

## SEASONAL INFLUENCE ON THE QUALITY AND FREEZABILITY OF SEMEN OF SWAMP BUFFALO BULLS

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### ABSTRACT

A study was conducted to record the basic information on seasonal influence on the quality and freezability of semen of four swamp buffalo bulls maintained at "Network Project on Swamp Buffalo," Department of AGB, College of Veterinary Science, Khanapara, Guwahati. The year was divided into summer (June to August), autumn (September to November), winter (December to February) and spring (March- May) on the basis of meteorological data of the area. Each ejaculate was collected biweekly by AV method to record the ejaculate volume, mass activity, initial sperm motility, sperm concentration, live sperm, total HOST reacted sperm, live intact acrosome, sperm abnormality percentage. After collection the semen samples were extended with Tris-egg yolk- citrate glycerol extender before filling in 0.25 ml French straws and assessed the freezability by examining the percentage of progressively motile spermatozoa. The results revealed that the effect of seasons was found to be significant for ejaculate volume ( $P < 0.01$ ), initial sperm motility ( $P < 0.05$ ), sperm concentration ( $P < 0.01$ ), and total head abnormalities ( $P < 0.05$ ). The ejaculate volume and sperm concentration was significantly ( $P < 0.01$ ) higher during summer season. The initial sperm motility was significantly ( $P < 0.01$ ) lower and the incidence of head abnormalities significantly ( $P < 0.05$ ) higher during winter season.

**Key words:** Swamp buffalo bull, seasons, semen characteristics.

The quality and fertility of buffalo semen has been reported to vary remarkably during various season<sup>3,4</sup>. Better semen quality of buffalo bull has been reported during the hot and humid summer than in colder months<sup>8</sup>, but contrary observations have also been published<sup>6</sup>. The present study was aimed to ascertain the best season/ months for harvesting and freezing maximum number of good quality ejaculates of swamp buffalo bulls to achieve better fertility results in the field.

### MATERIALS AND METHODS

The study was carried out over a period of one year (2013-2014) utilizing biweekly collected semen ejaculates by artificial vagina method of four swamp buffaloes maintained at "Network Project on Swamp Buffalo," Department of Animal Genetics and Breeding, College of Veterinary Science, Khanapara, Assam. The year was divided into summer (June to August), autumn (September to November), winter (December to February) and spring (March- May) on the basis of meteorological data of the area. Each ejaculate was used for freezing with Tris-egg yolk- citrate glycerol extender<sup>3</sup>. The extended semen was equilibrated in an equilibration chamber for 4 h at 5°C before filling in 0.25 ml French straws. After filling and

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sealing, the semen straws were placed in a rack at 4 cm above liquid nitrogen in the vapour phase for 8 min and plunged into liquid nitrogen container ("196°C). The freezability was assessed by thawing frozen semen straws in water- bath kept at 37°C for 30 s and examining the percentage of progressively motile spermatozoa under high power phase contrast microscope. The ejaculate volume, mass activity, initial sperm motility<sup>10</sup>, sperm concentration, live sperm<sup>1</sup>, total HOST reacted sperm<sup>5</sup>, live intact acrosome<sup>9</sup>, sperm abnormality percentage<sup>10</sup> were studied as per methods described by earlier workers. The statistical analysis of the data was done using SAS Enterprise Guide 4.2 version.

### RESULTS AND DISCUSSION

The averages of some important seminal attributes and freezability of semen of swamp buffalo bulls observed during different seasons of the year have been presented in Table 1. The effect of seasons was found to be significant for ejaculate volume (P< 0.01), initial sperm motility (P< 0.05), sperm concentration (P< 0.01), and total head abnormalities (P< 0.05) while mass

activity, live sperm, total HOST reacted spermatozoa, intact acrosome, mid piece abnormalities, tail abnormalities and freezability did not differ significantly. The ejaculate volume and sperm concentration was significantly (P<0.01) higher during summer than the other three seasons. The initial sperm motility was significantly (P<0.01) lower and the incidence of head abnormalities significantly (P< 0.05) higher during winter season. A similar seasonal variation in the quality and freezability of buffalo semen has also been reported by earlier workers <sup>2,3</sup>. The low quality and freezability of semen observed during winter season was attributed to extremely low ambient temperature and chilly winds that prevailed during the months of December- January. The too low temperature and chilly winds adversely affect the vigor and testosterone production of bulls thereby suppressing the testicular function and accessory sex glands secretion as opined by earlier workers<sup>3</sup>. On the other hand, the summer season prevailed during the months of June – August favoured production of excellent quality semen with high freezability. These findings also agreement with the findings of earlier workers <sup>2, 3, 9</sup>.

**TABLE 1. SEASONAL VARIATIONS IN THE QUALITY AND FREEZABILITY OF SEMEN OF SWAMP BUFFALO BULLS**

Semen characteristics	Summer (Jun - Aug)	Autumn (Sep-Nov)	Winter (Dec- Feb)	Spring (Mar-May)	Overall
Ejaculate volume (ml)	2.80 <sup>a</sup> ±0.14	1.84 <sup>b</sup> ±0.08	2.11 <sup>b</sup> ±0.08	2.10 <sup>b</sup> ±0.10	2.21±0.06
Mass activity (0 to 4+ scale)	3.89 <sup>a</sup>	3.89 <sup>a</sup>	3.50 <sup>a</sup>	3.83 <sup>a</sup>	3.78 <sup>a</sup>
Initial sperm motility (%)	80.00 <sup>a</sup> ±0.83	79.44 <sup>a</sup> ±0.56	75.33 <sup>b</sup> ±1.48	78.33 <sup>ab</sup> ±1.44	78.28± 0.63
Live sperm (%)	82.82 <sup>a</sup> ±0.87	79.37 <sup>b</sup> ±1.06	80.30 <sup>ab</sup> ±1.06	79.80 <sup>b</sup> ±0.95	80.57±0.50
Sperm concentration (million/ml)	1251.00 <sup>a</sup> ±27.82	1243.25 <sup>a</sup> ±31.90	1171.50 <sup>a</sup> ±26.00	1081.00 <sup>b</sup> ±29.67	1186.68 ±15.32
HOST-reacted sperm (%)	82.78 ± 1.24	81.44 ± 1.18	82.44 ± 1.32	83.33 ± 1.05	82.50 ± 0.59
Intact acrosome (%)	95.11± 0.31	94.67 ± 0.24	94.44 ± 0.24	95.44± 0.38	94.92 ± 0.16
Head abnormalities (%)	0.66±0.16	0.60 <sup>a</sup> ±0.18	1.40 <sup>b</sup> ±0.25	0.53 <sup>a</sup> ±0.22	0.80±0.11
Mid piece abnormalities (%)	0.67±0.17	0.56±0.18	0.33±0.17	0.44±0.18	0.50±0.08
Tail abnormalities (%)	4.11±0.54	3.67±0.24	3.44±0.30	3.78±0.32	3.75±0.18
Freezability (%)	63.44 ± 0.38	61.67 ± 0.41	53.56 ± 0.44	60.11 ± 0.51	61.11 ± 0.67

Means bearing different superscripts in a row differ significantly.

## CONCLUSION

The present findings clearly suggested that swamp buffalo bulls exhibited identical influence of seasons on their reproductive performance and

semen freezability. Therefore, to obtain higher conception rates using frozen semen maximum number of good to excellent quality of ejaculates should be frozen during favourable months of the year from the sires.

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