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RESEARCH ARTICLE

ETHOGRAM IN BANNUR SHEEP UNDER FARM CONDITION

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ABSTRACT

The experimental sheep (Bannur breed) were observed for their basic behavior patterns for six hundred hours, six hours in a day during the study. Study was done to construct the ethogram for bannur breed of sheep under semi-intensive farm conditions. Eight main behavioral categories consisting of forty-six different behavioral patterns were grouped under different headings, were used for the study. Behavioral categories included, gaits, animal oriented locomotion, visual patterns, object and self oriented contact patterns, vocal and non-vocal patterns, stretching patterns, stationary body positions and stances and feeding, digestive and elimination patterns. Sheep utilized the maximum time for grazing activity with occasional browsing on plants, trees, etc. Defecation and urination were the common patterns exhibited along with the feeding activities. Most of the activities were expressed during the day time. The rumination was observed during rest while the animals slept during night times. These results of the study indicated that the bannur sheep express maximum natural behavioral activities in free range system. Further the behavior patterns exhibited under confinement are only need based suggesting that the animal prefer an independent free movement space than enclosed systems.

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INTRODUCTION

Twenty million households are engaged in sheep rearing around the world as per the activity of the Food and Agricultural Organization, 2001. Understanding animal behavior is paramount for development of scientific managemental practices. However there are very few systemic studies on the behavior of sheep and goat in different type of farming systems (Gouri *et al.,* 2009, Sonia and Pirta, 2010). The study of animal behavior involves global and local issues ranging from environmental conservation (Saberwal., 1999) to survival of marginal populations in remote areas (Negi., 2007). A detailed description of the behavioral features of particular spices is refers as ethogram. Observation of basic behavioral patterns provides a descriptive catalogue of all phases of the annual cycle (Gouri *et al*., 2009). Behavioral patterns provides a descriptive catalogue of all phases of the annual cycle (Gouri *et al.,* 2009). It is important to understand the behavior patterns of the animals under natural conditions (Smith 1971). The ethogram is reasonably complete, but the thoroughness depends on variety of instances where in animals have been observed for their behavior patterns.

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It has been reported that the behavior pattern differs between different breeds and animals (Gouri *et al.,* 2009). As per our knowledge, there are no report on the behavioral studies of Bannur sheep seen predominantly in the southern part of Karnataka state and a well known mutton type of breed recognized for meat quality. The objectives of the present study was to record a descriptive catalogue of all patterns exhibited by an adult Bannur sheep.

MATERIALS AND METHODS

Observations on behavioral patterns in fourty adult (2-3yrs of age) sheep were made for a total period of 600 hours. A descriptive catalogue of all the behavioral patterns exhibited by adult Bannur sheep, under the farm conditions, was made and a continuous behavioral inventory was prepared with an average six-hour observation a day. Human interference was avoided as far as possible. The definitions of behavior categories based on observation made by Gouri *et al*. (2009) in Ramnad white sheep and Malabari goat breeds was adopted to the current experiment. During the experiment, animals were maintained under standard managemental system that is; under semi-intensive system of management. The recordings were taken both times during confinement and grazing periods. Further, the most of the observations made during cooler parts of the day.

Following are the definitions of behavior categories based on observation made

Gaits: The limb coordination's used in locomotion.

Animal oriented movements: Body movements towards or away from another animal, or in response to the motion of another animal.

Visual Patterns

- Animal oriented non-contact patterns: Distinctive motions or postures of the body or its visual patterns may or may not involve contact with, or be oriented in space towards, another animal.
- Animal oriented contact patterns: Movements in which a part of the body is brought into contact with the body of a con specific.

Object and Self oriented contact patterns

- Object oriented patterns: Movements in which a part of body is brought in contact with some inanimate part of the surrounding environment.
- Self oriented contact patterns: Movements that bring an appendage or body region into contact with another part of the body.

Vocal and Non-vocal patterns

- Vocal patterns: Vocalizations-bellowing, Bleating etc.
- Non-vocal auditory patterns: Producing non- vocal sounds. e.g. Tooth grinding, Rumination sounds, Sneezing.

Stretching patterns: Short-term tonic postural adjustments.

Stationary body positions and stances: Postures of usually long duration associated with periods of rest and activity.

Feeding, digestive and elimination patterns

- Feeding and digestive patterns: Behavior associated with the intake and initial processing of food.
- Elimination patterns: Voiding of solid and liquid wastes.
- Common, rare and occasional occurrence of behavior
- Common occurrence: Exhibition of behavior patterns twice or more times in a given period
- Rare occurrence: Exhibition of behavior patterns once or more times in a given period
- Occasional occurrence: Behavior patterns were expressed very rarely; may or may not be expressed in a given period.

RESULTS AND DISCUSSION

Normal occurrences of behavior patterns of adult sheep are presented in Table 1. The pictorial presentation of some of the behavioral patterns exhibited by Bannur breed of sheep is shown in Figure 1. It also presents the classification of each pattern into one or more functional categories. Sheep exhibited 42 of 47 patterns, of which 13 more commonly observed (MCO) and 14 were commonly occurred (CO), 11 rarely occurred (RO) and four very rarely occurred (VRO) and five patterns were not observed at all (NO)

**Fourteen out of 47 patterns can be classified as those having primarily comfort grooming or protective functions and seven patterns were of feeding and elimination, in sheep three patterns were of social type. Nineteen patterns can be classified as agonistic, sexual, excitation, discomfort and play behavior. Seven patterns were exclusively of agonistic nature exhibited more commonly sheep. Three of them were sexual, three patterns were both sexual and agonistic, two patterns each were excitation, discomfort and playful acts and one pattern was agonistic or submissive. Two behavioral patterns were concerning rest or sleep in sheep. Five behavioral patterns were not observed in sheep viz., stepping in place, curled lateral recumbancy, extended lateral recumbancy, rumination sound and walk stretch. The reports published by Gouri, *et al.* (2009) in Ramnad White sheep exhibited more commonly stepping in place. Whereas, studies on Ramnad white sheep breed and Deer exhibited rare, curled lateral recumbancy and extended lateral recumbancy (Gouri, *et al.*, 2009 and Wemmer *et al.,* 1983).

The current study was conducted to formulate the standard detailed ethogram for bannur breed of sheep. In this study it was observed that when these animals were housed inside the shed, sheep were less active and exhibited mainly rumination, sleep and defecation. Grooming and rumination were the most common behavior patterns exhibited by these species under confinement. Investigative behavior such as sniffing urine and faeces, licking objects and biting were less commonly observed in these places. Biting, fore leg kicking, head rubbing, head pressing, muzzle tossing, rearing and kicking and fighting were also more commonly observed during rest period when they were in groups in an enclosed area. Low stretch and yawning were a typical patterns observed more frequently during rest period. Flehmen, tongue flipping and mounting were exhibited mainly during estrous period. Similar findings were reported by Gouri, *et al.* (2009). Object and self-oriented contact patterns were mainly observed as to dislodge adhering material on the body. eg. Head shaking, tail swishing, face and neck rubbing, licking, muzzle to body touching, scratching with the hind leg, body rubbing were observed probably while trying to get rid of the irritation on the body parts or for grooming the body. Similar such findings were reported by Gouri, *et al.* (2009). Further in ewes it was observed (that high frequency of licking, especially directed at the head (41% of licks) and anterior body (30% of licks) of their lambs. Licking followed a specific, non-random pattern. Ewes licked from front to back of their lambs. Bleating/bellowing was the commonly noticed behavioral pattern when they were taken for grazing, possibly due to the fear of being missed from the group. Pawing the ground was seen commonly during sitting in sheep. The results of this experiment are in agreement with the findings of Das *et al.* (1990) and Patel *et al.* (2007) in sheep and goats and in Rams respectively. Tooth grinding was observed rarely in sheep. Rumination sounds and feeding sounds were also less audible in sheep, similar observations with slightly more intensity were noticed by Sabine *et al.* (2015). Feeding and digestive patterns were more evident. Grazing was a common feature in sheep. Browsing was occasional in sheep, instead they spent their major time for grazing, and similar findings were also observed by Sonia and Pirta (2010) in the mobile herds of sheep and goats in Gaddis, Himachal Pradesh.

Licking

Scratching with the hind leg

Chin resting

Muzzle to body touch

Body scratching

Flhemann's reaction

Head rubbing

Fore limb licking

Biting (flucking)

Fighting

Sniffing

Mounting

Grazing & Browsing

Approaching

Table 1. Occurrence and probable functional categories of behavior patterns in sheep

	Behaviour pattern	Sheep	Function
1	Stepping in Place	--	Protective
2	Approaching	+++	Variable, Social
3	Low stretch	++	Variable, Social
4	Departing	+	Variable, Social
5	Chasing	+++	Play, Agonistic
6	Threat swaggers	+	Agonistic
7	Flehmen (Lip curl)	+++	Sexual
8	Lip flipping	+++	Agonistic, Submissive
9	Yawning	+++	Comfort
10	Pawing the ground	+++	Agonistic
11	Ears back	+++	Agonistic, Exitation
12	Arched tail	++	Sexual, Elimination
13	Sniffing/Nasal contact	++++	Comfort, Variable
14	Licking	++++	Comfort, Variable
15	Biting	++	Agonistic
16	Fore leg kicking	+++	Agonistic
17	Head rubbing	++++	Contact promoting
18	Head butting	++	Agonistic
19	Muzzle tossing	+	Agonistic, Sexual
20	Rearing and kicking	++	Agonistic
21	Chin resting	++	Play, Sexual, Contact promoting
22	Mounting	+++	Play, Sexual, Contact promoting
23	Fighting	+++	Agonistic
24	Standing-on	+	Agonistic, Play
25	Face and neck rubbing	++++	Protective, Comfort
26	Head shaking	++++	Grooming
27	Scratching with horns	++	Grooming
28	Muzzle to body touching	++++	Grooming, Protective
29	Tail swishing	++++	Protective
30	Bleating/bellowing	++++	Agonistic, Sexual, Discomfort
31	Tooth grinding	+++	Agonistic, Sexual, Discomfort
32	Rumination sounds	---	Nutritive
33	Feeding sounds	++	Nutritive, Contact
34	Walk Stretch	---	Comfort
35	Standing stretch	++	Comfort
36	Curled lateral recumbancy	---	Rest, Sleep
37	Extended lateral recumbancy	---	Rest, Sleep
38	Grazing	++++	Nutritive
39	Browsing	+++	Nutritive
40	Rumination	++++	Nutritive
41	Defaecation patterns	++++	Elimination
42	Urination	++++	Elimination
43	Head scratching with hind leg	++++	Grooming
44	Body scratching(rubbing)	+++	Grooming
45			
45	Body shaking	+++	Grooming
46	Snizzing	++	Discomfort
47	Licking of hindlimb	++	Agonistic

++++ more Common occurrence (>10times),+++ Common occurrence (5-10times),
++ rare occurrence (2-5times),+very rare occurrence (1-2times),--nil occurrence (0times).

Walk stretch was less common sheep. Stand stretch was noted. These were commonly observed soon after rising from the reclining position. Defaecation and urination were observed during foraging/feeding in ranges as well as at rest. Sheep exhibited investigative and eliminative behavior during feeding in ranges. The results of the study are in agreement with reports of Das *et al.* (1990) and Gouri *et al.* (2009).

Conclusion

Thus, the ethogram of sheep observed in semi arid region of Karnataka (Bengaluru) belonging to southern regions of India has similar facets and features as that observed elsewhere, in the world. Further, similar such studies are needed in large scale and longer durations involving bigger sample size of animals would help in formulating a standard behavior patterns and ultimately aid in developing animal models of attachment that have theoretical and applied significance.

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