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THE ROLE OF ACCUMULATED FEEDING EFFECT OVER THE CONFLICT FEEDING BEHAVIOUR OF DAIRY EWES OF DIFFERENT AGES

Zhana Peeva, Ivan Dimitrov, Milena Mihaylova, M. Dzhorbineva

Agricultural Institute – Stara Zagora, Bulgaria
janant24@abv.bg

The purpose of this study was to establish the role of accumulated feeding effect over the conflict feeding behavior in dairy ewes of different ages. The conflict feeding behaviour expressed during the rack feeding was recorded in 40 ewes from the Synthetic Bulgarian Dairy Population of different age, respectively at I-st (two years old), II-nd, III-rd and IV-th lactation (five years old), each represented by 10 animals, reared all together in a flock of 250 dairy sheep. The social conflict activity during feeding was recorded in the experimental animals that have been fed firstly by intensive grazing at pasture (for three hours) and then consequently by limited amounts of bulky feed – alfalfa, for 30 minutes in five consecutive days. All animals were betting on average 1 kg green alfalfa and secured front of 50 cm per sheep. The following behavioural reactions during feeding were recorded such as number of conflicts – won and lost. It was established that feeding with restricted amounts of bulky forage after intensive grazing of three hours (accumulated feeding effect) caused conflicts between ewes of different ages. The sheep of two years age (I-st lactation) have been the most passive animals in taking place for the first twenty minutes of feeding. Ewes of this age have lost most frequently the conflicts during feeding and for this reason had less feeding time in comparison with other ages, in spite of the accumulated feeding effect. Animals of all ages have revealed similar conflict feeding behaviour over the last ten minutes of feeding.

Key words: feeding behaviour; conflicts; accumulated feeding; age; dairy sheep

УЛОГАТА НА АКУМУЛИРАНИОТ ЕФЕКТ НА ИСХРАНАТА ВРЗ КОНФЛИКТНОТО ОДНЕСУВАЊЕ ПРИ ИСХРАНА НА МЛЕЧНИ ОВЦИ НА РАЗЛИЧНА ВОЗРАСТ

Целта на ова истражување беше утврдување на улогата на акумулираниот ефект на исхраната врз конфликтното однесување при исхрана на млечни овци од различна возраст. Конфликтното однесување при хранењето, изразено за време на исхраната на јасли, беше забележано кај 40 овци од бугарската синтетичка млечна популација на различна возраст, односно во првата (две години стари), втората, третата и четвртата лактација (пет години стари), секоја возраст претставена од 10 животни одгледувани сите заедно во стадо од 250 млечни овци. Социјалната конфликтна активност за време на хранењето беше евидентирана кај експерименталните животни кои беа претходно хранети со интензивно напасување (за време од три часа) и потоа со лимитирани количини луцерка 30 минути во 5 последователни дена. Сите животни добиваа во просек по 1 kg зелена луцерка и обезбеден преден дел на јасла од 50 см по овца. Беа контролирани следните реакции во однесувањето за време на хранењето: број на конфликти – добиени и изгубени. Утврдено е дека хранењето со намалени количини складирана сенажа по интензивно напасување од три часа (акумулиран хранителен ефект) предизвикува конфликти помеѓу овците на различна возраст. Овците на возраст од две години (прва лактација) беа најпасивните животни во заземањето на место во првите 20 минути од хранењето. Овците од оваа возраст најчесто ги губеа конфликтите за време на хранењето и од оваа причина имаа помалку време за хранење во споредба со другите возрасни групи, без оглед на акумулираниот хранителен ефект. Животните од сите возрасни групи покажуваа слично конфликтно однесување при исхраната за време на последните 10 минути од хранењето.

Клучни зборови: однесување при хранење; конфликти; акумулирано хранење; возраст; млечни овци

INTRODUCTION

The feeding motivation is defined by the complex interaction between the external stimuli (palatability of the food) and the internal physiological state (metabolite stimuli, energy deficit). The tendency to seek food may be of similar inten-

sity whether due to high motivation for feeding in the absence of food or low motivation for feeding in the presence of food (Forbes, 1995). There are mechanisms of brain reward causing pleasure from the feeding behaviour (hedonic behaviour), which are in competitive relations with the physiological factors controlling consumption (Spruit et al., 2001). The palatability of the food can stimulate to some extent the pleasure from its consumption (Baumont, 1996). The pleasure of feeding behaviour explains the exceptional intake of good quality food by sheep fed ad libitum (Baumont et al., 1997). The sensory motivation induced by a second distribution of fresh hay will override the satiety signals associated with the first distribution (Baumont et al., 1990b). However, the size of the second meal depends on the relative palatability of the two hays distributed. Sheep satiated with low-quality meadow hay will eat 400 g of lucerne hay. However, they are reluctant to eat meadow hay when satiated with lucerne. In goats, hedonic behaviour may explain why they make refusals even when this selectivity prevents them meeting their energy requirements (Morand-Fehr et al., 1991b).

The age plays an important role in defining the social position in ruminants (Cummins and Myers, 1991; Kabuga, 1992a,b; Veissier et al., 1992; Boissy et al., 1998). A negative correlation between aggressive behaviours and live space has been established in calves (Kondo et al. 1989). Regrouping and mixture of animals of different ages is a common practice in modern dairy management. There is a lack of investigations on the conflict feeding behaviour in sheep of different ages.

The aim of this study is to establish the role of the accumulated feeding effect on the conflict feeding behaviour of dairy ewes of different ages.

MATERIAL AND METHODS

The conflict feeding behaviour expressed during the rack feeding was recorded in 40 ewes from the Synthetic Bulgarian Dairy Population of different ages, respectively at I-st (two years old), II-nd, III-rd and IV-th lactation (five years old), each represented by 10 animals, reared all together in a flock of 250 dairy sheep. The social conflict activity during feeding was recorded in the experimental animals that have been fed firstly by intensive grazing at pasture (for three hours) and then consequently by limited amounts of bulky feed – green alalfa, for 30 minutes in five consecutive days (temperature between 20 and 24^0 C, and humidity – 60%). All animals were betting on average 1 kg green alfalfa and secured front of 50 cm per sheep. The following behavioural reactions during feeding were recorded such as number of conflicts – won and lost. Observations were made of three observers – each recorded a certain segment of the food area. The experimental animals were marked with serial numbers on the back so that observers could easily recognize the sheep from a distance. The feeding was done on the yard in front of the main building on an area of $700m^2$ where the animals were normally reared.

Data from the observations were statistically processed by ANOVA. To determine, the differences in temperament between the relevant parameters a degree of accuracy when $P < 0.05$ was chosen.

RESULTS AND DISCUSSION

The aim of this study was to establish the role of the accumulated feeding effect over the conflict feeding behaviour in dairy ewes of different ages.

The conflict feeding behaviour in dairy ewes of different ages during the first ten minutes period of green alfalfa rack feeding (after intensive grazing of three hours) can be seen on the Table 1. The five yea old sheep (IV^{th} lactation) have won 3.1 ± 0.4 conflicts with different sheep while approaching the nearest and the best places for feeding.

The number of conflicts that have been won by the two year old sheep (Ist lactation) was 1.8 ± 0.3, as a statistical significant difference was found at $P < 0.05$. Ewes of the third lactation have won 3.0 ± 0.4 conflicts and a significant difference at $P < 0.05$ between I/III lactation was found. Significant differences between feeding activity of the remaining groups of ages were not established.

It has been registrated less number of conflicts – lost during the first ten minutes of feeding, varying between 0.9 ± 0.2 in the ewes of IV-th lactation and 2.0 ± 0.3 in those of I-st lactation. The differences between I/III – $P < 0.05$; I/IV – $P < 0.01$ were very well contrasted. It was not established a significant difference between the feeding activity of the remaining groups of ages.

The number of conflicts – won during the first ten minutes of feeding of green alfalfa was progressively increasing over the ages. The most active in their feeding behaviour were the sheep of the third and the fourth lactation. Ewes of these

groups of ages had less conflicts – lost during feeding in spite of the decreased feeding motivation. Ewes of the first lactation had significantly less conflicts – won and more conflicts – lost in comparison with those of III-rd and IV-th lactation. Sheep of this group of age had more changes of the feeding place than those of III-rd and IV-th lactation. As a result of the accumulated feeding effect, sheep revealed less conflict behaviours in comparison with their feeding behaviour without pasture (Peeva et al., 2009). Nevertheless, the ad libitum consumption of green grass, the availability of enough green alfalfa quantity and sufficient feeding front did not prevent from conflict feeding behaviour.

Table 1

Conflict feeding behaviour in dairy ewes of different ages during the first ten minute period of green alfalfa rack feeding (after intensive grazing of three hours)

Behaviours	2 years old (I-st lactation) $n = 10$ $x \pm Sx$	3 years old (II-nd lactation) $n = 10$ $x \pm Sx$	4 years old (III-rd lactation) $n = 10$ $x \pm Sx$	5 years old (IV-th lactation) $n = 10$ $x \pm Sx$	td
Number of conflicts – won	1.8 ± 0.3	2.8 ± 0.4	3.0 ± 0.4	3.1 ± 0.4	I/III-P < 0.05; I/IV-P < 0.05;
Number of conflicts – lost	2.0 ± 0.3	1.4 ± 0.3	1.0 ± 0.2	0.9 ± 0.2	I/III-P < 0.05; I/IV-P < 0.01;

Table 2 shows the conflict feeding behaviour in dairy ewes of different ages during the second ten minute period of green alfalfa rack feeding (after intensive grazing of three hours).

It can be seen from the table that the overall feeding activity of the four groups of ages was decreased in comparison with the first ten minute period of feeding. Contrasts between different ages progressively decreased. Differences between I/IV, at $P < 0.05$ in the two parameters (number of conflicts – won and conflicts – lost) remained statistically significant.

Table 2

Conflict feeding behaviour in dairy ewes of different ages during the second ten minute period of green alfalfa rack feeding (after intensive grazing of three hours)

Behaviours	2 years old (I-st lactation) $n = 10$ $x \pm Sx$	3 years old (II-nd lactation) $n = 10$ $x \pm Sx$	4 years old (III-rd lactation) $n = 10$ $x \pm Sx$	5 years old (IV-th lactation) $n = 10$ $x \pm Sx$	td
Number of conflicts – won	1.5 ± 0.3	2.5 ± 0.4	2.7 ± 0.3	2.8 ± 0.4	I/IV-P < 0.05
Number of conflicts – lost	1.4 ± 0.3	1.4 ± 0.3	0.8 ± 0.2	0.7 ± 0.3	I/IV-P < 0.05

The number of conflicts – won during the second ten minutes of feeding of green alfalfa was progressively increasing over the ages. However, the differences were not contrastingly distinguished apart from this between the groups of the first and the fourth lactation. The same trend could be seen in the parameter "Number of conflicts – lost".

Table 3 shows the conflict feeding behaviour in dairy ewes of different ages during the third ten minutes period of green alfalfa rack feeding (after intensive grazing of three hours).

The decreased feeding activity in both parameters: "Number of conflicts – won" and "Number of conflicts – lost" was typical for this period. The values of the parameter "Number of conflicts – won" varied between 1.3 ± 0.4 in sheep of I-st lactation and 2.1 ± 0.3 in ewes of IV-th lactation. No statistical differences were found between groups of different ages. The values of the parameter "Number of conflicts – lost" had limited variation between 0.6 ± 0.1 in ewes of IV-th lactation and 1.0 ± 0.2 in sheep of I-st lactation without statistical significance between ages. Competitive interactions coming from the more active groups

of ages (III-rd and IV-th lactation) decreased as a result of the satiety. A part of these animals became moving, drinking water and ruminating. Passive groups (like this of I-st lactation) and a part of the remaining groups continued consumption of green alfalfa.

Table 3

Conflict feeding behaviour in dairy ewes of different ages during the third ten minute period of green alfalfa rack feeding (after intensive grazing of three hours)

Behaviours	2 years old (I-st lactation) $n = 10$ $x \pm Sx$	3 years old (II-nd lactation) $n = 10$ $x \pm Sx$	4 years old (III-rd lactation) $n = 10$ $x \pm Sx$	5 years old (IV-th lactation) $n = 10$ $x \pm Sx$	td
Number of conflicts – won	1.3 ± 0.4	1.8 ± 0.4	1.9 ± 0.3	2.1 ± 0.3	NS
Number of conflicts – lost	1.0 ± 0.2	1.0 ± 0.2	0.8 ± 0.2	0.6 ± 0.2	NS

CONCLUSIONS

Feeding with restricted amounts of bulky forage after intensive grazing of three hours (accumulated feeding effect) caused conflicts between ewes of different ages. The sheep of two years age (I-st lactation) have been the most passive animals in taking place for the first twenty minutes of feeding. Ewes of this age have lost most frequently the conflicts during feeding and for this reason had less feeding time in comparison with other ages, in spite of the accumulated feeding effect. Animals of all ages have revealed similar conflict feeding behaviour over the last ten minutes of feeding.

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