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The effect of age, lactation number, sex and birth type on suckling and nursing behaviour of Karayaka lambs

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Abstract. This study has been conducted on a specific sheep breed named Karayaka that is raised in Turkey. The purpose is to determine the effects of age, sex, birth type, and lactation number on suckling and nursing behaviour, and to find out at which week the lambs are normally weaned. Also, different numbers of lactations and characteristic behaviours such as suckling duration per hour, suckling duration per bout, suckling frequency and rejection frequency have been observed on 24 sheep and 32 lambs for 9 weeks. Another observation is that lambs' age and number of lactations has a noteworthy effect on suckling duration per hour, suckling duration per bout, suckling frequency and rejection frequency ($P < 0.001$), and also that aging of lambs increased rejection frequency. Moreover, it has been determined that birth type has a significant effect on suckling and nursing behaviours, such as single lambs experiencing a longer suckling duration per bout than twins ($P < 0.01$). Besides, twins experienced longer suckling durations per hour and suckling frequency and rejection frequency were greater in comparison to single lambs ($P < 0.001$). The study shows a significant effect of sex on suckling duration per bout ($P < 0.05$) while the other suckling and nursing behaviours are not affected at all ($P > 0.05$). As a conclusion, age, birth type and lactation have a significant effect on suckling and nursing behaviours, and by the 7th week no suckling no nursing behaviour changes have been observed. Therefore, Karayaka lambs can normally be weaned by the 7th week.

Keywords. Karayaka lamb – Suckling behaviour – Rejection frequency – Weaning.

L'effet de l'âge, du nombre de lactations, du sexe et du type de naissance sur l'allaitement et le comportement maternelle chez les agneaux Karayaka

Résumé. Cette étude a été menée pour déterminer les effets du nombre de lactations, du sexe, du type de naissance et de l'âge des moutons et des agneaux sur certains comportements de succion et d'allaitement chez les agneaux Karayaka élevés en Turquie. Dans cette étude, la longueur du circuit de succion, la durée de succion par heure, la fréquence de succion et la fréquence de rejet par la mère ont été observées au cours de 9 semaines chez 24 moutons et chez 32 agneaux. On a déterminé que l'âge de l'agneau et le numéro de lactation sont efficaces ($P < 0,001$) sur la durée du circuit de succion, la durée de la période de succion, la fréquence de succion et sur l'incidence de rejet par la mère. En outre, on a déterminé que le type de naissance est important sur les propriétés de succion et d'allaitement maternel et la durée de succion est plus longue chez les agneaux uniques par rapport aux jumeaux ($P < 0,001$). De plus, la durée de succion par heure, la fréquence de succion et la fréquence de rejet par la mère sont plus élevées chez les jumeaux que les agneaux uniques ($P < 0,001$). L'effet du sexe sur la durée du circuit de succion est significatif ($P < 0,05$), tandis qu'il est non significatif sur les comportements de succion et d'allaitement ($P > 0,05$). Par conséquent, l'âge, le type de naissance et la lactation sont importants sur les comportements de succion et d'allaitement et on a déterminé que les comportements de succion et d'allaitement ne changent pas à partir de la 7ème semaine. A cause de cela on a raisonné que les agneaux Karayaka sont enclins pour le sevrage à partir de la 7ème semaine.

Mots-clés. Agneau Karayaka – Comportement d'allaitement – Fréquence du rejet – Sevrage.

I – Introduction

The Karayaka sheep is a native, dominant breed in the mid Black Sea region in Turkey and it consists 3% of the Turkish sheep population. The Karayaka breed whose meat and offspring yields are low, is primarily raised to produce meat because of its high meat quality (Olfaz *et al.*, 2005). Karayaka with 100-140 days of lactation period, 30-45 kg of milk yield, and 35-40 kg of live weight, has lower milk yield than the other breeds in Turkey (Akçapınar, 2000).

In farm management, offsprings are separated from their mothers abruptly at a relatively young age, before natural weaning occurs. This management policy ensures an earlier reproductive cycles in mothers and in this way the number of offspring per stud increases. However, the early separation of offspring results in the interruption of social bond between the mother and her offspring. The lack of maternal care may increase the risk of diseases and death, resulting in a need for additional care by humans (Panksepp, 2003; Dawkins, 2006; Houpt and Wolski, 1982).

The frequency and duration of suckling change, as the lamb grows up. The mother allows the lamb to suckle as often and willingly after post partum at the first week, but later suckling pattern is controlled by the mother by moving away the lamb during feeding or attempting to do so (Novak *et al.*, 2008). The precise timing of weaning becomes a problem for both mother and offspring (Trivers, 1974). When offspring attempts to extend the suckling period, the mother attempts to stop it.

High milk yield is important in terms of economic significance and nutrition of the lamb. The highest level of milk production in ewe is during the lamb suckling period. In ewes with low milk yield, a decrease in milk production occurs at the end of 6-7 weeks of lactation and this is followed by weaning. In the determination of weaning time the behaviour characteristics of lambs also should be taken into consideration in addition to the decrease in the amount of milk. Behavioral characteristics are one of the defining features in the improvement of the animal husbandry and are related to herd management practices in terms of increasing the effectiveness (Yakan *et al.*, 2007). Behavioral characteristics can be used as an indicator of organism function, and in this sense can be read directly related to behavior (Orgeur *et al.*, 1998).

This research was conducted to determine effects of age, lactation number, sex and birth type on suckling and nursing behaviours of Karayaka lambs and to find out the most suitable period for weaning.

II – Materials and methods

This study was conducted in a private farm in Tekkeköy, Samsun, 41° 12' N and 36° 27' E, located 380 m above sea level with an average annual rainfall of 800 mm and temperature of 21°C. The study was carried out from January to March in 2010. In this study, 24 sheep and 32 lambs were used at 1st, 2nd and 3rd lactation numbers.

The sheep and lambs were numbered by spray paint so they can be observed clearly from everywhere. The lambs were held together with their mothers during first 3 days after birth. Then they were separated from their mothers and taken to another fold. In the study, sheep and lambs were observed twice a week (on Tuesdays and Thursdays) between 15:00 and 18:00 h during 9 weeks in order to record the suckling and nursing behaviours. The lambs were gathered in the pens where they suckle everyday so they can be observed. A pen was placed out of the fold whom upper side was open and dimensions were 10 m x 10 m. Behaviour features of lambs in the pens were recorded by the help of a digital video camera that was placed 4 m high from the floor. The lambs were separated from their mothers and taken to the

sections in the fold after suckling ended. Suckling duration per bout, suckling duration per hour, suckling number of frequencies and rejection number of frequencies were observed and Berger's method was used in the study (Berger, 1979).

The conditions provided during the nutrition of sheep and lambs were same. Ad libitum dry clover, 100 g concentrate feed per lamb, free access water and a mineral lick were given to lambs. The content of the concentrate feed was 26% sunflower meal, 21% barley, 19% corn, 13.5% wheat, 8.3% soybean meal, 6.5% maize bran, 2.5% molasses, 1.8% marble powdered, 0.8% plant oil, 0.5% salt, and 0.1% vitamins/minerals. In addition to them, corn silage was given to sheep.

Statistical analysis: All statistical analyses were performed using the SPSS 10.0 statistical package. The differences among groups were tested by analysis of variance and Duncan test.

III – Results and discussion

The effect of lactation number, sex, birth type and the age on some suckling and nursing behaviours of the lambs are shown at Table 1. It is determined that the effect of age is significant on suckling duration per bout, suckling duration per hour, suckling frequency and rejection frequency ($P < 0.001$). Suckling duration per bout, suckling duration per hour, suckling frequency of the lambs decrease until 7th week, then these values stay constant, while the rejection frequency increases up to 7th week and after 7th week it stays constant. As a result of this fact it can be thought that the milk yield decreases and the nutrition of the lamb isn't enough provided by mother during the first 7 weeks because of the decrease in suckling duration per hour and suckling frequency and the increase in the rejection frequency. Akçapınar (2000) determined that the amount of milk decreased in ewes with low milk yield around 6-7 weeks of lactation. In studies where suckling and nursing behaviours were examined in sheep, Ewbank *et al.* (1964; 1967) and in Tokaro goats, Bungo *et al.* (1998) showed that as the lamb or kid grew up, suckling duration per bout, suckling duration per hour and suckling frequency decreased.

In this study it is determined that suckling duration per bout ($P < 0.001$), suckling duration per hour ($P < 0.001$), suckling frequency ($P < 0.01$), and rejection frequency ($P < 0.001$), are affected by the number of lactation greatly. It is observed that the mothers at first lactation allow their lambs to suckle longer than during the second and third lactation. In other words, in mothers at first lactation, suckling frequency, suckling duration per bout, suckling duration per hour were longer when compared with other lactations although it was just the opposite for rejection frequency. The reason of more rejection frequency after first post partum period may be due to the inexperienced mother when compared with subsequent post partums.

It is observed that the effect of sex of the lamb was significant in only suckling duration per bout ($P < 0.05$) while the other features' effect was insignificant. The suckling frequency, suckling duration per bout, suckling duration per hour of female lambs tended to be longer than the male lambs. Some of the researchers (Cameron *et al.*, 1999; Ronald *et al.*, 1999; Pluhacek *et al.*, 2010) examined the suckling duration per bout of different animals and determined that suckling duration per bout of females were longer than the males as in this study.

It was observed that the effect of birth type on suckling duration per bout, suckling duration per hour and rejection frequency were significant ($P < 0.01$). Besides it was determined that single lambs suckled longer per bout than twins, while suckling durations per hour were shorter and suckling frequency were less than the twins. Rejection frequency of twin lambs were more than the singles. The results of some researchs (Birgersson *et al.*, 1994; Hafez and Hafez, 2000) about suckling frequency and suckling duration of both single and twin lambs were similar to the results of this research.

The suckling frequency and suckling duration per hour of single lambs were shorter in this study. The single lambs have less suckling frequency and shorter suckling duration per hour while the twins have longer suckling duration per bout.

Table 1. The effect of age, lactation number, sex and birth type on some suckling and nursing behaviours of the lambs (Mean ± S.E.)

Characteristics	Suckling duration per bout (s)	P value	Summed duration per hour (s / h)	P value	Suckling frequency for 3 h	P value	Rejection frequency for 3 h	P value
Age of lambs (weeks)	N	***	N	***	N	***	N	***
1	32 20.01 ± 0.26 ^a		32 83.33 ± 1.34 ^a		32 12.90 ± 0.23 ^a		32 4.07 ± 0.29 ^a	
2	32 13.91 ± 0.26 ^b		32 37.36 ± 1.34 ^b		32 8.46 ± 0.23 ^b		32 7.39 ± 0.29 ^b	
3	32 11.46 ± 0.26 ^c		32 28.24 ± 1.34 ^c		32 7.62 ± 0.23 ^c		32 8.43 ± 0.29 ^c	
4	32 9.88 ± 0.26 ^d		32 24.05 ± 1.34 ^d		32 7.43 ± 0.23 ^c		32 9.31 ± 0.29 ^c	
5	32 6.92 ± 0.26 ^e		32 13.02 ± 1.34 ^e		32 5.58 ± 0.23 ^d		32 11.76 ± 0.29 ^d	
6	32 6.01 ± 0.26 ^f		32 10.46 ± 1.34 ^{ef}		32 5.40 ± 0.23 ^d		32 11.76 ± 0.29 ^d	
7	32 4.83 ± 0.26 ^g		32 7.33 ± 1.34 ^{fg}		32 4.71 ± 0.23 ^e		32 12.38 ± 0.29 ^{de}	
8	32 4.38 ± 0.26 ^g		32 6.21 ± 1.34 ^g		32 4.49 ± 0.23 ^e		32 13.02 ± 0.29 ^e	
9	32 4.17 ± 0.26 ^g		32 6.30 ± 1.34 ^g		32 4.71 ± 0.23 ^e		32 12.89 ± 0.29 ^e	
Lactation No.		***		**		**		***
1	8 9.53 ± 0.15 ^a		8 25.65 ± 0.80 ^a		8 7.01 ± 0.14 ^a		8 11.02 ± 0.17 ^a	
2	9 8.97 ± 0.13 ^b		9 22.34 ± 0.71 ^b		9 6.49 ± 0.13 ^b		9 9.72 ± 0.15 ^a	
3	7 8.68 ± 0.16 ^b		7 24.11 ± 0.85 ^{ab}		7 6.93 ± 0.15 ^a		7 9.60 ± 0.12 ^b	
Sex		*		NS		NS		NS
Male	14 8.86 ± 0.14		14 23.46 ± 0.73		14 6.76 ± 0.13		14 9.98 ± 0.15	
Female	18 9.27 ± 0.11		18 24.61 ± 0.57		18 6.86 ± 0.99		18 10.24 ± 0.12	
Birth Type		***		***		***		***
Single	16 10.19 ± 0.12		16 20.67 ± 0.65		16 5.15 ± 0.11		16 9.98 ± 0.15	
Twin	16 7.93 ± 0.12		16 27.39 ± 0.65		16 8.47 ± 0.11		16 10.24 ± 0.12	

*P<0.05; **P<0.01; ***P<0.001. NS: No significance P>0.05.

Different superscripts indicate significant difference P<0.05.

IV – Conclusions

In conclusion, the study showed that number of lactation, birth type, and age of the lamb was affected by suckling duration per bout, suckling duration per hour, suckling frequency and rejection frequency. However, it was determined that suckling duration per bout of female lambs was longer than the males. Moreover, suckling duration per bout, suckling duration per hour, suckling frequency decreased towards the seventh week post partum, and on the other hand rejection frequency increased. After the seventh week, all these values stayed constant. This result showed that the amount of milk began to decrease and the nutrition of the lamb became insufficient approximately at seventh week. As a result, it was thought that the most appropriate period for weaning age of Karayaka lambs might be nearly the seventh week after post partum.

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