SIRE CONCEPTION RATE IN MURRAH BREEDING BULLS

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ABSTRACT

The present study based on 180 Murrah bulls for sire conception rate managed at buffalo farm under department of Livestock Production Management (LPM), Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar during a period of 24 years from 1996 to 2019. Sire conception rate (SCR) was calculated by subtracting the average conception rate from individual conception rate of the sire. In this study, average daughter conception rate of sire is used to calculate sire conception rate. The least-squares means of conception rate and number of services per conception of daughters of sires were 67.08±1.18 and 2.01±0.05, respectively. The results showed that the average overall conception rate of Murrah bulls was estimated as 23.32% with the coefficient of variation of 26.23%. The average sire conception rate of Murrah bulls varied from - 18.56% to + 26.68%. This study concluded that there were 77 sires which had high SCR, should be used for breeding and their male progeny should be tested for the use in future generations.

India is a vast land of agriculture and livestock, comprising 24% of global milk production stands at first position in total milk production (DAHD, annual report 2021-2022). With the annual growth rate of 5.29%, India's milk production was 221.06 million tonnes (BAHS, 2022). According to 20th livestock census, with the growth of 1% over the previous year, total buffaloes population in our country has reached to 109.85 million, out of which 51.17 million buffaloes are in milk. Male buffalo population decreased by 42.35% over the previous census, while female buffalo population climbed by 8.61%. India has 19 recognized breeds of buffalo of which Murrah is the best breed of buffalo not only in India but in the whole world. Water buffalo (*Bubalus bubalis*) of the Murrah breed are domesticated buffalo raised for milk production.

It is native of Rohtak, Hisar and Jind of Haryana as well as the Nabha and Patiala districts of Punjab in India and Punjab provinces of Pakistan. Sire is considered to be half of a herd as it contributes much in the germplasm of next generation in the herd, so the role of a sire in conception is vital. The superiority of one sire over another in a population is determined by sire conception rate. Higher sire conception rate (SCR) increases the chances of pregnancy rate and thus improves the fertility performance of the dam, however, loss of conception is multifactorial in nature (Ortega *et al.*, 2018). Keeping in mind, the importance of sire conception rate, this study was conducted to estimate the SCR of sires and their use for improvement of performance of herd and to produce male progeny which could be for next generations.

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MATERIALS AND METHODS

The data of 180 Murrah bulls was gathered from history cum pedigree sheets of Buffalo Farm, Department of Livestock Production Management, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar during a period of 24 years amid between 1996 to 2019. Hisar's climate is subtropical in nature and is found in a semi-arid area. Hisar is located in a latitude of 29° 10' N, a longitude of 75° 40' E, and an elevation of 215.2 metres. A maximum likelihood computer programme (Harvey, 1990) using Henderson's method III (Henderson, 1953) was used to evaluate the least-square mean and influence of several non-genetic factors viz. period of calving, season of calving and parity on the conception rate (CR) and number of calving per conception (NSC) of the daughters of sires, in order to overcome non-orthogonality of the data caused by uneven subclass frequencies. The whole twenty-four-year span was divided into six periods, each of which was made up of four consecutive years. These six periods were: 1996-1999 (Period 1), 2000-2003 (Period 2), 2004-2007 (Period 3), 2008-2011 (Period 4), 2012-2015 (Period 5), and 2016-2019 (Period 6). The geo-climatic circumstances in the area led to the additional division of each year into four calving seasons: summer (April to June), monsoon (July to September), autumn (October to November), and winter (December to March). Data up to third parity was included in the present study. Sire conception rate determines the superiority of one sire over other sire in a population. It was calculated by subtracting the adjusted average conception rate from individual conception rate of the sire (Kuhn *et al.*, 2008). In this study, average daughter conception rate of sire is

Table 1.   List of elite sires with individual conception rate and sire conceptionrate with rank

Sr. No.	SNC	CR_i	SCR	Rank	Sr. No.	SNC	CR_i	SCR	Rank
1.	233	50	26.68	1	14	276	32.29	8.97	10
2.	115	41.67	18.35	2	15	112	32.29	8.97	10
3.	159	38.89	15.57	3	16	261	32.29	8.97	10
4.	160	36.9	13.58	4	17	123	31.94	8.62	11
5.	184	36.11	12.79	5	18	258	31.82	8.5	12
6.	260	34.92	11.6	6	19	201	31.67	8.35	13
7.	158	34.72	11.4	7	20	107	31.55	8.23	14
8.	230	33.89	10.57	8	21	142	31.25	7.93	15
9.	148	33.33	10.01	9	22	263	30.95	7.63	16
10.	153	33.33	10.01	9	23	231	30.95	7.63	16
11.	274	33.33	10.01	9	24	225	30.83	7.51	17
12.	179	33.33	10.01	9	25	170	30.78	7.46	18
13.	238	33.33	10.01	9	26	133	30	6.68	19

Average conception rate of herd = 23.32%; SNC- Sire Number Code; CRi - Individual Conception Rate; SCR- Sire Conception Rate

used to calculate sire conception rate. Overall means of CR and NSC of daughters of sires were observed and adjusted data was used for the estimation of SCR by using the individual CR of each sire of herd deviated from the herd mean of all sires.

RESULTS AND DISCUSSION

The least squares mean of conception rate (CR) and number of services per conception (NSC) of daughters of sires was 67.08±1.18 and 2.01±0.05, respectively. Season of calving and parity had a significant effect on CR and NSC but remain unaffected by period of calving. Monsoon calvers performed better in terms of both these traits and improvement was seen along the lactation order due to favourable weather conditions and physiological maturity of animals with time (Sarkar *et al.*, 2005 and Bhave *et al.*, 2016). Sire conception rate showcase the superiority of bull over the average performing bulls of the herd. The average conception rate of herd was 23.32%. Naha *et al.* (2015) reported higher average conception rate based on first AI (45.95%) and overall conception rate (46.38%) of breeding bulls of Sahiwal cattle.

The list of top elite sires which had high sire conception rate, top of them had 50% individual conception rate exhibited 26.68% SCR and other top subsequent sires which exhibited SCR between 18.35% and 6.68% whose individual conception rate varied from 41.67% to 30% as depicted in Table 1. Average number of daughters per sire was 10, ranged from 8 to 20. The sire conception rate of sire varied from -18.56% to +26.68% and the coefficient of variation of sire was 26.23%. Nearly similar results for SCR in Murrah bulls were obtained by Patil (2017) which ranged from -17.99 to +19.02% and in HF crossbred bulls which were found between -18.21 to +19.27%. The SCR rankings enable up to seven proven services per cow (22

month of age) per lactation and are based on a big, nationwide database (Kuhn *et al.*, 2006). SCR of Holstein bulls varied from +5% to -6% (Van Raden, 2008) and +7% to -4% for Jersey bulls (Lee and Steinnert, 2008). Kuhn *et al.* (2006) found that SCR ranged from -4% to +5% for Holstein bulls and -4% to +7% for Jersey bulls. Penagaricano *et al.* (2012) reported SCR of HF bulls ranged from -6.80% to +10.66%. Average sire conception rate as reported by Naha *et al.* (2015) was ranged from -2% to + 3% and -2% to + 4 % for conception rate based on first AI and overall conception rate in Sahiwal breeding bulls. The USDA Animal Improvement Programmes Laboratory launched a nationwide study for service sire conception rate (SCR) in August 2008 (Norman *et al.* (2008). There is a need of such programs in India for widespread improvement in productivity by using proven high SCR sires with superior germplasm. Apart from this, the number of daughters of each sire were also varied largely and showed non-uniformity. Daughters of elite sires performed better in terms of production traits as compared to reproduction traits in the herd. Elite sires tend to produce more progeny and had better sire conception rate.

CONCLUSION

From the present research, it was concluded that the average conception rate of herd was 23.32% and sire conception rate of sire ranged from -18.56% to +26.68%. Top elite sires had SCR ranging from 6.68 to 26.68% and produced more progeny and contributed more to the next generation. Herds can use these sires and their stored semen for the improvement of their herd.

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