

Facets of Estrus Behavior in Surti Buffaloes

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Abstract

The investigation was undertaken on sixteen healthy Surti buffaloes to document and characterize female sexual/estrus behavior in Surti buffaloes maintained at Livestock Research Station, Navsari Agricultural University, Navsari, Gujarat. Perusal of data revealed that in about 56.25 per cent of animals showed estrus during morning while remaining 42.75 percent in the evening time. Result of this study indicated that restlessness, frequent urination and sniffing of vagina, chin resting, chasing, bellowing, being mounted by others, mounting others and tail raising was the estrus specific signs in Surti buffaloes. The overall estrus duration, onset of estrus to ovulation and estrus duration after end of estrus were 22.19 ± 0.75 , 31.50 ± 0.87 and 9.31 ± 0.48 hrs, respectively.

Keywords: Surti; Estrus behavior; Ovulation; Arborization; Buffaloes; Mounting

Introduction

Surti is small-medium size, well-defined milch breed of buffalo, well adapted to the climate of Central and South Gujarat region and are mainly kept by the landless, small and marginal farmers of this area [1]. Manifestation of observable estrus behavior is not only important for sexual receptivity for mating (standing behaviour) but also for imminence of spontaneous ovulation, facilitating proper timing of service and successful fertilization [2]. Estrus detection is most important routine activity in reproductive management of buffaloes followed at a farm as it is directly related with the reproductive and economic efficiencies of the farm [3,4]. Various externally detectable physical changes around the time of estrus are not consistently exhibited by all animals. Therefore, it is imperative to find out the most reliable signs like physical activity, bellowing, swelling of the vulva reddening of the vestibular mucosa, chin resting over the rump of the herd mate, mucous discharge, reduction of milk yield around estrus and frequent voiding of small quantities of urine [5-7] and/or techniques like use of teaser animal, ultrasonography, milk/serum progesterone and estrogen concentration, rectal palpation of ovary, uterus and time-lapse video recording etc., [8-10] or combination of both which can be employed to identify animal in heat most accurately and effectively in buffaloes. Information on female sexual behaviour of buffaloes is few and no structured information is available for these traits for Surti buffaloes under this agro-climatic region. Hence, the study was undertaken to document and characterize female sexual/estrus behavior in Surti buffaloes.

Materials and Methods

Present investigation was conducted on sixteen healthy Surti buffaloes maintained at Livestock Research Station, Navsari Agricultural University, Navsari, Gujarat, India during September 2013 to March, 2014. Geographically, Livestock Research Station, NAU, Navsari is located in South Gujarat region at $20^{\circ}15'$ to $21^{\circ}23'$ N latitude and $70^{\circ}38'$ to $74^{\circ}23'E$ longitude at an elevation of 800 meters above the mean sea level. The climate of the region is sub-humid tropical with heavy rainfall. Generally, winter (November to February) remains fairly cold and dry, summer (March to June) is moderately hot and humid while monsoon (July to September) is hot and extremely humid. The animals were maintained under loose housing and group management system. All management practices were uniform to all animals. They were allowed to feed in continuous feeding manger inside the shed and were also allowed for grazing for 4-5hr during day time. They were provided with different kinds of roughages (barley, wheat straw, cornstalks and sugar cane residues). Green fodders were provided @ 12-15 kg per animal once daily. In addition, they were given concentrate mixtures @ 1 kg/head/day for maintenance and 0.5 kg/head/day for each additional 1 kg of milk at time of milking. The animals had free access to fresh and clean drinking water all the time. They were hand-milked twice in a day. Calves were allowed to suckle their dams both before and after milking up to 3-4 months of their age after that they were allowed to suckle only before milking.

Evidence of female sexual activities of Surti buffaloes were observed after calving till the animal shows the signs of heat or 90th day postpartum on daily basis. During this period incidence of discharge of lochia, uterine involution, estrus behavior, duration etc were observed, documented. Female sexual activities of Surti buffaloes were observed with the help of a low light-intensity camera (eight bullet type) and a time-lapse digital video recorder (Gobbler H.264 Network DVR). For

identification of the animals, coloured plastic neck collar with different numbers and fluorescent marking paint was used. During this period, various estrus related activities like restlessness, chin resting, tail raising, chasing, bellowing, sniffing of vagina, frequent urination, mounting others and being mounted by others was recorded over a period of 24 hrs at 2 hours interval and during each interval animals were observed for 30 minutes. Each of these twelve episodes of observations represented as stages I to XII. Besides this, animals were exposed to teaser bull for 20-30 minutes three times a day i.e., 6:00 AM, 12:00 Noon and 6:00 PM. rectal palpation of uterine tone and presence of follicle on the surface of the ovary was done to confirm incidence of estrus. Further, on the day of estrus cervical mucus discharge of all the buffaloes was checked for color, consistency and arborization. Based on estrus detection by teaser bull, rectal palpation of ovary, estrogen estimation and behavioural signs of estrus animals were considered in estrus. The collected data has been compiled, tabulated and analyzed by using SAS 9.2. To study oestrus behaviour, frequency of each behaviour activities as well as percentage of animal showing these activities at different time intervals were recorded and analyzed.

Results

The least square's means for number of days postpartum discharge of lochia took place, number of day's postpartum uterine involution

PPIE groups	PPIE (Days)	Discharge of lochia (Days)	Uterine involution (Days)	Estrus duration (hrs)	Interval between start of estrus to ovulation (hrs)	Duration of ovulation after end of estrus (hrs)
1 (PPIE≤50 days)	38.1 ± 2.3 b (7)	9.5 ± 0.4 (7)	26.4 ± 0.9 b (7)	21.7 ± 0.7 (7)	31.0 ± 1.7 (7)	9.2 ± 0.8 (7)
2 (PPIE> 50 days)	58.6 ± 3.5 a (9)	10.7 ± 0.3 (9)	31.2 ± 0.9a (9)	22.5 ± 1.5 (9)	31.8 ± 0.8 (9)	9.3 ± 0.5 (9)
OVERALL	49.6 ± 3.4 (16)	10.2 ± 0.3 (16)	29.1 ± 0.8 (16)	22.1 ± 0.7 (16)	31.5 ± 0.8 (16)	9.3 ± 0.4 (16)

LSM showing different superscripts in lower case letters in a column differ significantly (P<0.05).
 Figures in parentheses show the number of animal to derive LSM

Table 1: Least squares' means and standard error (LSM ± SE) of postpartum interval to estrus (PPIE), lochia discharge & uterine involution, estrus duration, interval between start of estrus to ovulation and duration of ovulation after end of estrus.

Per cent and number of animals showing different behavioural activities have been depicted in Table 2. Restlessness was observed in 100, 75, 62.5, 31.2, 37.5, 68.5, 25, 75, 50, 43.7, and 37.5 percent of the animals from stage I to XII, respectively. Chin resting was observed in 25, 18.7, 25, 31.2, 31.2, 31.2, 43.7, 31.2, 12.5, and 12.5 percent of the animals from stage I to XI, respectively. Tail raising was observed only 6.25 percent of the animal at in the stage IX. Chasing was observed 13, 37.5, 18.7, 31.2, 6.2, 25, 18.7, 25, and 6.2 percent of the animals at stage I, III, IV, V, VI, VII, VIII, X and XII, respectively. Bellowing was observed 12.5, 6.2, 18.7, 18.7, 12.5, 12.5, 12.5, 31.8, 18.7, 18.7, and 18.7 percent of the animals from stage II to XI, respectively. Sniffing of vagina was observed 81.2, 31.2, 75, 75, 62.5 and 6.2 percent of the animals at stage VI, VII, VIII, IX, X and XII, respectively. Frequent urination was seen in 31.2, 25, 31.2, 6.2, 25, 68.7, 62.5, 50, 43.7, 50 and 37.5 percent of the animals at stage I, II, III, IV, V, VI, VIII, IX, X, XI and XII, respectively. Mounting others was observed 6.2 and 6.2

completed and postpartum estrus interval has been depicted in Table 1. We observed that in about 56.2 percent of animals showed estrus during morning while remaining 42.7 percent in the evening time.

On the day of estrus cervical mucus discharge of all the buffaloes was checked for color, consistency and arborization. Color of cervical mucus was clear in 62.5 percent of buffaloes and in 37.5 percent of buffaloes it was cloudy. Consistency of cervical mucus was thick in 50 per cent of buffaloes while it was moderate and thin in 25 and 25 per cent. Arborization was observed for its typical and atypical pattern, in present experiment a majority of buffaloes had typical arborization pattern (68.7%) while the reminder had atypical (31.2%) pattern.

In about 62.5 per cent of the animal ovulation took place in right side ovary while in remaining 37.5 per cent of the animals it occurred in left side ovary. The least squares' means of estrus duration, onset of estrus to ovulation and estrus duration after end of estrus in the group 1 animals were 21.7 ± 0.7, 31 ± 1.7 hrs and 9.2 ± 0.8 hrs while it was 22.5 ± 1.5, 31.8 ± 0.8 hrs and 9.3 ± 0.5 hrs for group 2 animals (Table 1).

percent of the animals at stages in V and X. Being mounted by others was seen 12.5, 18.7, 6.2, 12.5, 12.5, and 6.2 percent of the animals at stage VI, VII, VIII, IX, X, and XII, respectively. It was 38.14 ± 2.4 and 58.6 ± 3.5 days, respectively. Overall result of this study indicated that restlessness, frequent urination and sniffing of vagina, chin resting, chasing, bellowing, being mounted by others, mounting others and tail raising was observed in 56.7, 35.9, 27.6, 23.4, 15.1, 15.1, 5.7, 1.0 and 0.5 per cent of the animals, respectively.

Discussion

Perusal of data revealed that number of days postpartum discharge of lochia took place was lesser in group 1 animals than group 2 animals. Further, number of days postpartum uterine involution completed was found to be significantly (P<0.05) lower (26.4±0.9 days) for group 1 animals than group 2 animals (31.2±0.9 days). Similar

findings were reported by Presicce et al. [11], Khasatiya et al. [12] and Snel-Oliveira et al. [13] also reported that as in cattle, uterine involution in buffalo is usually completed in 25-35 days after calving, which is comparable with our findings. The least squares' means of

postpartum estrus interval for group 1, 2 animals differed significantly ($P < 0.05$) and it was 38.1 ± 2.3 and 58.6 ± 3.5 days, respectively. Similar diurnal pattern in exhibiting estrus was also reported by El-Wardani and El-Asheeri [14], Prakash et al. [15] and Srivastava and Sahni [16].

Estrus behaviour	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Over all
Restlessness	100% (16)	75% (12)	75% (12)	62.5% (10)	31.2% (5)	37.5% (6)	68.7% (11)	25% (4)	75% (12)	50% (8)	43.7% (7)	37.5% (6)	56.7% (109)
Chin resting	25% (4)	18.7% (3)	25% (4)	18.7% (3)	31.2% (5)	31.2% (5)	31.2% (5)	43.7% (7)	31.2% (5)	12.5% (2)	12.5% (2)	0	23.4% (45)
Tail raising	0	0	0	0	0	0	0	0	6.2% (1)	0	0	0	0.5% (1)
Chasing	13% (2)	0	37.5% (6)	18.7% (3)	31.2% (5)	6.2% (1)	25% (4)	18.7% (3)	0	25% (4)	0	6.2% (1)	15.1% (29)
Bellowing	0	12.5% (2)	6.2% (1)	18.7% (3)	18.7% (3)	12.5% (2)	12.5% (2)	12.5% (2)	31.2% (5)	18.7% (3)	18.7% (3)	18.7% (3)	15.1% (29)
Sniffing of vagina	0	0	0	0	0	81.2% (13)	31.2% (5)	75% (12)	75% (12)	62.5% (10)	0	6.2% (1)	27.6% (53)
Frequent urination	31.5% (5)	25% (4)	31.2% (5)	6.2% (1)	25% (4)	68.7% (11)	0	62.5% (10)	50% (8)	43.7% (7)	50% (8)	37.5% (6)	35.9% (69)
Mounting others	0	0	0	0	6.2% (1)	0	0	0	0	6.2% (1)	0	0	1.0% (2)
Being mounted by others	0	0	0	0	0	12.5% (2)	18.7% (3)	6.2% (1)	12.5% (2)	12.5% (2)	0	6.2% (1)	5.7% (11)

Table 2: Estrus related activities exhibited by Surti buffaloes.

Color and consistency of cervical mucus was mainly clear and thick in most of the animals during estrus. Majority of buffaloes had typical arborization pattern. Similar findings were reported by Layek et al. [17].

In about 62.5 per cent of the animal ovulation took place in right side ovary while in remaining 37.5 per cent of the animals it occurred in left side ovary. The least squares' means of estrus duration, onset of estrus to ovulation and estrus duration after end of estrus were slightly higher in the group 1 animals than the group 2 animals. However, means of these parameters are comparable with the findings of Perera [18], Kumaresan et al. [19], Prakash et al. [15] and Layek et al. [17], Perera [18] and Yoshida C and Nakao T [20].

We observed that restlessness, frequent urination and sniffing of vagina, chin resting, chasing, bellowing, being mounted by others, mounting others and tail raising were the estrus specific signs in Surti buffaloes. Similar findings were reported by Yindee et al. [21], Kumar et al. [22], Perera [18] and Dubey [23].

Conclusion

In about 56.2 per cent of animals showed estrus during morning while remaining 42.7 per cent in the evening time. The overall estrus duration, onset of estrus to ovulation and estrus duration after end of estrus were 22.19 ± 0.75 , 31.5 ± 0.8 and 9.3 ± 0.4 hrs, respectively for Surti buffaloes. Restlessness, frequent urination and sniffing of vagina, chin

resting, chasing, bellowing, being mounted by others, mounting others and tail raising are estrus specific signs in the Surti buffaloes.

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