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Research Article

A NOTE ON CONCEPTION RATE AND SEX RATIO IN A.I. BRED JAFFARABADI BUFFALO

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ABSTRACT
Data on 13,628 Artificial Inseminations (A.I.) performed during September 2013 to August 2015 leading to 3,505 normal calvings recorded during July 2014 to September 2015 on 12,343 Jaffarabadi buffaloes owned by 10,792 farmers from Amreli, Junagarh and Rajkot districts of Sourashtra region of Gujarat under in-situ conservation program sponsored by Indian Council of Agricultural Research, New Delhi and executed through National Bureau of Animal Genetic Resources (NBAGR) Karnal were compiled for present investigation. The animals not repeated within 90 days post insemination were examined per rectum for pregnancy confirmation. The conception rate (CR) was calculated using formula suggested by Qureshi *et al.,* (2008). Overall CR was observed to be 52.59±1.43 per centand amongst factors studied for effect on CR, district differences were significant. Highest number of inseminations (48.77%) and CR (54.80±0.61%) was noticed in Junagarh district. Inseminations performed in Amreli and Rajkot districts were 38.24 and 13.00 per cent while the CR was 50.09±0.69 and 51.67±1.19 per cent, respectively. Other factors like A.I. periodand season, cluster of A. I., parity of animal, service sire used for service and A.I. sequence did not affected conception rate significantly. In present study, 48 per cent females and 52 per cent male births were recorded and it was further noticed that no significant association of sex ratio with the parameters like calving period, calving season, A.I. season, dam parity, service sire and districts were noticed.

Keywords: *Jaffarabadi Buffalo, Sourashtra Region, Gujarat State, Conception Rate, Sex Ratio*

INTRODUCTION
Buffaloes (*Bubalusbubalis*), a principal milk producer numbering 47.22 million milch heads contribute to more than half of the total milk (55%) in the country (Mathivanan, 2014). Farmerchoice for buffalo maintenance is due to efficiency in converting low quality roughage and higher milk fat content. Fertility plays an important role in animal's productive life and per cent conception rate (CR) is the accepted indicator. Low conception rate and its heritability due to either non-expression of heat, reproductive problems or increased number of services per conception leads to increased age at first calving, service period, calving interval and ultimately lowering overall life time productivity of animals. Lower heritability of the trait isindicative of greater environment and management influence suggesting scope for improvement in management of animals by farmers. Available fertility literature on Jaffarabadi breed of buffalo in relation to effect of season, region, parity, service sire, A.I. sequence etc. is scanty and inadequate to explain the role of these factors for deciding management strategy at village levels. An attempt in the present investigation was made to study effect of some factors related to fertility and sex ratio in Jaffarabadi buffalo in Sourashtra region of Gujarat state.

MATERIALS AND METHODS
Data on 13,628 Artificial Inseminations (A.I.) performed during September 2013 to August 2015 leading to 3,505 normal calvings recorded during July 2014 to September 2015 on 12,343 Jaffarabadi buffaloes owned by 10,792 farmers from Amreli, Junagarh and Rajkot districts of Sourashtra region of Gujarat under in-situ conservation program sponsored by Indian Council of Agricultural Research, New Delhi and executed through National Bureau of Animal Genetic Resources (NBAGR) Karnal were compiled for present investigation. The animals were individually maintained and reared by farmers. The housing ranged from open to permanent constructed sheds. Animals were semi stall fed with dry and green fodder

along with concentrate. The calls for artificial insemination were received through mobile phones and animals were inseminated with frozen semen at doorstep of farmers. Buffaloes not repeated within 90 days post insemination were examined per rectum for pregnancy confirmation. The conception rate was calculated using formula suggested by Qureshi *et al.,* (2008). The information on period of insemination, season, districts, Cattle Development Centre, parity and bull used for insemination, birth date of calves, calf sex were compiled for studying conception rate and sex ratio related to these factors. The data were analyzed using statistical methods suggested by Snedecor and Cochran (1967) and significance within subgroups was tested by Duncans Multiple Range Test as modified by Kramer (1957). Sex ratio was tested using X^2 test of significance according to Chandel (1963).

RESULTS AND DISCUSSION

Overall conception rate (CR) was recorded as 52.59±1.43 per cent. Mean CR and standard error for different factors studied are presented in Table 1.

The CR reported in present investigation was found similar to that reported by Pushpa and Chandel (2014) in animals from Sumul dairy Surat and much higher than animals from Amul dairy Kheda, Sabar dairy Sabarkheda and Gopal dairy Juangarh.

A.I. Period: The highest inseminations (56.88%) as well as conception rate (52.98±0.57%) was recorded during the period 2013-14. Pushpa and Chandel (2014) noticed lower CR during similar period in animals from Sumul dairy Surat (48.59%), Amul dairy Kheda (23.01%), Sabar dairy Sabarkheda (35.30%) however conception rate of animals from Gopal dairy Junagarh was higher (56.56%). Remaining 43.12 per cent inseminations were performed in 2014-15 and conception rate was recorded as 52.08±0.62 per cent. A.I. period did not had any significant effect on conception rate.

A.I. Season: Inseminations performed during winter season (October-January) was highest (48.92%) followed by 32.87 per cent in summer (February to May) and lowest (18.21%) in rainy season (June to September). Although highest conceptions were recorded in winter season (52.68±0.61%) followed by rainy season (52.62±1.00%) and summer season (52.44±0.75%), the differences were statistically non-significant.

District: Significant district wise variation in conception rate was noticed. Highest number of inseminations (48.77%) and conception rate (54.80±0.61%) was noticed in Junagarh district. Inseminations performed in Amreli and Rajkot districts were 38.24% and 13.00% while the conception rates in these two districts were observed to 50.09±0.69% and 51.67±1.19% respectively. Environmentally favorable conditions such as availability of green fodder, supply of adequate ration and effluent condition of farmers in Junagarh district might have resulted overall better management of animals compared to those in other districts could be reason for resultant higher CR in Jaffarabadi buffaloes.

Cattle Development Centre (CDC): Twenty cluster locations (Cattle Development Centers- CDC) in Sourashtra region of Gujarat state were selected where in-situ Jaffarabadi breed conservation program was implemented.

Although, conception rate among CDC's ranged from 45.40±1.86 per cent in Rabarika CDC to 60.76±2.08 per cent in Vyajpur, the differences were not of any significance. It was noticed that number of inseminations performed and conception rate recorded was inversely proportional. Similar results have been reported by Ricord *et al.,* (2004) who observed that in USA dairy animals, conception rate decreased as number of inseminations increased.

Table 1: Mean Conception Rate in Jaffarabadi Buffalo and Sex Ratio

Source	Parameter	N	CR (%)	% Observations
A.I. Period	2013-14	7752	52.98±0.57	56.88
	2014-15	5876	52.08±0.62	43.12
A.I. Season	Summer	4479	52.44±0.75	32.87
	Rainy	2482	52.62±1.00	18.21
	Winter	6667	52.68±0.61	48.92

District**	Amreli	5211	50.09±0.69[a]	38.24
	Junagadh	6646	54.80±0.61[b]	48.77
	Rajkot	1771	51.67±1.19[a]	13.00
CDC	Bhalpara	770	53.64±1.80	5.65
	Devrajiya	681	53.30±1.91	5.00
	Dhanfuliya	826	56.54±1.73	6.06
	Dhava	299	51.51±2.90	2.19
	Dolti	577	55.29±2.07	4.23
	Gadhakda	317	52.05±2.81	2.33
	Gopalgram	763	46.00±1.81	5.60
	Jasdan	676	52.66±1.92	4.96
	Kovaya	1054	49.91±1.54	7.73
	Mota barman	841	51.72±1.72	6.17
	Moviya	1105	51.04±1.50	8.11
	Panidhara	1182	54.06±1.45	8.67
	Prashnavada	631	53.25±1.99	4.63
	Rabarika	718	45.40±1.86	5.27
	Ranpur	488	57.58±2.24	3.58
	Savni	614	52.93±2.02	4.51
	Sutrapada	583	58.83±2.04	4.28
	Umrethi	690	49.71±1.90	5.06
	Valaradi	260	48.08±3.10	1.91
	Vyajapur	553	60.76±2.08	4.06
Animal parity	Heifer	3232	45.08±0.88	23.72
	1	1840	55.16±1.16	13.50
	2	2083	54.73±1.09	15.28
	3	2845	55.78±0.93	20.88
	4	2032	53.44±1.11	14.91
	5	760	56.84±1.80	5.58
	6 & more	836	53.83±1.73	6.13
A.I. Bull	Tahir	661	55.98±1.93	4.85
	Taimur	842	54.51±1.72	6.18
	Taj	1015	52.71±1.57	7.45
	Tambora	936	50.32±1.64	6.87
	Tanaji	770	51.82±1.80	5.65
	Tarang	825	54.79±1.73	6.05
	Tejab	1214	50.49±1.44	8.91
	Terbez	771	50.45±1.80	5.66
	Thaksen	897	50.50±1.67	6.58
	Tirth	847	53.96±1.71	6.22
	Tomy	1036	50.10±1.55	7.60
	Topaz	798	57.02±1.75	5.86
	Trilok	1051	53.19±1.54	7.71
	Trimurti	1023	51.42±1.56	7.51
	Tuka	942	54.14±1.62	6.91
A.I. Sequence	1	12343	52.22±0.45	90.57
	2	1183	56.30±1.44	8.68
	3 & more	102	53.92±4.96	0.75
Grand Total		13628	52.59±1.43	100

** Dissimilar superscripts indicates significant (P<0.01) differences of means*

Animal Parity: Conception rate in heifers (45.08±0.88%) was recorded lowest among other parity of animals studied. Although highest (56.84±1.80%) conception rate was noticed in fifth lactation animals followed by third (55.78±0.93%), first (55.16±1.16%), second (54.73±1.09%), sixth and more (53.83±1.73%) and lowest (53.44±1.11%) in fourth lactation. The difference in CR among parity was not of any significant consequence. Bhagat and Gokhale (2013) recorded similar results in field crossbred cattle however, Shindey *et al.,* (2014) recorded significant effect of animal parity in animals from Vidharbha region of Maharashtra state.

Service Sire: During the study period, semen from fifteen sires was used for breeding Jaffarabadi buffaloes. Highest number of inseminations was performed by using semen from Tejab (8.91%) while lowest (4.85%) from Tahir sire however the conception rate recorded highest from Topaz sire (57.02±1.75%) and lowest from Tomy sire (50.10±1.55%). The CR among service sires were not statistically significant and hence were not important.

A.I. Sequence: Out of 13,628 inseminations 90.57 per cent inseminations were performed in first attempt followed by second (8.68%) and third (0.75%). The conceptions recorded in first attempt were 52.22±0.45 per cent which were much higher compared with 41.66 per cent in Murrah noticed by Ingawale *et al.,* (2014). Although, conceptions recorded for first attempt were low but per cent AI coverage was highest (90.57%). The results noticed by Ricord *et al.,* (2004) in USA dairy animals supported the present findings that number of A.I. performed and conception rate had negative correlation. Further, it was noticed that the sequence of A.I. did not affected conception rate.

Sex Ratio: Out of 3505 births recorded 48 per cent were females and 52 per cent were males, it was further noticed that no significant association of sex ratio with the parameters like calving period, calving season, A.I. season, dam parity, service sire and districts.

Yilmaz *et al.,* (2010) while studying in Brown Swiss state animal farm in Turkey observed that calving year-sex, calving season-sex, parity-sex, and sire-sex associations were non-significant, supporting the findings in the present investigation.

Since variation in sex ratio findings of the present investigation have not been reported in Jaffarabadi breed of buffaloes earlier and elsewhere, it is hoped that findings noted in the present study could beusefulin planning and executing breed conservation and improvement program under field conditions.

It was concluded that under Sourashtra region of Gujarat state, within districts where assured irrigation facility for having abundant green fodder availability for overall better management of Jaffarabadi buffaloes under field conditions are needed to be considered for improvement in conception rate in field animals.

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