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Pregnancy Rate and Sex-ratio of Calves Born to Sex-sorted Semen in Murrah Buffaloes

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ABSTRACT

The research was carried out to study the pregnancy rate and sex-ratio of female calves born through sex-sorted semen in buffaloes. Murrah and graded Murrah buffaloes were inseminated with sex-sorted semen (n=44) and with conventional semen (n=20). Out of which 17 (38.63%) and 9 (45%) buffaloes were found pregnant in sex-sorted and conventional semen groups, respectively. Out of seventeen calves born with inseminations of sex-sorted semen, 15 (88.23%) were female calves while two (11.77%) calf born were male. Out of nine calves born with inseminations of conventional semen, 5 (55.55%) were females and four (44.45%) were male. Female calves born were 32.68 % more in sex-sorted semen compared to conventional semen in buffaloes so female sex-sorted semen should be utilized for production of more number of female calves in buffaloes.

Key words: Buffalo, Pregnancy Rate, Sex-ratio, Sex-sorted Semen

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INTRODUCTION

As per 20th livestock census, in 2019 the buffalo population was 109.85 million and nearly 49 % of the milk production was contributed by indigenous and non-descript buffaloes (Annual Report, DAHD, 2020-21). The main constraint in buffalo milk production is low reproductive efficiency. The reduced fertility is due to seasonality of estrus, long calving interval due to postpartum, weak or silent estrus, lower conception rate through artificial insemination (Kundalkar *et al.,* 2017). This affects not only the total milk production of buffalo but also the calf crop in her reproductive life affecting the herd's profitability. India continues to be highest milk-producing country globally

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with 221.1 million tonnes in year 2021-22. To meet the increasing demands for the milk by 2030 (266.5 million MT) to India's ever-growing population, it is necessary to substantially increase the number of elite buffalo females as replacement heifers. This could be achieved majorly by widespread use of sex-sorted semen in buffaloes with spontaneous and synchronized estrus.

Ovsynch is one of the most adopted estrus synchronization protocols utilized for synchronization of ovulation and fixed time artificial insemination in buffaloes at the field level (Ingawale *et al.,* 2007). Double PG Ovsynch protocol includes administration of the second dose of PGF2α on a subsequent day after the first PGF treatment in the Ovsynch protocol, which increases pregnancy rate in buffaloes by reducing chances of inadequate corpus luteum regression (Dhatonde, *et al.,* 2023). Sex of calf is an important aspect and buffalo farmers prefer female calves as progeny for milk production. Commonly the male calves in buffaloes are not reared by buffalo owners. The most important variables in the extent of use of sex-sorted semen are pregnancy rate and female sex ratio. Considering the importance of topic, the present research work was carried out to study pregnancy rate and sex- ratio of calves born to buffaloes inseminated with female sex-sorted semen.

MATERIALS AND METHODS

The study was conducted on graded Murrah buffaloes maintained at dairy farms from January 2020 to December 2022 in and around Akola, Maharashtra. The buffaloes that had completed a postpartum period of sixty days with normal reproductive genitalia were selected. All the selected buffaloes were dewormed using injection with Ivermectin @ 1 ml per 50 kg body weight subcutaneously and initial treatment were given like injection vitamin AD_3E&H 5 ml I/M and supplemented with a chelated mineral mixture 50 gm daily orally after a first gynaecological examination. The buffaloes exhibited spontaneous estrus after supplementation with normal estrual attributes without clinical and subclinical infection were selected.

Group-I (n=10):

The buffaloes exhibiting spontaneous estrus were inseminated with female sex-sorted semen at mid-estrus

Group-II (n=22)

The buffaloes were synchronized with the Ovsynch protocol (Inj. Buserline acetate 10 µg i/m on day 0, Inj. Cloprostenol sodium 500 µg on a day 7, and Inj. Buserline acetate 10µg i/m on a day 9) and inseminated with female sex-sorted semen after 16-20 hrs at last GnRH injection.

Group-III (n=12)

The buffaloes were synchronized with the double PG Ovsynch synchronization protocol (Inj. Buserline acetate 10µg i/m on a day 0, Inj. Cloprostenol sodium 500 µg on a day 7 and day 8 and Inj. Buserline acetate 10µg i/m on a day 9) and inseminated with sex-sorted semen after 16-20 hrs at last GnRH injection.

Group-IV (n=10):

The buffaloes exhibiting spontaneous estrus were inseminated at mid-estrus with conventional semen.

Group-V (n=10)

The buffaloes from this group were synchronized with Ovsynch protocol and inseminated with conventional semen after 16-20 hrs after last GnRH injection.

The thawed sex-sorted and conventional semen were deposited in body of uterus during artificial insemination. The pregnancy diagnosis was carried out by per rectal (P/R) examination in inseminated buffaloes after sixty days and statistical analysis of variation in pregnancy rate was carried out by Chi-square test using Web Agri Stats Package (WASP-2).

RESULTS AND DISCUSSION

The pregnancy rates and sex ratio of calves born after AI with sex-sorted and conventional semen are depicted in Table 1. In all 44 buffaloes were inseminated with sex-sorted semen and 20 with conventional semen, out of which 17 and 9 buffaloes, respectively were found pregnant, giving conception rate of 38.63% and 45%. Out of seventeen calves born with inseminations of sex-sorted semen, 15 (88.23%) were female calves and two (11.77%) calf born were male. Out of nine calves born with inseminations of conventional semen, 5 (55.55%) were females and four (44.45%) were male. Female calves born with sex-sorted semen were 32.68 % more compared to conventional semen in buffaloes.

In the present study, lower pregnancy rate was recorded after AI with sex-sorted semen than conventional semen. These results were in concurrence with Sawant *et al.* (2022) who reported 40 and 50 % pregnancy rate in buffaloes inseminated during spontaneous estrus with

Table 1: Pregnancy rate and sex-ratio with female sex-sorted and conventional semen in buffaloes

Sr. No.	Groups	No. of buffaloes inseminated	No. of buffaloes pregnant	No. of female calves born	No. of male calves born
Female sex-sorted semen					
1	Group-I (n=10) SS-Spontaneous Estrus	10	04 (40 %)	04 (100%)	00
2	Group-II (n=22) SS-Ovsynch	22	08 (36.36%)	07 (87.50%)	01(12.50%)
3	Group-III (n=12) SS-Double PG Ovsynch	12	05 (41.66%)	04 (80%)	01(20%)
	Overall	**44**	**17 (38.63%)**	**15 (88.23%)**	**2 (11.77%)**
Conventional semen					
4	Group-IV (n=10) CS- Spontaneous Estrus	10	05 (50%)	03 (60%)	02 (40%)
5	Group-V (n=10) CS-Ovsynch	10	04 (40%)	02 (50%)	(50%)
	Overall	**20**	**9 (45%)**	**05 (55.55%)**	**04 (44.45%)**

sex-sorted and conventional semen. Dhatonde *et al.* (2023) reported 33.33 % pregnancy rate with Ovsynch protocol in buffaloes inseminated with sex-sorted semen. The pregnancy rate for sex-sorted semen in Ovsynch synchronization was in harmony with results reported by Shinde *et al.* (2022) who observed 40 % pregnancy rate in sex sorted and 50% in conventional groups following Ovsynch protocol in Gir cows. The pregnancy rate for sex sorted semen obtained in the present study was similar to that obtained (42.7%) by Sharma *et al.* (2019) in buffaloes. However, higher pregnancy rate was recorded in Nili-Ravi (46.2%), Swamp (48.5%) and in Murrha (52.5%) buffaloes by Lu *et al.* (2015).

Deshmukh *et al.* (2022) reported 47.72 % (21/44) and 43.18 % (19/44) first service conception rate in cows with sex-sorted semen with spontaneous and synchronized estrus while in heifers it was 50 % (3/6). Sharma *et al.* (2022) reported 47.37 and 54.32 % first service conception rate in cows with sex-sorted and conventional semen, respectively. The female calves born were 90.50 % with sex-sorted semen while 47.69 % with conventional semen. Patra *et al.* (2022) recorded 50 % conception rate with double inseminations 12 hrs apart and 37.1 % with single insemination of sexed semen at spontaneous estrus in Tharparkar cows and female calves born were 91.7 %. Shukla *et al.* (2022) recorded 58.00 % conception rate in bovines for more than 1.52 lakh AI has been performed with sex-sorted semen. The variation in the pregnancy rate in different studies may be due to difference in species, parity, body condition score, managemental and nutritional conditions, season, exogenous supplementation of hormones and site and time inseminations.

CONCLUSIONS

Inseminations with female sex-sorted semen achieved optimum pregnancy rate in synchronized as well as spontaneous estrus in parous buffaloes and produced more number of female calves under field condition.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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