

The animals included in the study were consisted of Ramlıç sheep and lambs born in 2005-2008 in Marmara Livestock Research Institute (MLRI), Bandırma, Turkey. The Ramlıç ewes were transferred from Plolatlı State Farm and flock has been raised since 2004 in MLRI. The research station is located in the Marmara region of Turkey (Latitude: 27°57N, Longitude: 40°21E and 65 meter altitude). The climate is predominantly Mediterranean; however dry season aridity is not as great as along the Mediterranean coast. Average temperatures are 23-27°C in the warmest months and 1-8°C in the coldest months, with mean annual rainfall precipitation of 500-800 mm per annum over the data collection periods.

During the day all ewes grazed on pastures composed of native grass and wheat stubble at night, ewes were housed and had access to water and mineral licks ad lib. The ewe flock was kept indoors during winter months and then taken to pasture as the weather conditions improved. Before mating season, 400-600 g/head of concentrated feed produced at the Institute was given daily to the ewes. A similar program was also carried out to prepare the ewes for parturition. The concentrate feed contain is 74% barley, 24% sunflower oilcake, 1.4% marble powder, 0.5% salt and vitamin + mineral premix.

Lambs were kept alone with their mothers in stalls for 3 days after lambing. When lambs were 15 day old, they were fed ad libitum a creep-feed concentrate and, alfalfa hay and water. The lambs were permitted to suckle for 1 h twice a day. The suckling program of lambs lasted for about three months at the average. After weaning (90 day) lambs were raised in separate sex groups and were offered 200-400 g/d of concentrate feed for the first 6 months. Than lambs was kept pasture and managed same condition ewe flock in the MLRI.

Reproductive performance and lamb survival rate

Reproductive (n=396) records collected from 2005 to 2008 at the Marmara Livestock Research Institute's (MLRI) Sheep Research Station were analyzed in this study. Ewes were assigned to sexually active 16-18-month-old. A total of 15 ram and 396 ewes were used and each rams being used for two mating seasons. Oestrus detection was performed daily by using teaser rams, and ewes were mated with selected rams. Ewes were exposed to rams for 60 days beginning the 15 June and the 15 August. Parameters of reproductive performance analyzed included: Oestrus rate (ewes oestrus/ewe mated ×100), lambing rate (ewes lambed/ewe mated ×100), infertility rate (infertile ewe/ewes exposed ×100), fecundity (lambs born/ewes mated), litter size (lambs born/ewes lambing) single lambing (single born lamb /lamb born ×100), twin lambing (twin born lamb/lamb born ×100), and survival rate (lamb weaning/lambs born ×100)⁷.

Growth traits

Birth weight (BW) was recorded for all lambs born alive. Individual lamb weaning weight (WW) at 90 day was calculated by linear interpolation, and average daily weight gain (ADWG) from birth to weaning was calculated. The 6th month weights (SMLW) were recorded, but not adjusted.

Statistical analysis

The statistical analyses of reproductive performance of ewes and lambs survival rates were carried out by the chi-square test⁸. The effects of year, dam age, birth type and sex on the growth of the lambs were determined by least squares analysis of variance⁹. The differences between the means of the sub-groups were tested by Duncan test. SPSS statistical software package program was used for the analyses of phenotypic parameters¹⁰. The model used to analyze the growth characteristics was:

$$Y_{ijkl} = \mu + A_i + B_j + C_k + D_l + e_{ijkl} \text{ where;}$$

For lamb growth characteristics, Y = traits, μ = overall mean, A_i = year where i = 2005, 2006, 2007, 2008, B_j = age of dam where j = 2-5, C_k = birth type where k = 1-2, D_l = sex where l = 1-2 and e_{ijkl} was the random residual.

RESULTS

Reproductive traits and lamb survival rate

The some reproductive performances and survival rate of Ramlıç ewes are shown in [Table 1](#). The effect of the years was found significant on the estrus rate ($P < 0.05$), lambing rate, infertility rate, single and twin

Table 1. Some Reproductive Performance of Ramlıç Sheep**Tablo 1.** Ramlıç koyunların bazı üreme özellikleri

Traits	Years				Average
	2005	2006	2007	2008	
Ewes Exposed	100	91	94	111	396
Oestrus Showing Ewes	88	78	92	97	355
Ewes Lambing	70	60	82	63	275
Ewes Infertility	30	31	12	49	122
Ewes Single Lambing	56	59	68	58	241
Ewes Twin Lambing	14	1	14	5	34
Lambs Live Born	85	61	96	70	312
Lambs number dead	5	2	5	4	16
Oestrus Rate, %	88.0	85.7	97.9	87.4	89.6*
Lambing Rate, %	70.0	65.9	87.2	56.8	69.4**
Infertility, %	30.0	34.1	12.8	43.2	30.6**
Single Lambing, %	80.0	98.3	82.9	92.1	87.6**
Twin Lambing, %	20.0	1.7	17.1	7.9	12.4**
Survival Rates, %	94.1	96.7	94.8	94.3	94.9 ^{NS}
Fecundity	0.85	0.67	1.02	0.63	0.79
Litter size	1.21	1.02	1.17	1.11	1.13

*: $P < 0.05$, **: $P < 0.01$, NS: Not significant**Table 2.** The least squares means (LSM) and standard errors (SE) of the live weights and ADWG of Ramlıç lambs**Tablo 2.** Ramlıç kuzuların canlı ağırlıkları, günlük canlı ağırlık artışı, en küçük kareler ortalaması ve standart hataları

Factors Investigated	BW (kg)			WW (kg)			SMLW (kg)			ADWG (g)		
	n	LSM	SE	n	LSM	SE	n	LSM	SE	n	LSM	SE
Dam age	**			*			*			*		
2	109	3.88	0.182 ^b	95	31.47	2.038 ^b	73	33.71	1.416 ^b	95	298.54	17.513 ^a
3	71	4.06	0.259 ^b	68	31.96	2.880 ^b	59	32.37	2.010 ^b	68	300.07	24.754 ^a
4	79	4.93	0.250 ^a	66	23.95	2.783 ^c	44	37.63	2.028 ^a	66	240.87	23.924 ^{ab}
5	52	4.80	0.213 ^a	43	33.62	2.412 ^a	33	37.52	1.719 ^a	43	208.02	20.725 ^b
Birth year	**			**			**			**		
2005	85	4.70	0.213 ^a	73	33.65	2.219 ^{ab}	54	34.12	1.569 ^b	73	328.86	19.074 ^a
2006	61	4.78	0.297 ^a	59	29.98	3.177 ^b	51	43.99	2.249 ^a	59	289.95	27.310 ^b
2007	95	3.96	0.248 ^b	81	35.06	2.577 ^a	56	30.63	1.838 ^b	81	316.06	22.147 ^a
2008	70	4.20	0.199 ^{ab}	59	22.31	2.014 ^c	48	32.49	1.396 ^b	59	212.63	17.316 ^c
Birth type	**			*			NS			NS		
Single	240	4.86	0.058 ^a	209	31.73	0.860 ^a	168	36.16	0.496	209	296.53	5.653
Twin	71	3.98	0.105 ^b	58	28.77	1.189 ^b	41	34.45	0.970	58	277.22	10.221
Sex	**			**			**			*		
Male	168	4.63	0.075 ^a	140	30.92	0.860 ^a	114	37.40	0.659 ^a	140	303.62	7.658 ^a
Female	143	4.20	0.081 ^b	132	26.94	0.891 ^b	95	33.21	0.721 ^b	132	270.13	7.789 ^b
Overall Mean	311	4.42	0.061	272	30.25	0.686	161	35.31	0.550	272	286.88	5.893

a,b,c: The differences between the means of groups carrying various letters in the same column are significant* $P < 0.05$; ** $P < 0.01$; NS: $P > 0.05$

lambing rate ($P < 0.01$). High infertile rate could be resulted from the timing of the mating season and the method of hand mating. Survival and fecundity, described as productivity of ewes and the ability to be born alive and stay alive until certain ages, were significant factors affecting the profitability of sheep breeding. The average mean for lamb's survival rate was 94.9% (Table 1) and there were not significant differences between the years.

Growth Traits

The least square means and standard errors of BW, WW, SMLW, and ADWG of the Ramlıç lambs are shown in Table 2. The effect of year, age of dam, type of birth and sex on BW and WW was significant ($P < 0.05$, $P < 0.01$). The effects of birth type on SMLW were not significant.

The effects of year, age of dam and sex on ADWG were significant ($P < 0.05$, $P < 0.01$), but the effect birth type on ADWG was not significant. In similar studies carried out on different genotypes of lambs, the effect of sex and type of birth was found significant^{11,12}.

DISCUSSION

The average oestrus rate, lambing rate, infertility rate was 89.6%, 69.4% and 30.6%, respectively. The results of the present study were paralel to the literature¹³ and different from^{4,6-14}. In this study the mean fecundity and

litter size recorded over the observation periods were 0.79 and 1.13 for the Ramlıç Sheep. These results are lower when compared to the results of other commercial crossbreeding studies in Turkey^{15,16}. Our findings were different from by Yalçın et al.³ for Rambouillet x Dağlıç F₁ and B₁ sheep.

Hacıslamoğlu and Evrim⁶ were reported the ewe

lambing rate as 93.0% and ewes prolific lambing as 18% for the Ramlıç sheep, higher than finding in this current study.

The survival rates until weaning (90th day) are presented in *Table 1*. One of the important characteristics of crossbreed lambs is high survival rate at the age of weaning. The overall mean for lamb's survival rate was 94.9% (*Table 1*) and there was not significant difference between the years. According to these results, the Ramlıç lambs has high survival rate at Marmara Livestock Institute. The survival rate of 94.1% determined in the Ramlıç lambs was quite higher than those reported in some crossbred studies ^{11,14-17}.

This situation can be related to the good feeding management of lambs during birth to weaning age. This result agrees with the results 93.7% by Hacıslamoğlu and Evrim ⁶, 93.3% by Yalçın ¹⁸ for Ramlıç Sheep.

The BW, WW, and SMLW in the Ramlıç lambs were 4.42 kg, 30.25 kg, and 35.75 kg, respectively. This result agrees with the results of growth traits values obtained in this study are in line with results of Akçapıar et al. ¹¹, Özbey et al. ¹⁹, Altinel et al. ¹⁵, Kul and Akcan ²⁰, Ekiz and Altinel ¹⁷, Özcan et al. ²¹ and Ulsan and Bakyürek ¹². The overall mean for ADWG was 286.88 g (*Table 2*) and there was a significant difference between the dam age, sex and year. These results support the findings of Tekin et al. ²² and Kaymakçı et al. ¹¹ who reported daily gain value for lambs.

In conclusion, based on the results obtained in this study, the Ramlıç sheep had low reproductive performance in Marmara Livestock Research Institute. It leded us to conclude that Ramlıç sheep will need to time ability to adapt to environmental conditions of Marmara region. On the other hand, the lamb's growth performances from birth to 6th month weight and ADWG are quite high in Marmara Livestock Research Institute. The effects of year, age of dam, sex and type of birth have significant effect on some growth traits of lambs.

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