Estrus Detection Methods in Buffalo

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Abstract

Buffaloes are the main milk producing unit, rearing somewhere in villages of India and back bone of Indian milk Industries. Buffalo require some peculiar management. They should be managed age group wise, so that the estrus buffaloes can easily be identified. It is proved that majority of buffaloes show peak sexual activity during late evening or in early morning. So deploying extra labour or providing the incentives to supervisors/ animal attendants should be done to identify majority of estrus buffaloes. Some of the peculiar characteristics of estrus aids of its diagnosis and reproductive physiology and related problems are highlighted and discussed in this paper.
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Introduction

The dairy business depends on milk production from cattle and buffaloes which are somewhere reared by the local villagers of the India. India has 53% of world buffalo population with 7 recognized breeds. The buffaloes are much known as “Peculiar Shy Breeder”. This information is not surprising if some physiological features of this species are considered: 1) lower number of primordial follicles observed in the buffalo ovary, varying from 10,000 to 19,000 (Samad and Nasseri, 1979; Danell, 1987) compared with 150,000 in cattle (Erikson, 1966); 2) lower number of antral follicles throughout the whole estrous cycle, and 3) high incidence of follicular atresia. According to a majority of scientific and research communities, the buffalo, apart from a delayed puberty, has silent estrus, long postpartum ovarian inactivity, and, on the whole, poor fertility. We believe that most of these problems crop up from the lack of or poor estrus detection and use of the “out of breeding season” mating technique, carried out to meet the market demand. In order to increase the reproductive efficiency of buffaloes, it is necessary to have a comprehensive and accurate knowledge of the regulatory mechanisms involved in the estrous cycle of the animal.

Factors Affecting Efficiency of Estrous Cycle in Buffaloes

Beg and Totey, (1999) and Singh et al., (2000) recent studies on estrous cyclicity and estrus behaviour in the buffalo have been reviewed and considerable variations in reproductive traits of buffaloes have been observed in compared with. Several factors, such as climate, temperature, photoperiod and nutrition, were indicated as affecting the length of estrous cycle and the degree of heat expression.

1. Environmental Factors

a. Ambient Temperature: Extreme weather conditions such as cold or heat depress the sexual activity and usually less number of conceptions occurs when the temperature is severe. In hot or cold environment the length of estrous cycle is prolonged and duration of heat become shorter as feed intake is drastically reduced compared to the comfortable environment. Decrease thyroid activity during severe summer may indirectly reduce the reproductive efficiency.

b. Season: There is a complex dependency of bovine reproduction on soil, plant and climatic factors particularly in tropical and subtropical parts of the world (Singh et al., 2000). Although buffaloes are polyestrous, they exhibit a distinct seasonal variation in display of estrus, conception rate, and calving rate (Singh and Nanda, 1993). Buffaloes are generally seasonally polyestrous, expression of heat being limited to during winter (October to February) (Sane et al., 1994). Estrous cycle is controlled by the estrogenic substances. The concentration of the substance present in plants or fodders varies according to different seasons of the year.

c. Light: The duration and intensity of light to which the animals are exposed also influence the onset of estrous cycle. This effect of light on animal is known as ‘sexual photoperiodicity’.

2. Age and Body Weight: The younger animals show shorter length of estrum and estrous cycle than adult animals. First estrus in young animals is generally not prominent than other stages of life. Body weight of animal also influences the estrous cycle. Different experiments show that buffalo heifers should be bred for the first time either at their age of 30 months or at about 360 kg body weight whichever is earlier.

3. Nutrition: Very poor nutritional status or starvation of animals for the prolonged period, deficiency of vitamin A and other minerals contents in feed prevent maturation of graffian follicles (Singh et al., 2000). This situation is responsible for abnormal cyclicity of animals or no prominent estrous.

4. Level of Production: High producing animals suffer from chronic systemic diseases, definitely the estrous cycle is hampered until or unless special preventive measures are taken.

5. Hormonal Imbalance: Cystic ovarian disease, nymphomania etc., disturb the hormonal (mainly estrogen, progesterone, and LH) balance which causes either irregularities in the cycle or frequent/ continuous estrum.

Estrus Behavior in Buffaloes

As discussed earlier buffaloes are shy or poor breeder. They are generally seasonally polyestrous, expression of heat being limited to eight months of the year and sexually inactive condition is observed from March to June, when hardly 3% of the heats are recorded. The peak season for estrus in buffaloes is reported to be from October to February. Indian buffaloes are showing more conceptions when both diurnal temperature and relative humidity are low i.e. winter. High temperature affects the conception.

Estrus symptoms in buffaloes are much less obvious than those in cattle, for example, less than a third of buffaloes in estrus can be detected by homosexual behaviour. Symptoms such as swollen vulva, mucous discharge and increase frequency of urination are not regarded as reliable indicators of estrus. Estrus can be detected on the basis of reactions to a vasectomized male/ teaser or an androgenized female buffalo. Jainudeen, (1988) reported that silent estrus is the common problem in the buffaloes. He also reported that estrus in the buffaloes commences towards late evening, with peak sexual activity occurring during the hours of darkness. The incidence of silent estrus may be higher in herds using AI rather then natural service and this may indicate that the problem may often lie with estrus detection rather than animal itself.

Methods of Estrus Detection

Recent efforts to overcome the problem of estrus detection in the water buffalo (Bubalus bubalis) include use of a vasectomized teaser, androgen zed females (Drost et al., 1985), plasma (Shrivastava et al., 1996) and milk progesterone, laparoscopy, use of vaginal electrical resistance (VER) (Gupta and Purohit, 2001) and ultrasonography (Manik et al.,1992). The results with these and other efforts like pre-fixed AI with the use of prostaglandins have been modest. The following methods are used to detect the estrous in buffaloes.

1. Observing Symptoms: Estrus behaviour in buffalo has a lower intensity than in cows and is, therefore, much more difficult to detect. Acceptance of the male is considered as the most reliable estrus indicator in buffalo. Frequent urination, bellowing, valver swelling, mucus discharge are also salient estrus signs in buffalo, but their expression is weak and vary from season to season but it should be considered. Restlessness, bellowing, valver lips appear moist, red, swollen, turgid and stands prominently, wrinkles on the vulva disappear, clear, shiny, stringy odorless mucous discharge sometimes extending from vulva to feet, inappetitance, nervousness, riding on other buffaloes or allow other buffaloes to mount on her, reduction in milk yield, standing alone with frequent micturation with raised tail and crutching the back and lumber region etc.

2. Presence of Bull: The presence of a bull in the vicinity of the females will stimulate estrus behaviour and is particularly helpful in silent heat. If the bull is placed in a pen sited in such a way that the buffaloes can pass closely and regularly, those in estrus will generally migrate towards the bull.

3. Manual Checking: The female reproductive tract of the buffalo is similar to that of the cow in structure and location, although the cervix is less conspicuous and the uterine horns are more coiled. As in cattle, the uterine horns are turgid and coiled and have marked tone during estrus; they are flaccid with lack of tone during diestrum.

4. Bull Parading: Parading of teaser or vasectomized bulls or androgenized buffalo bullocks in the shed at least twice during cooler part of the day is the common practice of heat detection in buffaloes.

5. Chin ball marking device: Vasectomized bulls or cystic buffaloes can be used as heat detectors. If these animals are fitted with a "chin ball marker", they will mark the backs of those buffaloes which they have mounted. When the animal presses down with its chain on the back or rump region of mounted animals, a spring loaded valve in the device is opened and marking fluid is released.

6. Painting of Tail: A well-placed strip of paint on the tail head is a cheap and effective aid. This paint will be rubbed off or at least cracked when the painted cow is mounted by another. Again, false positives can be a problem, as in heat mount detectors. The technique demands good management, in the sense that buffaloes should be checked at least once a day, otherwise heats may be missed.

7. KaMaR Heat Mount Detector: These devices are glued to hair over the middle just in front of the tail head. Pressure of mounting animal squeezes dye from the device and the color of the area will be changed. It will indicate mounting of the animals.

8. Breeding Record Analysis: Probable date of incoming heat can be calculated by analyzing the breeding/ reproduction records of the individual buffalo.

9. Close Observation (Use of CCTV): Close circuit television can be used to monitor the buffaloes in sheds. It also can detect the sexually active buffaloes during estrous period.

10. Change in Body Temperature: Rise in vaginal temperature (about 0.5-0.80C) during estrus is the main characteristic feature.

11. Pedometer: Based on the grater movement and activity of animals in estrus pedometers are used. As compared to normal buffalo, the overall movement as well as activity of estrus buffalo is increased up to 40%.

12. Vaginal Probe: Lowest electrical conductivity of the fluid in the vagina at the time of estrus is the characteristic feature of using probe.

13. Synchronization of Estrus: This is one of the alternative approaches for the estrus detection at fixed time. The traditional farmer possesses only one to four buffaloes and usually no bull; hence, there is little opportunity for behaviuoral interaction among estrous animals. Artificial control of the estrous cycle has provided an efficient means of increasing the reproductive capacity of buffalo by obviating the need for frequent visual inspections. Progesterone- or norgestomet-containing devices with injections, PRID, pessaries, CIDR, ear implants along with PMSG, estradiol and/or prostaglandin (PGF2a) have been used successfully to improve synchrony of estrus and conception in buffalos. But exception PGF2a other hormonal aids have limited use in India due to economic point.

14. Trained dogs may be one of the prospectus (Hafez, 1990)

15. Sub dermal insertion of sophisticated microchips in the buffaloes to detect the changes in impedance, movement, activity, temperature etc. during estrus.

16. Laboratory Tests

Many tests are performed in the laboratory to detect the estrus in buffaloes which are as follows.

i) Progesterone Assay: (Sharma and Kaker, 1990) Milk progesterone level will be lowered during estrus period. If the decrease level persists for 2-3 days the animal may served. ELISA test or RIA test are the optional for progesterone assay. It may be from Blood serum or milk.

ii) Cervical Mucous Fern Pattern Test

iii) Endometrial Biopsy: Endometrial biopsy shows that before estrus starts, phosphates activity reaches its peak and increased level persists even 1-2 hours after onset of heat.

Iv) Vaginal smear also indicates an increase in cornified acidophilic cells during heat period.

v) The viscosity of vaginal mucous is lowered during heat.

The estrus detection aids such as pressure sensitive indicators placed on the sacrum like KaMaR heat mount detector or painting the tail-head are unsatisfactory because wallowing are rubbing interfere with their efficiency.

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