SEASONAL VARIATION IN SEMEN PRODUCTION PARAMETERS OF GIR BULLS REARED UNDER TROPICAL CLIMATE

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ABSTRACT

The present study revealed that the semen production potential and semen ejaculate attributes of Gir breeding bulls maintained under tropical climatic conditions were influenced by the season. Sperm concentration as well as semen doses frozen and stored per ejaculate were higher ($p<0.05$) in winter compared to rainy and summer season. In brief, among all the three seasons, winter contributed maximum towards annual production of frozen semen doses followed by rainy and summer season.

Keywords: Breeding, Bull, Gir, Season, Semen

Considering the adaptability of Gir breed under tropical conditions, this breed is taken up in the breeding policy for grading up the non-descript cattle in India. This demands huge number of frozen semen doses of pure Gir bulls of superior genetic ability. However, the impact of seasonal fluctuations on semen production parameters were observed in exotic (Mishra *et al.*, 2012) as well as Indian (Tiwari *et al.,* 2013) breeds. Therefore, the present study was carried out to find out the impact of season on semen production parameters of pure Gir bulls maintained under tropical climatic conditions.

For the present study, the data on semen production of 25 pure Gir bulls recorded in SMILE software (System Management in Integrated Laboratory Environment, IMV, France) of Frozen Semen Bull Station, Salboni, West Bengal over a period of one year (March 2014 to February 2015) was utilized. All the bulls had normal breeding soundness evaluation and were maintained under identical managemental conditions. Total number of ejaculates obtained during the study period from all the bulls were 3,561. The seasons of the area were classified as summer (March to June), rainy (July to October) and winter (November to February). As per the collection schedule, semen was collected using artificial vagina from all the bulls twice in week (two ejaculates per collection). The neat semen of each ejaculate was evaluated for volume (>2 ml, accepted), concentration (500 million/ml, accepted) and motility (<70%, rejected) and the accepted ejaculates were used for further processing. The semen dilutions were carried out by mixing neat semen with Tris-egg yolk citrate dilutor. The filling and sealing of straw of 0.25 ml volume was performed and freezing of semen was done using conventional method (equilibration at 4^0C for 4 h, followed by gradual drop in temperature from 4^0C to -140^0C in 9 min in bio-freezer and finally shifting the straws in liquid nitrogen at -196^0C). The data was statistically analysed using one-way ANOVA by a computer programme named SPSS 16.0®.

In the present study in Gir bulls, the neat ejaculate discard percentage was higher in summer and rainy compared to winter season ($p<0.05$, Table 1). The variation in semen ejaculate volume, initial motility and post-thaw motility in different seasons was absent ($p>0.05$, Table 1) in Gir bulls. However, the

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Table 1: Seminal parameters as well as production and rejection status of frozen semen doses (FSDs) of Gir breeding bulls in different seasons

Parameters	Season		
	Summer	Rainy	Winter
Total ejaculates, n	1152	1205	1204
Ejaculates/ month/bull, n	15.36	16.07	16.05
Neat ejaculates discarded, %	20.6±1.8[a]	20.9±1.6[a]	12.3±1.2[b]
Ejaculate volume, ml	6.2±0.1	6.2±0.1	6.4±0.1
Sperm concentration, M/ml	705.6±18.3[a]	794.0±21.1[b]	948.1±18.8[c]
Initial motility, %	71.0±0.6	71.0±0.5	74.1±0.2
Post thaw motility, %	55.2±0.4	56.7±0.3	54.8±0.3
FSDs produced/ejaculate, n	240.1±5.3[a]	271.3±8.2[b]	302.3±7.0[c]
FSDs stored/ejaculate, n	227.1±5.8[a]	262.4±8.1[b]	294.5±7.1[c]
FSDs stored/bull, n	8462	9887	12465
FSD discard, %	4.5±1.0[a]	2.4±0.6[b]	1.8±0.5[b]

[a vs b vs c]P<0.05, within a row

results revealed that season had impact on sperm concentration with higher concentration (p<0.05) in winter and lower in summer season (Table 1). Others have also reported the effect of season on sperm concentration in indigenous breeds like Sahiwal (Tiwari *et al.*, 2013).

The semen doses frozen as well as stored per ejaculate were higher in winter followed by rainy and summer season (p<0.05, Table 1). Similar results were reported in Sahiwal (Tiwari *et al.,* 2013) and Red Sindhi (Tiwari *et al.,* 2012) cattle. The winter season contributed maximum (40%) towards annual frozen semen dose production followed by rainy (32%) and summer (28%) season as the frozen semen doses stored per bull were higher in winter followed by rainy and summer season (Table 1). Furthermore, the frozen semen dose discard percentage was higher in summer than both rainy and winter season (p<0.05, Table 1).

In brief, the production of good quality semen from Gir bulls under tropical climatic condition can be best achieved in winter season. The season had major impact on sperm concentration and frozen semen dose production as well as rejection in Gir breeding bulls.

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