The Pharma Innovation Journal 2022; SP-11(4): 1437-1440

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(4): 1437-1440

www.thepharmajournal.com
Received: 28-02-2022
Accepted: 30-03-2022

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Study of basic behavioural patterns in lactating dairy buffaloes under intensive system of farming

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Abstract
The experimental lactating dairy buffaloes were observed for their basic behavioural patterns for a total period of 300 hours. The study was carried out to construct the ethogram for lactating dairy buffalo under intensive farming system. Eight main behavioural categories consisting of forty-seven different patterns were grouped under different title, were used for the study. Behavioural 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. A descriptive catalogue of all the behavioural patterns exhibited by adult dairy buffaloes under the farm conditions was made and a continuous behavioural inventory was prepared with an average six-hour observation in a day. Buffaloes were exhibited 41 behavioural patterns out of 47 patterns, of which ten more commonly occurred (MCO) and six were commonly occurred (CO), 16 rarely occurred (RO) and nine very rarely occurred (VRO) and six patterns were not observed at all (NO). The complete study of ethogram is simple and easy tools for assessment of health status of animals. Further, it would help in future planning and preparation of health charts for the animals, so that the productivity of animals can be increased and diseases prevented to save the future economic losses to the farmers.

Keywords: Ethogram, behaviour patterns, buffaloes, intensive system

Introduction
India is that the native tract for the best buffalo breeds of the world, so as to derive the utmost potential from native buffaloes and for their better management, there is a requirement to study the animal behaviour for development of scientific managemental practices. In an experiment [4] reported that the animal behavior involves global and local issues, ranging from environmental conservation to the survival of marginal populations in remote areas [5]. A detailed description of the behavioral features of particular species is referred as Ethogram. Observation of basic behavioral patterns provides a descriptive catalogue of all phases of the annual cycle [1]. It is important to understand the behavior patterns of the animals under natural conditions [8]. The Ethogram is reasonably complete, but the thoroughness depends on variety of instances where in animals have been observed for their behaviour patterns. In an experiment on study of the behaviour patterns in Ramnad white sheep and Malabari goat, revealed that there was a differences observed between different breeds and animals [1]. The research works especially on welfare or behavioural studies in buffaloes are scanty. Hence the current study was undertaken with an objective to study the basic behavioural patterns in 30 adult dairy buffaloes.

Materials and Methods
Various behavioural patterns were recorded in 30 adult dairy buffaloes for a total period of 300 hours. A descriptive catalogue of all the behavioral patterns exhibited by adult dairy buffaloes under the farm conditions was made and a continuous behavioral inventory was prepared with an average six-hour observation per day without disturbing the day to day routine management activities. Observations were recorded at a distance from the animals. Human interference was avoided as far as possible. The definitions and recording of array of behaviour categories were based on observations made by [1] in Ramnad white sheep and Malabari goat breeds were adopted for the current experiment with modifications to suit the dairy buffaloes. Furthermore most of the observations were made during cooler parts of the day.

Following were the definitions of behaviour categories based on the observations made

1. Gait: The limb coordination's used in locomotion.

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

3. Visual Patterns

a. **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.
b. **Animal oriented contact patterns:** Movements in which a part of the body was brought into contact with the body of a con specific.

4. Object and Self oriented contact patterns

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

5. Vocal and Non-vocal patterns

a. **Vocal patterns:** Vocalizations-bellowing, bleating etc.
b. **Non-vocal auditory patterns:** Producing non- vocal sounds. e.g., Tooth grinding, Rumination sounds, sneezing.

6. Stretching patterns: Short-term tonic postural adjustments.

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

8. Feeding, digestive and elimination patterns

a. **Feeding and digestive patterns:** Behaviour associated with the intake and initial processing of food.
b. **Elimination patterns:** Voiding of solid and liquid wastes.

9. Common, rare and occasional occurrence of behaviour

a. **Common occurrence:** Exhibition of behaviour patterns twice or more times in a given period.
b. **Rare occurrence:** Exhibition of behaviour patterns once or more times in a given period.
c. **Occasional occurrence:** Behaviour patterns were expressed very rarely; which may or may not be expressed in a given period.

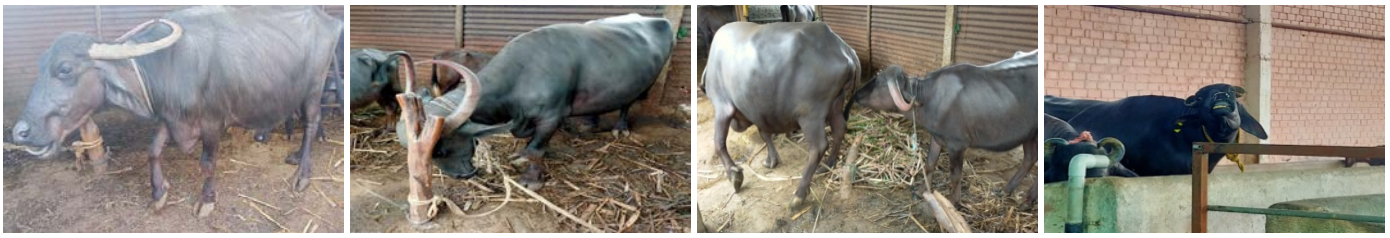
Results and Discussion

Normal occurrences of behaviour patterns of dairy buffalo are presented in Table 1. The pictorial presentation of some of the behavioural patterns exhibited by buffaloes is shown in Figure 1. It also presents the classification of each pattern into one or more functional categories. The Buffaloes exhibited forty one behavioural patterns out of forty seven patterns, of which nine patterns more commonly occurred (MCO) and nine were commonly occurred (CO), 13 rarely occurred (RO) and ten were very rarely occurred (VRO) and six patterns were not observed (NO) in buffaloes during study period.

The buffaloes mainly exhibited feeding, rumination, sleep and defecation patterns under intensive farming system. The sexual behavioural patterns such as Flehmen reaction, tongue flipping and mounting were exhibited mainly during estrous period. Biting, fore leg kicking, head rubbing, head pressing, muzzle tossing, rearing and kicking and fighting were observed rarely during rest period. Similar findings were reported in ramnad white sheep and bannur sheep respectively [1, 3, 7].

Low stretch and yawning were a typical patterns observed rarely during rest period. Object and self-oriented contact patterns were mainly observed as to remove attached material from the body surface e.g. Head shaking, tail swishing, face and neck rubbing, licking, muzzle to body touching, scratching with the hind leg, body rubbing were observed most commonly while trying to get rid of the irritation on the body parts or for grooming the body. Bleating/bellowing pattern was most commonly observed during the buffaloes in estrous period and may be due to any discomfort. Similar such findings were reported in sheep [1, 3, 6].

Tooth grinding was observed rarely in buffaloes. Rumination sound was not audible in buffaloes and feeding sounds were commonly audible while eating. Feeding and digestive patterns were more evident and buffaloes spent more time while feeding, defecation and urination.



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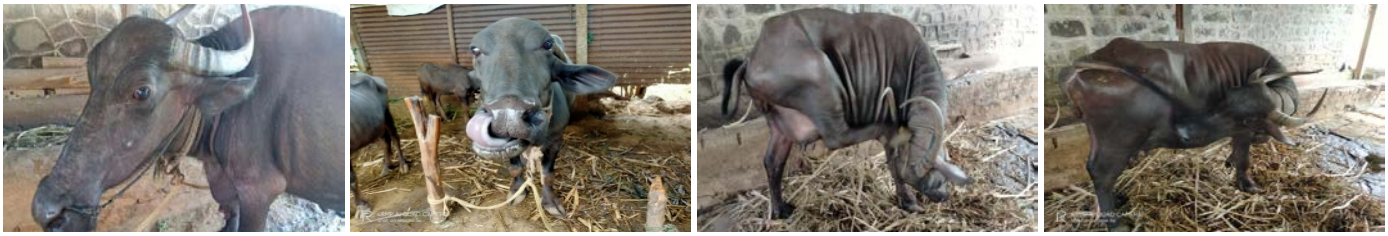

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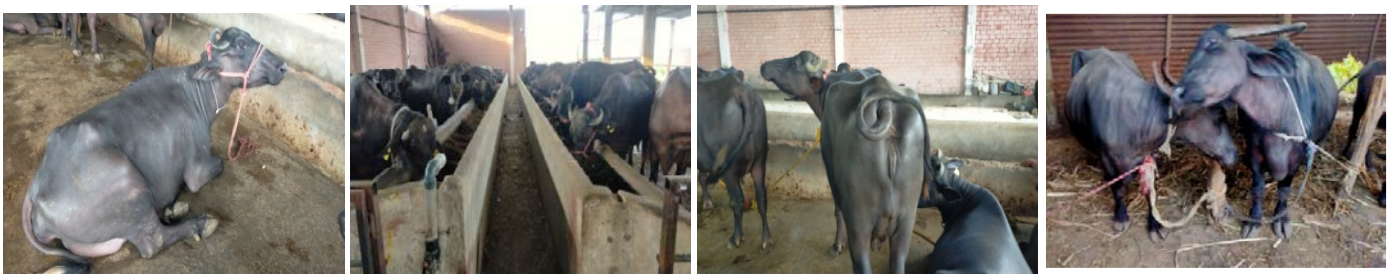

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Plate 1: Buffaloes showing different basic behavioural patterns under farm conditions Stepping in place (a), Head pressing (b), Sniffing/Nasal contact (c), Flehmen (Lip curl) (d), Ears back (e), Tongue rolling (f), Head scratching with hind leg (g), Muzzle to body touching (h), Curled lateral recumbency (i), Feeding (j), Tail swishing (k) and Fighting (l).

Table 1: Occurrence and probable functional categories of behaviour patterns in buffaloes

Sl no	Behavioural pattern	Occurrence	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, Excitation
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	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

Grazing and browsing patterns were not observed in the present study because the present study was carried out in intensive system of rearing. Curled lateral recumbency was observed commonly and extended lateral recumbency observed rarely during rest period whereas, these in studies on behavioural patterns in ramnad white sheep and bannur sheep respectively [1,3].

In a study on behaviour patterns observed in buffaloes indicated that the animals spent most time idling, followed by ruminating, eating, sleeping and walking during 24 hours [2]. Eating, idling and walking were more frequent during day light hours, while ruminating and sleeping were the predominant activities during the night.

Conclusion

Buffaloes exhibited the maximum number of behavioural patterns in the present study. The study showed that the buffaloes too have a unique way of expression of their needs, based on this the feeding and managemental practices can be easily designed. The complete study of ethogram is simple and easy tool for assessment of health status, feeding patterns and feeding behaviour of the animals maintained under intensive system of rearing. Thus, the ethogram of buffaloes observed in the north Karnataka regions of India has similar facets and features as those reported from other parts of the world.

Further the ethogram of buffaloes in the current experiment is a unique study and this would definitely of great help to the farmers for developing new tools of attachment that have theoretical and practical importance based on the results obtained in the current study.

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