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RESEARCH ARTICLE

Determination of Pre-parturition and Post-parturition Behaviors of Norduz Goats

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Summary

The objective of this study was to determine of pre-parturition and post-parturition behaviors of Norduz Goats. Animal subjects consisted of 18 primiparous single-birth does aged 2-3 years. During the kidding time, the goats were recorded with digital video cameras for one hour pre parturition and 24 h post-parturition in order to register parturition traits. Twelve does (67%) gave birth while being recumbent and six (33%) while standing (P<0.01). The majority of kidding (n=12, 67 %) occurred between 12.00 -18.00 h, followed by 18.00-24.00 h (n=4, 22%) and 00.00-06.00 h (n=2, 11%). The majority of does (n= 83 %) accepted and nursed their kids after parturition; however, 3 does (17%) rejected their kids after parturition. Of those does who accepted their kids, 14 (93%) refrained from feeding throughout the observation period, whereas only 1 (7%) left her kid to feed during this period (1/15). The duration of parturition, the duration of placenta expulsion, the latency to first sniffing, the latency to first licking, the latency to first suckling, the duration of first suckling, the latency to first standing, and the duration of standing at the birth site were 21.99±2.49 min., 120.74±6.98 min., 0.64±0.39 min., 0.82±0.22 min., 22.65±2.37 min., 0.62±0.13 min., 17.50±2.42 min. and 4> hrs., respectively. These results clearly suggest that in Norduz goats the parturition behavior occurs within four hours after the parturition, and also Norduz goats are observed to be having a normal maternal behavior regarding with investigated behavioral characteristics

Keywords: *Norduz goat, Licking, Rejection, Behavior*

Norduz Keçilerinde Doğum Öncesi ve Doğrum Sonrası Davranışlarının Belirlenmesi

Özet

Bu çalışmanın amacı doğum öncesi ve doğum sonrası Norduz keçilerinde doğum davranışını belirlemek amacıyla yapılmıştır. Hayvan materyalini 18 tekiz doğuran Norduz keçisi (2-3 yaşlı) oluşturmuştur. Keçilerin doğum davranışları barınakta kurulan dört kamera ile kaydedilmiştir. Deneme materyali keçilerin %67'si (n= 12) yerde yatarak doğum yaparken %33'ü (n= 6) ayakta durur pozisyonda doğum yapmıştır (P<0.01). Norduz keçilerinde doğumların %67'si (n= 12) 12.00-18.00 arasında, %22'si (n= 24) 18.00-24.00 saatleri arasında %11'i (n=2) ise 00.00-06.00 saatleri arasında gerçekleşmiştir. Doğum sonrası 15 keçi (%83) yavrusuna ilgi göstermiş ancak 3 baş (%17) yavrusunu reddetmiştir. Yavrusunu kabul eden 15 baş keçiden 14'ü yem yeme davranışında bulunmazken sadece bir baş keçi yeme davranışı göstermiştir. Keçilerde doğum süresi, plasentanın atılma süresi, ilk koklamaya kadar geçen süre, ilk yalamaya kadar geçen süre, ilk emiştirmeye kadar geçen süre, ilk emiştirme süresi, oğlakların ayakta kalmasına kadar geçen sure ve doğum yerinde kalma süresi ortalamaları sırasıyla 21.99±2.49, 120.74±6.98, 0.64±0.39, 0.82±0.22, 22.65±2.37, 0.62±0.13, 17.50±2.42 dakika ve 4> saat olarak saptanmıştır. Bu sonuçlar tekiz doğuran Norduz keçilerinde doğum davranışının doğumdan sonra ilk dört saat içerisinde gerçekleştiğini ve aynı zamanda incelenen davranışsal özellikler bakımında normal bir analık davranışa sahip oldukları gözlemlendi.

Anahtar sözcükler: *Norduz keçi, Yalama, Reddetme, Davranış*

INTRODUCTION

The present production systems have limited the opportunity to exhibit natural maternal care behavior of livestock species making some manipulative changes, especially in semi-intensive or intensive commercial farms.

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In a plan of intensive livestock production system, however, it has been a vital issue to consider high standards of animal welfare and thus to develop the efficient management techniques which permit to exhibit the natural behavior requirements [1,2].

Goat is different from sheep an in terms of the organization of maternal care. The goat, called as "hider" species, leaves her offspring behind while grazing during the first few days after parturition. In pre-parturient period the goats tended to isolate themselves from its flocks for proper maternal care and bonding. For goats, the organization of maternal care is established within 4 h after parturition [3-6].

For mammals, although fertilization is an essential process, the ability to rear young is also a critical factor in this process. In fact, the presence of well-adapted maternal behavior at parturition is necessary for the survival of the newborn. Recently, pre-weaning mortality has been a growing problem in animal breeding worldwide, with the majority of deaths occurring during the neonatal or post-natal period. Abnormal parturition behavior in sheep and goats plays an important role in the post-parturition mortality of kids. Besides poor management systems, mis-mothering is the main cause of pre-weaning mortality. Improvements in management systems can reduce the likelihood of mismothering and improve survival rates among kids. In order to accurately assess the economic aspects of animal improvement programs, behavioral characteristics must be evaluated along with the other factors; however, little is known about the behavioral characteristics related to parturition behavior in goats. Knowledge of the material and topographic features of paddocks and the time periods during which births may be expected to occur are also important [7-9].

The aim of the present study was to determine behavioral characteristics of primiparous goats of Norduz (single-birth) one hour pre-parturition and four hour post-parturition pattern of goats.

MATERIAL and METHODS

The study was carried out on goat flock in the Yüzüncü Yıl University Faculty of Agricultural in Van, Turkey (38°29′ 39″N, 43°22′48″W). Eighteen primiparous Norduz goats (18 single-birth) were selected for the study. The pregnant does were housed as a single flock in a barn two weeks before the parturition and throughout the parturition period (about 25 does; minimum area: 1.5 m^2 per doe). Does were fed twice a day with alfalfa and barley mixture, and given to access the water (at 08.00 and 14.00). All does were permitted to choose their own parturition sites within the barn in which they were normally housed and to remain there throughout the experiment. At the same time, does and their kids were permitted to remain together throughout the observation period. Digital video cameras (Sony Super Had CCD, 3.5-8 mm 1:1/4 lens) were placed in all four corners of the barn in order to provide a full, continuous view of all animals throughout the experiment. Images were transferred to computers and recorded on DVD. The video cameras were recorded continuously for 24 h, but we only evaluated during one h pre-parturition and at 4 h post-parturition for behavior parameters examined. The parturition behavior of Norduz goats was evaluated according to Ramírez et al.[10], Romano and Piaggoi [11] and Martinez et al.[9]. These parturition behaviors were the birth shape (%), the time of birth (%), the rejection (%), the eating (%), the licking (%), the duration of parturition (min), the duration of placenta expulsion (min), the latency to first sniffing (min), the latency to first licking (min), the latency to first suckling (min), the duration of first suckling (min), the latency to first standing (min) and the duration of stay at birth site (h), respectively.

Data was analyzed using the SAS [12] statistical software program, with the two-proportion Z test used to make comparisons between the groups.

RESULTS

The behavioral characteristics of Norduz primiparous does in pre-parturition are shown in *Table 1*. Twelve single-birth does (67%) gave birth while recumbent, the remaining six (33%) gave birth standing. There is significant differences regarding the shape of birth (P<0.01). Also, we found that in Norduz primiparous does a large proportion of kidding occurred between 12.00 and 18.00 h, with the lowest percentage occurring between 00.00 and 06.00 h.

Table 1. *Behavioral characteristics of Norduz goats during parturition*
Tablo 1. *Doğum sırasında Norduz keçilerinde davranışsal özellikler*

Behavioral Characteristics	**%**
Birth shape	
Recumbent %	67 (12)[a]
Standing %	33 (6)[b]
Time of birth	
12.00-18.00 h	67 (12/18)[a]
18.00-24.00 h	22 (4/18)[b]
00.00-06.00 h	11 (2/18)[b]
Rejection (%)	17 (3/18)
Eating (%)	6 (1/15)
Licking	
Head (%)	57 (8/15)[a]
Genital area (%)	36 (5/15)[a]
Rest of body (%)	7 (2/15)[b]

[a,b] The differences among the values for every behavior characteristic are statistically important (P<0.01)

The 22% of Norduz primiparous does were kidded between 18.00 and 24.00 h (P<0.01).

At the same time, fifteen single-births does accepted their kids after parturition, and nursed near to their kids throughout observation while three single-births does (3/18) rejected their kids after the parturition. Fourteen single -births does accepting their kids did not eat throughout the observation, and stayed near their kids at postpartum, whereas only one doe ate (1/15).

The behavioral characteristics of Norduz primiparous does pre parturition are shown in *Table 1*. The areas of the newborns' bodies were divided to evaluate the place of licking, where does first directed their actions, like the head, the genital area, the rest of body. The licking of head, the genital area, the rest of body in Norduz primiparous does were 57%, 36%, and 7%, respectively (P<0.01). All Does mainly directed to their kids' head immediately after birth, except for the rejections.

The behavioral characteristics of Norduz primiparous does pre parturition are shown in *Table 2*. The duration of parturition, the duration of placenta expulsion, the latency to first sniffing, the latency to first licking, the latency to first suckling, the duration of first suckling, the latency to first standing, and the duration of standing at the birth site were 21.99±2.49 min, 120.74±6.98 min, 0.64±0.39 min, 0.82±0.22 min, 22.65±2.37 min, 0.62±0.13 min, 17.50±2.42 min and 4> h, respectively.

occurred between 11.00-16.00 hr; Boch et al.[14] reported that goat parturition to have an unmodal distribution, with 90.6% of deliveries occurring between 06.00-20.00 h, the majority at midday and the fewest at around midnight; Das and Tomer [15] found that 80% of births occurred between 06.00-1800 h, with a major peak at about 16.00 h; Yamin et al.[16] reported that Angora goats give birth more frequently during daylight hours; and Romano and Piaggio [10] found that 78% of births occurred during daylight hours, with 65.7% occurring between 09.00-17.00 h (P<0.01). In contrast to these findings, Stevens [17] and George [18] found that 28% and 20%, respectively, of births occurred during daylight hours, and Lindahl [19] found no significant differences in the percentage of births occurring during the day (06.00-18.00 h) and night (18.00-06.00 h) (45.6% and 54.4%, respectively; P>0.05).

The majority of does (n=15, 83%) accepted and nursed their kids after the parturition, 3 does (17%) rejected their kids after the parturition. Of those does who accepted their kids, 14 (93%) refrained from feeding throughout the observation period, whereas 1 doe (7%) left her kid to feed during this period (1/15). First licking was directed primarily at the head (57%), followed by the genitals (36%) and the remainder of the body (7%), with the differences between areas of first licking statistically significant (P<0.01). With the exception of those does that rejected their kids, licking was directed mainly at the head of the kid immediately after birth. Licking is known to stimulate the respiratory system,

Table 2. *Parturition-related characteristics of primiparous Norduz goats*
Tablo 2. *Tekiz doğuran Norduz keçilerinde doğumla ilgili özellikleri*

Behavioral Characteristics	n	X±Sx	Minimum	Maximum
Duration of parturition, min	18	21.99±2.49	8.10	43.00
Duration of placenta expulsion, min	18	120.74±6.98	33.50	158.0
Latency to first sniffing, min	16	0.64±0.39	0.05	6.40
Latency to first licking, min	15	0.82±0.22	0.05	6.40
Latency to first suckling, min	15	22.65±2.37	11.12	43.15
Duration of first suckling, min	15	0.62±0.13	0.08	1.62
Latency to first standing, min	18	17.50±2.42	7.12	50.27
Duration of stay at birth site, h	15	4>	-	-

DISCUSSION

In this study, the majority of does (n=12, 67%) gave birth while recumbent, whereas the remaining does (n=6, 33%) gave birth standing. The difference in birth posture was statistically significant (P<0.01). These findings were in line with those of Ramírez et al.[10], who reported most goats birthed while lying down (73%). The majority of kidding in primiparous goats (n=12, 67%) occurred between 12.00-18.00 h, followed by 18.00-24.00 h (n=4, 22%) and 00.00-06.00 h (n=2, 11%). Differences in the time of kidding were statistically significant (P<0.01). Lickliter [13] found 72%of births

thereby facilitating breathing; to help removing the fetal membrane; and to stimulate peripheral blood circulation of the kid following birth. The phenomenon of licking in goats has been outlined in numerous studies [10,13,20]. In contrast to small ruminant animals, Owens et al.[21] found that the majority of cows (21/23) start licking their calves near the abdomen and sides, paying particular attention to breaking the umbilical cord. In sum, Norduz goats exhibited highly developed maternal behavior, in general caring exclusively for their offspring in the period immediately following birth, and most births occurred during day time and the birth shape was lying down.

The present study found the mean duration of parturition in Norduz primiparous does to be 21.99±2.49 min. This value was similar to the value given in Das and Tomer [15] for Beetal does (10-30 min), but lower than that given by Martinez et al.[9] for Murciano Granadina goats (60.48 mean). The differences between study findings may be due to differences in contraction times. In the present study, the mean duration of placenta expulsion was 120.74±6.98 min (minimum: 33.50 min; maximum: 158.0 min) *(Table 2)*. Although Das and Tomer [15] reported a lower mean value (49 min) for complete expulsion of the placenta, their finding is within the range of minimum and maximum values found in the present study.

Immediately following birth, does in this study typically stood up, turned around and began vigorously sniffing and licking their kids. First sniffing was observed to occur immediately after birth (0.64±0.39 min). This finding is similar to that of Martinez et al.[9], who found a value of 47.86 s for first sniffing, and to Lickliter [12], Sambraus and Wittmann [20] and Malfatti et al.[22], who indicated that sniffing and licking commenced immediately following parturition in small ruminants. However, this finding differed from that of Ramírez et al.[10], who found a latency of 8.7±0.8 min for first sniffing among single-birth does. In fact, in our study, the range of latency to first licking varied widely from 0.05 min to 6.40 min. In the present study, latency to first licking was 0.82±0.22 min and occurred immediately after first sniffing. Latency to first licking was shorter than in Ramírez et al.[10], who reported a time of 13.3±1.0 s. for single-birth kids, but longer than Martinez et al.[9], who reported latency to first licking to be 98.61 s. In general, the findings of this study regarding suckling are in line with those of other authors [12,19,21]. Most kids in this study (15 of 18) were able to suckle during the first hour post-partum; however, three kids were rejected by their mothers and were unable to suckle.

Mean latency to first suckling was 22.65±2.37 min. This finding is in contrast to Martinez et al.[9], who reported 37.32 min to mean suckling for single-birth kids. Duration of first suckling in the present study was 0.62±0.13 min, which is similar to that of Sambrauss and Wittmann [20], who reported the duration of first suckling to be 0.63 min, but it differs from Ramírez et al.[10] and Martinez et al.[9], who reported shorter durations for first suckling. In line with Ramírez et al.[10]and Martinez et al.[9], all kids in the present study succeeded in standing during the first hour of life. Mean latency to first standing of kids in the present study was 17.50±2.42 min, which is similar to the findings for single-birth kids reported by Martinez et al.[9], Sambrauss and Wittmann [20] and Ramírez et al.[10], who observed latency to standing to be 16.87 min, 18.7 min and 19.37 min, respectively. In addition, with the exception of the 3 does who rejected their kids, the does in this study did not leave their kids during the 4-hour post-partum observation period. This finding is important in terms of the bond developed between mother and kid.

In conclusion, in pre-parturient period Norduz goats isolated from themselves their flocks and most births occurred during day time, and the birth shape was lying down. Consistent with findings of other studies, the maternal care was established immediately following the birth. Immediately following the birth, does in this study typically stood up, turned around and began vigorously sniffing and licking their kids, and thus within 4 h after the parturition all postnatal behaviors evaluated except for the duration of standing at the birth was developed. Especially, in intensive selected populations, ability of parturition behavior shows an increasing decrease and causes seriously the lost of economic in developed countries using modern production systems. Therefore, in intensive production system planning based on natural behavioral characteristics of domestic animals, producers should be considered the selection related to maternal behavior because domestication decrease the ability of maternal behavior.

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REFERENCES

1. Miranda-dela L, Mattiello GC: The importance of social behavior for goat welfare in livestock farming. *Small Rumin Res,* 90, 1-10, 2010.

2. Arslan C: İneklerde beslenme davranışları. *Kafkas Univ Vet Fak Derg,* 15 (4): 641-648, 2009.

3. Addae PC, Awotwi EK, Oppong-Anane K, Oddoye EOK: Behavioural interactions between West African dwarf nanny goats and their single-born kids during the first 48 hours post-partum. *Appl Anim Behav Sci,* 67, 77-88, 2000

4. Poindoron P: Mechanisms of activation of maternal behavior in mammals. *Reprod Nut Dev,* 45, 341-351, 2005.

5. Poindoron P, Terrazas A, Navarro Montes de Oca ML, Serafin N, Hernández H: Sensory and physiological determinants of maternal behavior in the goat *(Capra hircus). Hormones and Behavior,* 52, 99-105, 2007.

6. Poindoron P, Levy F, Keller M: Maternal responsiveness and maternal selectivity in domestic sheep and goats: The two facets of maternal attachments. *Developmental Psychobiology,* 49, 54-70, 2007.

7. Awemu EM, Nwakalor LN, Abubakar BY: Environmental influence on preweaning mortality and reproductive performance of Red Sokoto does. *Small Rumin Res,* 34, 161-165, 1999.

8. Mellor DJ, Stafford KJ: Animal welfare implications of neonatal mortality and morbidity in farm animals. *Vet J,* 168,118-133, 2004.

9. Martinez M, Otal J, Ramírez A, Hevia ML, Quiles A: Variability in the behavior of kids born of primiparous goats during the first hour after parturition: Effect of the type of parturition, sex, duration of birth, and maternal behavior. *J Anim Sci,* 87, 1772-1777, 2009.

10. Ramírez A, Quiles A, Hevia M, Sotillo F: Behavior of Murciano-Granadino goat in the hour before parturition. *Appl Anim Behav Sci*, 44, 29-35, 1998.

11. Romano JE, Piaggio J: Time of parturition in Nubian goats. *Small Rumin Res,* 33, 285-288, 1999.

12. S.A.S: User's Guide: Statistics. SAS Inst. Inc., Cary, NC, 2010.

13. Lickliter RE: Bahviour associated with parturition in the domestic goat. *Appl Anim Behav Sci,* 13, 335-345, 1985.

14. Bosc M, Guillimin P, Bourgy G, Pignon: Hourly distribution of time of parturition in the domestic goat. *Theriogenology*, 30, 23-33, 1988.

15. Das N, Tomer OS: Time pattern on parturition sequences in Beetal goats and crosses: Comparison between primiparous and multiparous does. *Small Rumin Res,* 26, 157-161, 1997.

16. Yamin M, Payne G, Blackshaw JK: The Time of birth and the choice of birth sites by Booroola Merino ewes and Angora goats. *Appl Anim Behav Sci*, 45, 89-96, 1995.

17. Stevens D, Alexander G, Lynch JJ: Do Merino ewes seek isolation or shelters at lambing? *Appl Anim Etiology*, 17, 149-155, 1981.

18. George JM: Variation in the time of parturition of Merino and Dorset Horn ewes. J Agri Sci (Camb.): 73, 295-299, 1969.

19. Lindahl IL: Time of parturition in ewes. *Anim Behav,* 12, 231-234, 1964.

20. Sambrauss HH, Wittmann M: Beoachtungen zu geburtsabrauf and saugverhalten von ziegen. *Tierarztl Prax,* 7, 359-365, 1989.

21. Owens JL, Edey TN, Bindon BM, Piper LR: Parturient behavior and calf survival in a herd selected for twinning. *Appl Anim Behav Sci,* 13, 321-333, 1985.

22. Malfatti A, Lucaroni A, Debenedetti A: Behaviour associated with parturition in the domestic goat. *Appl Anim Behav Sci,* 30, 191, 1991.