

APPLYING OF VIDEO RECORDING AND SEQUENTIAL ANALYSIS METHOD IN INVESTIGATION OF FEEDING BEHAVIOR OF HIGH PREGNANT HEIFERS

Slavca Hristov, Aleksandra Ivetic

University of Belgrade, Faculty of Agriculture Institute of Animal Science, Department of Animal Health and Hygiene; 11080 Zemun, Nemanjina 6, Serbia and Montenegro

Key words: heifers, feeding behaviour, video recording, sequence analysis

Introduction

The most important factors which affect the feeding behaviour of ruminants are: type and amount of feed, the time span for the feed intake and social relations between the animals themselves (Fraser, 1985; Fraser and Broom, 1990; Lina Lindström, 2000). Recently are available a few methods (Forbes et al., 1986; Vasilatos et al., 1980; Rutter et al., 1997) for studying animal feeding behaviour. They are mainly based on observing and electronic registering of relevant behaviour activities. The aim of applying these methods is to find all the relevant activities during the feed intake, i.e. activities that indicate whether feeding needs are satisfied and what is the state of welfare concerning the satisfaction of that needs. The aim of this paper is thorough examination the feeding behaviour of high pregnant heifers prior and during the feed intake by applying video recording and sequential analysis method and discussions.

Material and methods

Five high pregnant heifers as focal animals in the tied and the free rearing system (at home range) are involved in thorough examinations. Besides examining these five pregnant heifers, feeding behaviour of other five heifers in each rearing systems was occasionally observed. The digital camera Kamkorder, VP-D20i to register the activities prior and during the feed intake is used. By direct insight in space conditions a recording angle was choosing which allows complete overlook on the activities of at least five individuals, which feed with green mass of alfalfa.

The sequential analysis method was being used for the analysis of the video records. In order to spot all activities of feeding behaviour five times repeated analysis of the video records are applied. Registered activities prior and during the feed intake are divided in sequences in total duration of 60 minutes. The basic criteria for division of feeding behaviour on sequences are changes of behaviour in type of activity. The first sequence in both rearing

systems involves shown activities prior the feed distribution. During the feed intake the sequences (4 sequences in the tied and 2 sequences in the free system) are set based on the moment of mechanical and additional manual feed distribution and intake. The behaviour analysis (ethogram) before and during the feed intake consisted of thorough examinations of the most important activities in the sequences and also their characteristics with regard to the duration and frequency of repetitions.

Results and discussion

Data regarding shown activities by high pregnant heifers in the sequences prior and during the feed intake (behavioral inventory) are given in the tables 1 and 2 in the tied and the free rearing system, respectively.

Table 1. Activities in sequences by high pregnant heifers in the tied rearing system

Sequence, Duration	Kind of activities	Duration, Frequency, n
1. Feed expecting sequence, from 00.00 to 11.56 minutes	Excitement	All the time
	Standing	All the time
	Bellowing	Occasionally
	Head and neck movements	130
	Foreleg movements	20
	Sham chewing	17
	Crib licking	11
	Licking up the nostrils	10
2. Mechanical feed distribution and intake sequence, from 11.56 to 27.31 minutes	Licking other individual	3
	Feed consumption	All the time
	Feed consumption, 1 minute, bites	64
	Feed consumption, 5 minutes, bites	330
	Crib licking	13
3. Animal excitement sequence, from 27.31 to 30.04 minutes	Feed taking from the feeding hall	35
	Standing	All the time
	Agitation	All the time
	Head movements	Very frequent
	Bellowing	15
4. Animal detraction sequence, from 30.04 to 42.24 minutes	Feed residue intake	6
	Standing	All the time
	Legs movement	5
	Bellowing	5
	Conciliation	Gradually
5. Additional manual feed distribution and intake sequence, from 42.24 to 60.00 minutes	Feed residue intake	Occasionally
	Standing	All the time
	Feed consumption	All the time
	Disturbance/Alert	2 minutes

Inside the tied system of rearing, the feeding behaviour activities of high pregnant heifers was divided into five sequences (table 1): feed expecting sequence, mechanical feed distribution and intake sequence, animal excitement sequence, animal detraction sequence, and additional manual feed distribution and intake sequence.

Obtained results show out that in the feed expecting sequence, inside the tied system of heifers rearing, are noticed 9 activities: excitement, standing, bellowing, head and neck movements, foreleg movements, mouth movements as if chewing (sham chewing), crib licking, licking up the nostrils and other individual. The first 2 activities were shown all the time during this sequence, while the bellowing followed occasionally several times. Head and neck movements (anticipatory reaction), manifested as the head waving, moving the head and neck toward side and up and moving the head, neck and legs like trying to move forward, in total frequency of 130 times. The foreleg movements were seen by 3 cows, in total frequency of 20 times, that is 2 times with 4 to 6 movements from one leg to another. Sham chewing was shown in totally 17 series; with frequency of at least 5 times to continuous chewing in period of 1 minute in each series. Crib licking was shown in totally 11 series with more than one time in each series. The licking up the nostrils was shown in totally 10 series, from 1 to 13 times in each series. Only two cows were licking a skin 3 times each other. All ascertain activities in this sequence express a category of intention movement and appetitive behavior.

In the mechanical feed distribution and intake sequence inside the tied rearing system 3 activities were shown. The dominate activity was feed consumption with average 64 bites pro 1 minute and 330 bites pro 5 minutes was shown. The licking of front cribs edge was found in 13 series with 4 to 6 times in single series. Feed reaching from the feeding hall was seen in 35 series with 3 to 5 times in single series. The licking the front edge of cribs and feed reaching from the feeding hall were mainly shown at the end of this sequence. When there was no feed left in the crib, strong agitation of the cows in duration of 2.33 minutes was shown and than gradual detraction sequence in duration of 12.20 minutes, followed until the additional manual feed distribution, although some short agitation was occasionally shown because of feed needs was not satisfied as much as they should be. In the additional manual feed distribution and intake sequence in duration of 17.36 minutes 3 activities with the feed consumption as the dominate one were seen. Agitation and alert are often appeared when there was no feed left and when the breeders were adding some more; it manifested with turning over toward the breeders, nervous head movements and crib explorations.

The activities in the free system of rearing of the heifers prior and during the feed intake are divided into 3 sequences: feed expecting sequence, mechanical feed distribution and start of intake sequence and feed intake sequence.

Table 2. Activities in sequences by high pregnant heifers in free rearing system

Sequence, duration	Kind of activities	Duration/frequency, n
1. Feed expecting sequence from 00.00 to 12.00 minutes	Excitement Bellowing Roaring Moving from the outlet to the stall Observation toward tractor passing by Crib exploration	All the time All the time All the time All cows, except one Frequently Occasionally
2. Mechanical distribution and start of feed intake sequence, from 12.00 to 15.26 minutes	Grouping and arranging along the crib Roaring Detraction Standing Feed consumption	30 seconds Occasionally Gradually All the time All the time
3. Feed intake sequence from 15.26 to 60.00 minutes	Feed consumption Feed consumption, 1 minute, bites Feed consumption, 5 minutes, bites Licking of the feeding hall Pushing the feed using the nose Group feed consumption	All the time 65 357 56 35 All the time

Inside the free rearing system during the feed expecting sequence 5 activities were seen: high excitement (more express than in heifers at the tied system), continuous bellowing and roaring, moving in groups from the outlet to the stall, and observation toward tractor passing by all the time and occasionally crib exploration. Moving in groups from the outlet to the stall with components of allelomimetic behaviour followed before the tractor passing by and it was seen in behaviour of all heifers with the exception of one. In the mechanical distribution and start of feed intake sequence in duration of 3.26 minutes two main activities were seen: grouping and arranging along the cribs and start of focused feed consumption. In both system of rearing it was seen that the heifers were not moving while the tractor was distributing a feed, although the feed was falling on their heads. In the feed intake sequences which lasted 44.54 minutes, feed consumption was continually during the whole sequence, and the number of bites pro 1 minute was 65, and 357 during 5 minutes. In addition, focused feed consumption and pushing the feed using the nose (some aspect of investigative behaviour), occasional licking of the feeding hall by the heifers were seen in this sequence. It was also seen that the animals were grouped during the feed consumption and strived for taking the feed from each other; although they disposed of enough space and feed, (there is no

individual distance). At the end of the video recording bustle and struggle for the feeding place were increasing which manifested by pushing the head.

Conclusion

Data regarding shown activities in sequences by high pregnant heifers prior and during the feed intake in tied and free rearing system reveal some important information. It is possible exactly separate activities in feeding behaviour of high pregnant heifers at sequences and in every sequence clearly observe each activity. Sequences in feeding behaviour were completed by exogenous stimuli. Disturbance in high degree is shown prior feed distribution followed by bellowing and head and neck movements in the tied system, and moving from outlet to the stall and crib explorations in the free system. Heifers focus very highly on the feed after the feed distribution with conciliation and occasional disturbance when the feed missing so, that the sequences and activities which are shown in them are under strong influence of the amount of feed and its means of distribution, and under strong control of the breeders. In addition, video records and sequential analysis method can significantly contribute to the comprehensive scrutinising of heifer's behaviour prior and during the feed intake, especially because they provide repeating analysis possibility.

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