

**SEMINAL ATTRIBUTES AND their relation with Scrotal Biometry
AND sexual BEHAVIOUR OF Murrah buffalo bull**

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ABSTRACT

A study was conducted on 32 Murrah buffalo bulls to evaluate the seminal attributes and their relation with scrotal biometry and sexual behavior of Murrah buffalo bull . There was significant ($P<0.05$) positive correlation between scrotal circumference with age, ejaculate volume, mass activity and sperm concentration. There was non-significant negative correlation of sexual behaviour with age and positive correlation with sperm concentration. Murrah buffalo bulls around the age of 5.0-6.5 year exhibit maximum sexual desire, however, maximum scrotal circumference for the age of more than 6.5 years was observed.

KEY WORDS: Murrah buffalo, Scrotal circumference, Sexual behaviour, Sperm motility.

INTRODUCTION

Determination of scrotal circumference is an essential aspect of breeding soundness examination and has great value as an indicator of puberty, total sperm production, semen quality, pathological conditions of the testes as well as the subfertility or infertility of a bull (Ahmad *et al.*, 1989). Yearling bulls with larger scrotum at puberty had increased pregnancy rates in their daughters (Werre and Brinks, 1986). Scrotal circumference has been shown to be affected by age of the bull and season of the year, hence selection of bulls can be made based on this measurement (Younis *et al.*, 2003). Sexual behaviour is one of the important measures for assessing reproductive soundness in bulls and is highly correlated with the quality and quantity of semen (Anzar *et al.*, 1993). This study was aimed at correlating seminal attributes with scrotal biometry and sexual behaviour in Murrah buffalo bulls.

MATERIALS AND METHODS

The experiment was conducted on 32 Murrah buffalo bulls maintained at central frozen semen station, Bhopal. Six ejaculates from each bull were collected in a service crate using Swedish pattern artificial vagina of 8 inch size filled with warm water and air. Collections were made in the morning hour, twice weekly.

Seminal attributes: The ejaculate volume was recorded in milliliters in the graduated semen collection tube immediately after collection. The mass activity of the semen was graded on 0-4 scale on the basis of waves and swirl motions as described by Herman and Madden (1953). The individual sperm motility of the fresh semen was expressed in terms of percentage of forward progressively motile spermatozoa as described by Zemjanis (1970) and sperm concentration was checked by a digital Accucell Photometer with auto dilutor (IMV Technology) calibrated haemocytometrically as described by Willet and Buckner (1951).

Scrotal circumference measurements: Bulls were restrained in a travis and the scrotal content was held in the ventral scrotum from the cranial side of the scrotum. Clinically detectable testicular and epididymal pathological conditions were ruled out by examination of the bulls prior to trans-scrotal circumference (TSC) measurement. The measurement was made at the widest point of

scrotum with plasticized cloth tape that follow the contours of scrotum more closely as described by Foote (1969).

Sexual behaviour: Sexual behaviour of each bull was recorded at the time of semen collection by assigning a numerical value as described by Singh and Pangawkar (1989) with slight modifications. Statistical analysis was carried out as outlined by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Semen attributes :

The experimental bulls were divided into four age groups and seminal attributes were compared accordingly in order to assess their reproductive efficiency. The results are presented in table. All the seminal attributes ie. Volume, mass motility, progressive motility and sperm concentration showed a steady increasing trend with increase in age, however, volume and mass motility in group 2 were slightly lower as compared to group 1.

Table : Comparison of Scrotal circumference (cm), sexual behaviour and seminal attributes of different age groups of Murrah buffalo bulls (means \pm SD)

Seminal Attributes	Group-I 2.0 - 3.5 year	Group-2 3.5 – 5.0 year	Group-3 5.0 - 6.5 year	Group-4 > 6.5 year	Overall mean \pm SE
No. of bulls	11	8	6	7	32
Scrotal circumference(cm)	34.7 \pm 1.4 ^a	37.2 \pm 0.1 ^a	38.0 \pm 0.2 ^b	40.0 \pm 1.3 ^{bc}	37.0 \pm 0.71
Sexual behaviour (0-9 score)	3.8 \pm 0.00 ^a	3.9 \pm 0.02 ^a	4.0 \pm 0.08 ^a	3.7 \pm 0.11 ^a	3.8 \pm 0.05
Ejac volume(ml)	2.54 \pm 0.06 ^a	2.47 \pm 0.09 ^a	2.65 \pm 0.00 ^a	3.2 \pm 0.27 ^b	2.71 \pm 0.22
Mass activity (score)	3.16 \pm 0.07 ^a	3.12 \pm 0.09 ^a	3.47 \pm 0.08 ^a	3.62 \pm .16 ^a	3.34 \pm 0.14
Progressive sperm motility (%)	62.27 \pm 2.15 ^a	65.78 \pm 0.39 ^a	72.24 \pm 2.83 ^b	70.91 \pm 2.17 ^b	67.8 \pm 3.32
Sperm concentra- tion (million/ml)	920.17 \pm 26.82 ^a	921.31 \pm 26.25 ^a	1057.15 \pm 41.67 ^b	1070.48 \pm 48.33 ^b	992.27 \pm 76.65

Different superscripts within row differ significantly.

The semen volume in the bulls of age groups above 6.5 year was significantly ($P < 0.05$) higher than other age groups, however, no significant difference between bulls of other age groups was observed and also no significant difference in the volume of semen between bulls. Variation in semen volume between bulls has been reported due to variation in the function of accessory sex glands and age.

There was statistically non-significant difference ($P < 0.05$) in the mass motility of spermatozoa between the bulls. Analysis of variance revealed no significant difference ($P < 0.05$) in the mass motility of semen between age group. The results are in close agreement with the findings of Shukla and Misra (2005) in Murrah buffalo bulls. The reason for non-significant variation between bull may

be due to the use of semen of bulls of known mass activity, same breed and identical managerial conditions and frequency of collection.

Progressive motility showed non significant variation between bulls is suggestive of good quality semen ejaculated throughout the year by the bulls. The mean progressive motility of semen samples among different age group bulls was higher in adult than young and old bulls (Table-1). The results observed in present study are in close approximation with the findings of Panayotova and Karabali (1996).

Statistically significant ($P < 0.05$) difference was observed between bull in their sperm concentration. The highest sperm concentration (1070.48 ± 48.33) was observed in bulls above 6.5 year of age, while the lowest (920.17 ± 26.82) in the 2.0-3.5 year age group bulls. The sperm concentration in the bulls of age group above 6.5 year was significantly ($P < 0.05$) higher than bulls of age groups 2.0-3.5 year and 3.5-5.0 year. Mann and Mann (1981) also stated similar values and variation.

Scrotal and testicular biometry: The mean transverse scrotal circumference of Murrah buffalo bulls was 37.0 ± 0.71 cm, which is comparable to the values (37.5 cm) reported by Shakya (2013). Significantly ($P < 0.05$) high scrotal circumference was reported in bulls over 6.5 years of age (40.0 ± 1.3) and 5.0-6.5 years (38.0 ± 0.2) as compared to bulls of 2.0-3.5 years age group (34.7 ± 1.4). No significant difference between other age groups was recorded. Higher scrotal circumference value bulls produced better semen quality and good sperm morphology. Similar report has been made by Siddique *et al.* (2011). There were significant ($P < 0.05$) positive correlations for scrotal circumference with age, semen volume, mass activity and sperm concentration. Thus, scrotal circumference could be used to know the sperm production potential (SPP) of the bulls. It also meant that selection for higher scrotal circumference bulls will produce more semen of better quality as also in the present study the semen attributes like volume, mass motility, progressive motility and sperm concentration were found in higher range in the same group of bulls having higher scrotal circumference.

Sexual behavior: The overall mean for mating behaviour score observed during present study was 3.8 ± 0.05 . There was non-significant difference in the sexual behaviour score of bulls of different age groups but higher sexual behaviour in adult than in young and old bulls. The greater scrotal circumference observed during the present study in the same age group (6-7 years) indicates effect of these parameters on the sexual behaviour of the bull. In present experiment non-significantly different *sexual behaviour observed* between age groups, suggest that bulls used for experiment have good *sexual behavior*. There was non-significant ($P < 0.05$) negative correlation between sexual behaviour with age and a positive correlation with sperm concentration. Singh *et al.* (2001) also reported a higher sexual behaviour in adult than in young and old bulls.

REFERENCES

- Ahmad, N., M. Shahab, S. Khurshid and M. Arslan (1989): Pubertal development in the male buffalo: longitudinal analysis of body growth, testicular size and serum profiles of testosterone and oestradiol. *Anim. Reprod. Sci.*, **19**: 161-170.
- Anzar, M., M. Ahmad, M. Nazir, N. Ahmad and I.H. Shah (1993). Selection of buffalo bulls: Sexual behavior and its relationship to semen production and fertility. *Theriogenology*, **40**(6): 1187-1198.
- Foote, R.H. (1969). Research techniques to study reproductive physiology in the male. Techniques and procedures in animal science research. *Am. Soc. Anim. Sci.*, Champaign, 11: 81.
- Herman, H.A. and F.W. Madden. (1953). *The artificial insemination of dairy cattle - A hand book of laboratory Manual*. Revised edn. Lucas Bros., Columbia, USA.
- Mann, T. and C.L. Mann (1981). *Male Reproductive Function and Semen*. Springer-Verlag. Berlin,

2nd Edn, p 250.

Panayotova, M. and I. Karabali (1996). The possibility of selecting bulls for reproductive traits. I. Semen production characters in bulls. *Zhivotnov dhi-Nauki*, **33**: 36-41.

Shakya, V. (2013). Studies on scrotal biometrics and seminal attributes in relation to chromosomal profile in buffalo breeding bulls. M.V.Sc Thesis, N.D.P.C.V.V. Jabalpur, India.

Shukla, M.K. and A.K. Misra (2005). Correlations between seminal characteristics in Murrah bulls. *Indian J. Anim. Sci.*, **75**(3): 263-266.

Siddique, R.A., G. Jagan, M. Mohanarao, R. Kumar, A. Kumar, P.K. Malik, C. Kumar and S.K. Atreja (2011). Sperm abnormalities and DNA fragmentation vis-à-vis mammalian male infertility - a review. *Wayamba. J. Anim. Sci.*, P: 578-598.

Singh, P., B.P. Sengupta and V.N. Tripathi (2001). Effect of multiple showing and vitamin supplementation on sexual behavior, quality and freezability of buffalo bull semen. *Asian-Aust. J. Anim. Sci.*, **14**(2):184-188.

Singh, D.M. and Pangawkar, G.R. (1989) studies on libido and sexual behaviour in exotic and cross bred bulls. *Indian Vet. J.* **66**(2): 744-748.

Snedcor G.W. and Cochran, W.G. (1994). *Statistical methods*, 8th Edn., Oxford and IBH Publishing Co., New Delhi.

Werre, J.F. and J.S. Brinks (1986). Relationship of age at puberty with growth and subsequent productivity in beef heifers. *Procee. West. Am. Soc. Anim. Sci.*, **37**: 300.

Willet, E.L. and J. Buckner (1951). Determination of number of spermatozoa in bull semen by measurement of light transmission. *J. Anim. Sci.*, **10**: 219.

Younis, M., H.A. Samad, N. Ahmad and I. Ahmad (2003). Effect of age and season on the body weight, scrotum circumference and libido in Nili-Ravi buffalo bulls maintained at the semen production unit Qadirabad. *Pakistan Vet. J.*, **23** (2): 59-65.

Zemjanis, R. (1970). *Diagnostic and Therapeutic Techniques in Animal Reproduction*. 2nd Edn., Williams and Wilkins, Baltimore., p. 145.

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