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EFFECTS OF SOME FACTORS ON GESTATION LENGTH IN HAMDANI, RED KARAMAN AND KARAKUL SHEEP

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Hamdani, Morkaraman Ve Karagül Koyunlarında Gebelik Süresine Bazı Faktörlerin Etkisi

Özet: Bu çalışma, Hamdani, Morkaraman ve Karagül koyunlarının gebelik süresi üzerine ırk, tohumlama mevsimi, koyunun yaşı, doğum tipi, kuzunun cinsiyeti ve doğum ağırlığının etkilerini araştırmak amacıyla yapılmıştır. Araştırmada, Hamdani, Morkaraman ve Karagül koyunlarının doğumlarına ait 259 veri analiz edilmiştir. Hamdani, Morkaraman ve Karagül koyunlarında gebelik süresi sırasıyla 149.77±0.18, 148.76±0.15 ve 147.79±0.19 gün olarak belirlenmiştir. Gebelik süresi ırk tarafından etkilenmiştir (P<0.01). Farklı mevsimlerde tohumlanan koyunların gebelik süresi benzer olmuştur (P>0.05). İki yaşlı koyunların gebelik süresi (148.76±0.17 gün) ile 4 yaşlı koyunların gebelik süresi (148.78±0.12 gün) benzer bulunmuştur (P>0.05). Tek doğum yapan koyunların gebelik süresi (149.36±0.11 gün), ikiz doğum yapan koyunların gebelik süresinden (148.18±0.21 gün) daha uzun sürmüştür (P<0.01). Erkek kuzu doğuran koyunların gebelik süresi (149.17±0.14 gün), dişi kuzu doğuran koyunların gebelik süresinden (148.37±0.13 gün) daha uzun olmuştur (P<0.01). Daha ağır doğum ağırlığına sahip kuzuların analarına ait gebelik süresi daha uzun sürmüştür (P<0.01). Bu araştırma gösteriyor ki, gebelik süresini ırk, kuzunun cinsiyeti, doğum tipi ve doğum ağırlığı etkilemiş, tohumlama mevsimi ve koyunun yaşı etkilememiştir.

Anahtar kelimeler: Hamdani, Morkaraman, Karagül, Gebelik süresi

Summary: This study was carried out to investigate effects of breed, mating season, age of ewe, birth type, sex of lamb and birth weight on gestation length in Hamdani, Red Karaman and Karakul ewes. In the study, data on 259 lambings of Hamdani, Red Karaman and Karakul sheep were analyzed.

Gestation length for Hamdani, Red Karaman and Karakul ewes were 149.77±0.18, 148.76±0.15 and 147.79±0.19 days. respectively. Gestation length was affected by breed (P<0.01). Gestation lengths of mated ewes in different seasons were similar (P>0.05). Gestation lengths of 2-yr-old ewes (148.76±0.17) and 4-yr-old ewes (148.78±0.12) were similar (P>0.05). Gestation length of ewes which gave birth to single lambs (149.36±0.11) were longer than those which gave birth to twin lambs (148.18±0.21) (P<0.01). Gestation length of ewes giving birth to male lamb (149.17±0.14) were longer than those giving birth to female lamb (148.37±0.13) (P<0.01). The ewes

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which gave birth to heavier lamb had a longer gestation length (P<0.01). This study showed that the gestation length was affected by breed, sex of lamb, birth type and birth weight of lamb, and was not affected by mating season and age of ewe.

Keywords: Hamdani, Red Karaman, Karakul, Gestation length

Introduction

Gestation length is important for some of the criteria that controls reproductivity in practice. Gestation length in the ewes is variable; additionally the variation in physical signs of imminent parturition makes the prediction of parturition in the ewes particularly difficult. The management of high value stock demands the precise prediction of parturition. The inability to accurately predict the timing of parturition incurs extra labour and veterinary costs and higher risks to both dam and lamb. Any factors that may be used to help determine the timing of parturition are, therefore, of considerable interest to the industry (**6**).

The duration of pregnancy in sheep can vary according to several factors; these include the number of lambs in the conceptus, the sex of the lambs, the sire breed, the breed of ewe and its age (**13**). Some authors have distinguished certain categories of sheep in terms of the length of their gestation period. These include: the early- maturing improved meat breeds (eg. Southdown, Suffolk, Hampshire, Dorset Horn) with gestation periods varying from 144 to 147 days; the slow-maturing fine-wool breeds (Merino, Rambouillet) with periods averaging 149-151 days; and crossbred long- wool breeds (Colombia, Corriedale) with periods in the intermediate range (**13**). Gestation length was longer for triple births (153.7 days) than for twin births (152.8 days), and twins was longer than single lambs (151.6 days) in Konya Merino ewes (**19**). There is, however, a decrease in gestation length with increasing litter size in Clun Forest ewes; for quadruplet births (144.8 days) it was lower than for triplet births (146.7 days), for triplet births it was lower than for twin births (146.8 days) and single lambs (147.5 days), and for twins it was lower than single lambs (**12**). It was reported that under a decreasing day length pattern and low temperatures during late pregnancy, gestation length in Finn-cross ewes was shorter than under the opposite environmental conditions (**3**). This study was carried out to investigate effects of breed, mating season, age of ewe, birth type, sex of lamb and birth weight on gestation length in Hamdani, Red Karaman and Karakul ewes.

Material and Method

In this study, Hamdani, Red Karaman and Karakul ewes were artificially inseminated at Experiment farm of Faculty of Veterinary Medicine University of Yüzüncu Yıl. Data (n=259 lambings) were collected from 40 Hamdani (2-yr-old=28; 4-yr-old=12), 50 Red Karaman (2-yr-old=14; 4-yr-old=36) and 35 Karakul (2-yr-old=10; 4-yr-old=25) ewes.

Sheep were received concentrate feed (500 g per ewe per day) in addition to grazing on pasture starting from 4 weeks before mating until mating time, concentrate feed (500 g per

ewe per day) in addition to ground sainfoin ad libitum at first 3.5 months of pregnancy, and concentrate feed (700 g per ewe per day) in addition to ground sainfoin ad libitum for last 1.5 months of pregnancy in the autumn mating season.

Sheep were received concentrate feed (500 g per ewe per day) in addition to grazing on pasture starting from 4 weeks before mating until mating time. The ewes grazed on pasture without any concentrate feed at first 3.5 months of pregnancy, and the ewes received concentrate feed (700 g per ewe per day) in addition to ground sainfoin ad libitum for last 1.5 months of pregnancy in the summer mating season.

Sheep were received concentrate feed (500 g per ewe per day) in addition to ground sainfoin ad libitum starting from 4 weeks before mating until first month of pregnancy. The ewes were grazed on pasture without any concentrate feed from second months of pregnancy until last 1.5 months of pregnancy, and the ewes received concentrate feed (700 g per ewe per day) in addition to ground sainfoin ad libitum for last 1.5 months of pregnancy in the winter mating season.

Mating and birth dates of ewes were recorded. Furthermore, age of ewe, birth type, sex of lamb and birth weight of lamb were recorded. Gestation length was described as the time period passed between last mating date and parturition of ewes. Data were analyzed using the least squares method (**14**). The difference between the mean values was determined by Duncan's test (**7**). Gestation lengths were analysed by linear models of statistical analysis as follow.

For ewe's gestation length

$y_{ijklmno} = \mu + b_i + g_j + a_k + t_l + s_m + w_n + e_{ijklmno}$

$Y_{ijklmno}$ is the individual observation,

μ the expected mean,

b_i the effect of birth weight (i: 1.5-2.5, 2.6-3.5, 3.6-4.5, ≥4.6 kg),

g_j the effect of breed (j: Hamdani, Red Karaman and Karakul),

a_k the effect of ewe's age (k: 2 and 4 year),

t_l the effect of type of birth (l: single and twin),

s_m the effect of sex (m: male and female),

w_n the effect of mating season (n: autumn, summer and winter),

$e_{ijklmno}$ the random error.

Results

Least square means, standart errors and significance probabilities for gestation length (day) are presented in Table. Average gestation lengths in Hamdani, Red Karaman and Karakul ewes were 149.77±0.18, 148.76±0.15 and 147.79±0.19 days, respectively. The

longest gestation length was observed in Hamdani breed, followed by Red Karaman and Karakul breeds, respectively. The effect of breed on gestation length was significant (P<0.01).

Gestation lengths of mated ewes in different seasons were similar (P>0.05). Gestation lengths of 2-yr-old ewes (148.76±0.17) and 4-yr-old ewes (148.78±0.12) were similar (P>0.05). Gestation length of ewes which gave birth to single lamb (149.36±0.11) was longer than those which gave birth to twin lambs (148.18±0.21). The effect of birth type on gestation length was significant (P<0.01).

Gestation length of ewes giving birth to male lamb (149.17±0.14) were longer than those giving birth to female lamb (148.37±0.13). There was significant difference (P<0.01) in gestation length between ewes which gave birth to male- and female-lambs. Birth weight did have a significant effect (P<0.01) on gestation length. Gestation length increased with increasing birth weight of lambs.

Discussion

Average gestation lengths in Hamdani, Red Karaman and Karakul ewes were 149.77, 148.76 and 147.79 days, respectively. When the results of this study were compared to the results of other researchers, gestation lengths of Hamdani, Red Karaman and Karakul ewes were shorter than those of Sharka ewes (154 days) **(5)**, White Karaman and Awassi (149.93 and 151.38 days) **(18)**, Konya Merino (152.7 days) **(19)** and Dohne Merino ewes (151.6 days) **(25)**, were longer than those of Prealpes-du-Sud (145.8 days) **(2)** and Dorper ewes (146.5 days) **(15)**. In the present study, the effect of genotype on gestation length was significant (P<0.01). This observation is in general agreement with the results reported in the literatures **(4, 18, 20)**, contrary to the results reported by Gabrilidis **(11)**, Sahani and Chand **(21).**

The effect of mating season on gestation length was not significant (P>0.05). The effect of mating season on gestation length could not be discussed, because no article has been found on the effect of mating season on gestation length.

Age of ewe did not have a significant effect (P>0.05) on gestation length. This result is in general agreement with the results reported in the literatures **(1, 22)** and contrary to the results reported by Fernandes and Deshmukh **(9)** and Gabrilidis **(11)**.

Awassi **(16),** Chios and Awassi sheep **(17).** However, Akçapınar and Kadak **(1),** El Karim and Owen **(8),** Fuentes et al. **(10)** and Öztürk **(18)** reported that gestation length of ewes giving birth to twin lambs were longer than those giving birth to single lambs. This observation is in general agreement with the results reported in the literatures (10, 24) and contrary to the results reported by Akcapinar and Kadak **(1),** Shrestha and Heanay **(22).**

Table. Least square means, standart errors and significance probabilities for gestation length (day).

Table. Gebelik süresine (gün) ait en küçük kareler ortlamaları, standart hataları ve önem kontrolü sonuçları.

Factors	N	Mean	S.E.	C.E.
Expected mean	259	148.77	0.12	
Breed	**			
Hamdani	65	149.77	0.18	0.999[a]
Red Karaman	115	148.76	0.15	-0.014[b]
Karakul	79	147.79	0.19	-0.985[c]
Mating season	ns			
Autumn	113	148.88	0.14	0.108
Summer	83	148.94	0.16	0.167
Winter	63	148.49	0.18	-0.275
Age of ewe (year)	ns			
2	86	148.76	0.17	-0.010
4	173	148.78	0.12	0.010
Type of birth	**			
Single	215	149.36	0.11	0.585
Twin	44	148.18	0.21	-0.585
Sex of lamb	**			
Male	122	149.17	0.14	0.400
Female	137	148.37	0.13	-0.400
Birth weight of lamb (kg)	**			
1.5-2.5	27	147.78	0.26	-0.992[c]
2.6-3.5	77	148.45	0.15	-0.325[b]
3.6-4.5	105	148.92	0.17	0.143[b]
≥4.6	50	149.94	0.23	1.174[a]

(**) P <0.01; S. E.: Standart error, C.E.: Constant estimate, ns: nonsignificant Values in columns with different letters are significantly different (P<0.01).

S. E.: Standart hata, C.E.: Etki payı, ns: Önemsiz.

Aynı sütunda farklı harf taşıyan ortalama değerler arası farklar önemlidir (P<0.01).

Gestation length of ewes which gave birth to single lamb was longer than those which gave birth to twin lambs. This result was in agreement with the results of Clun Forest (**12**),

Gestation length of ewes which gave birth to male lamb were longer than those which gave birth to female lamb, which is in agreement with some studies **(10, 18, 24)**. Some researchers reported that gestation length of ewes giving birth to female lamb were longer than those giving birth to male lamb **(1, 23)**.

Gestation length increased with increasing birth weight of lambs. Birth weight did have a significant effect ($P<0.01$) on gestation length. This result is not in agreement with the result reported by Trimnell et al. **(24)**. These differences among studies could be due to breed and various environmental factors.

In conclusion, gestation length in the breeding flock is the major factor influencing profitability. In order to optimize reproductive efficiency a sheep producer must understand the basic stages of the gestation of a sheep and factors affecting gestation length. Gestation length in Hamdani, Red Karaman and Karakul ewes were affected by breed, sex of lamb, birth type and birth weight of lamb, and was not affected by mating season and age of ewe. There was an increase in gestation length with increasing birth weight of lambs.

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References

1. **Akçapınar, H., Kadak, R.**: Bazı faktörlerin Akkaraman ve Morkaramanlarda gebelik süresi ve doğum ağırlığı üzerine etkileri. Ankara Üniv. Vet. Fak. Derg, 1982; 29: 392-400.
2. **Al-Gubory, K.H.**: Effects of the presence of rams during pregnancy of lambing performance in ewes. Anim. Reprod. Sci, 1998: 52 (3): 205-211.
3. **Amir, D., Genizi, A., Schindler, H.**: Seasonal and other changes in the gestation duration. J. Agric. Sci, 1980: 95: 47-49.
4. **Bradford, G.E., Quirke. J.F., Sitorus. P., Inounu, I., Tiesnamurti, B., Bell, F.L., Fletcher, J.C., Torell, D.T.**: Reproduction in javanese sheep: evidence for a gene with large effect ovulation rate and litter size. J. Anim. Sci, 1986: 63: 418-431.
5. **Cumlivski, B.**: Fertility of Merino type of sheep when they are kept in the open the whole year. proceedings. 3 rd World Congress on Sheep and Beef Cattle Breeding, 1988; 1: 345-367.
6. **Davies Morel, M.C.G ., Newcombe, J.R., Holland, S.J.**: Factors affecting gestation length in the thoroughbred mare. Anim. Reprod. Sci, 2002; 74 (3-4): 175-85.
7. **Duzgunes, O., Kesici, T., Gurbuz, F.**: İstatistik metotları I. Ankara Üniversitesi Ziraat Fakültesi yayınları no: 861. Ankara, 1983.
8. **El Karim, A.I.A., Owen. J.B.**: Reproductive performance of two types of sudan desert sheep. Res. Dev. Agric, 1987; 4: 183-187.

9. **Fernandes, A.P., Deshmukh, A.P.**: Effect of various factors of reproduction on the birth of lambs born to Deccani and its Crosses. Livestock Adviser, 1988; 13: 20-24.

10. **Fuentes, J.L., Pulenets, N., Peron, N.**: Gestation length of Pelibuey ewes, Revista Cubana de reproduction anim, 1987; 13: 27-33.

11. **Gabrilidis. G.T.**: Traditional sheep breeds in Greece within intensive production system: growth rate, reproduction and milk production. Anim. Breed. Abstr, 1992; 60: 221.

12. **Gordon, I.**: Controlled breeding in farm animals. Pergamon Press, Oxford, 1983; 181-195.

13. **Gordon, I.**: Controlled reproduction in sheep and goats, V, 2. CABI Publishing Wallingford Oxon OX10 8DE, 1997; 260-262.

14. **Harvey, W.R.**: User's guide for LSMLMWPC-I version mixed model least squares and maximum likelihood computer program. Ohio State University, Columbus, Mimeo, 1987.

15. **Joubert, D.M.**: Sex behaviour of purebred and crossbred Merino and Persian ewes. J. Reprod. Fertil, 1962; 3: 41–49.

16. **Kassem, R., Owen, J.B., Fadel, I., Suha, H., Whitaker, C.J.**: Aspects of fertility and lamb survival in Awassi sheep under semi arid conditions. Anim. Breed. Abstr, 1990; 58: 850.

17. **Mavrogenis, A.P.**: Breed group and parity effects on gestation duration and litter size at birth of sheep. Tech. Bull. Cyprus Agric. Res. Inst, 1992; 142.

18. **Özturk, A.**: Akkaraman ve İvesi koyunlarının gebelik süresine bazı çevre faktörlerinin etkisi. Turk. J. Vet. Anim. Sci, 1994; 19: 449-452.

19. **Özturk, A., Aktas, A.H.**: Effect of environmental factors on gestation length in Konya Merino sheep. Small Rumin. Res, 1996; 22 (1): 85-88.

20. **Roda, D.O., Otto, P.A.**: Gestation period in Polwarth and Corriedale ewes. Anim. Breed. Abstr, 1992; 60: 648.

21. **Sahani, M.S., Chand, L.**: Studies on gestation periods of exotic karakul sheep and its crosses with native carpet wool sheep. Anim. Breed. Abstr, 1991; 59: 902.

22. **Shrestha, J.N.B., Heanay. D.P.**: Genetic basis of variation in reproductive performance. 2. genetic correlation between gestation length and prolificacy in sheep. Anim. Breed. Abstr, 1991; 59: 338.

23. **Toteda, F., Martemucci, G., Manchisi, A.**: Pregnancy duration sheep of different genotypes reared in Apulia. Archivio Veterinario Italiano, 1988; 39: 21-30.

24. **Trimnell, A.R., Osinowo, O.A., Olorunju, S.A.S., Buvenandran, V.**: Environmental effects on gestation length in Yankasa sheep. J. Anim. Prod. Res, 1988; 8: 33-38.

25. **Van Niekerk, B.D.H., Mulder, A.**: Duration of pregnancy and of post-partum anoestrus in autumn mated Dorper, Dohne Merino and Merino ewes. Proc. S. Afr. Soc. Anim. Prod, 1965; 4: 205–212