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Short Communication

Computer automated analysis of morphometric characteristics of epididymal spermatozoa of spotted deer *(Axis axis)*

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ABSTRACT

The morphometric characteristics of epididymal spermatozoa of spotted deer *(Axis axis)* was analysed using a computer assisted semen analyzer (CASA). The smears prepared from epididymal spermatozoa were stained with Stat III Andrology stain and the morphometric parameters were measured on CASA. The mean (± SE) values for major axis (µm), minor axis (µm), elongation (per cent), head area (µm²), perimeter (µm) and tail length (µm) were recorded as 8.35 ± 3.24, 4.92 ± 2.31, 58.8 ± 0.24, 33.41 ± 0.26, 21.96 ± 7.87 and 51.9 ± 0.64, respectively.

Key words: Spotted deer *(Axis axis)*, spermatozoa, morphometry, CASA.

The dimensional characteristics of spermatozoa have been reported to differ between various laboratory animal species such as mice, rabbits and drosophila and in domestic animals like cattle (Koley and Mukherjee, 1984) and goats (Misra and Mukherjee, 1984). However, reports on morphometry of spermatozoa of wild ruminants are scarce. Therefore, a study on morphometrics of epididymal spermatozoa of spotted deer was undertaken using HT-IVOS Computer Assisted Semen Analyzer (CASA).

During post-mortem examination of a carcass of approximately 4 years old spotted deer *(Axis axis)*, the testes along with the epididymis were collected and transported to the laboratory of Veterinary University Training and Research Centre, Rajapalayam, Tamilnadu, in a polythene bag containing ice cubes. In the laboratory the testes were cleaned and the cauda epididymis was punctured to aspirate epididymal contents using a syringe. The epididymal contents were collected in a sterile petri dish containing normal saline. Uniform thin smears were prepared by taking a drop of the epididymal contents and normal saline mixture on clean grease free glass slides. The slides were dried in air. The smears were stained using STAT III Andrology stain. Dried smears were first immersed in Solution I (methanol) for 30 seconds. After drying, the slides were immersed in Solution II (Xanthene dye) for 60 seconds. Again after drying, the smears were stained by dipping in Solution III (Thiazine dye) for 60 seconds. The stained smears were dried in air. The excess stain was washed with distilled water and the smears were dried again in air. A total of 9 smears were used for evaluation of morphometric characteristics viz., major axis, minor axis, elongation, head area, perimeter and tail length by CASA.

The mean, range and standard error for morphometric characteristics of epididymal spermatozoa of spotted deer *(Axis axis)* recorded on CASA were presented in the Table. The mean (± SE) values for major axis (µm), minor axis (µm), elongation (per cent), head area (µm²), perimeter (µm) and tail length (µm) were recorded as 8.36 ± 3.24, 4.92 ± 2.31, 58.8 ± 0.24, 33.41 ± 0.26, 21.96 ± 7.87 and 51.9 ± 0.64, respectively. Major

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axis (length) of head of epididymal spermatozoa of spotted deer recorded in this study by CASA was marginally lower than those reported by Ahmed *et al.*(1991) by conventional method of measurement for Chital deer *(Axis axis,* 8.53 ± 0.78) but higher than those of Barking (7.03 ± 0.06) and Sambar deers (6.90 ± 0.04) and almost similar (8.34 ± 0.01) to Boer grade domestic ruminant (Sundararaman and Edwin, 2002). However, the minor axis (width) of sperm head of spotted deer *(Axis axis)* was lower than that of Chital (5.15 ± 0.07) but higher than those of Barking (3.70 ± 0.06) and marginally higher than the mean values (4.75 ± 0.05) recorded for Sambar deers (Ahmed *et al.*, 1991). Sundararaman and Edwin (2002) reported the mean value for sperm head width for Boer grade goats (3.95 ± 0.01) by computer automated measurement, which was lower than that of spotted deer *(Axis axis)* recorded in this computer assisted semen analysis.

The relationship between the morphometeric traits of sperm head length and width was referred as ratio by Ahmed *et al.* (1991), whereas, this trait was designated as elongation (per cent) in CASA. On comparison, the sperm head-width relationship for *Axis axis* reported by Ahmed *et.al.*, 1991 was similar to the results for spotted deer *(Axis axis)* obseved in this study. Nevertheless, the mean value indicating the relationship between head length and width for Boer grade goats reported by Sundararaman and Edwin (2002) on CASA was lesser than those for spotted deer *(Axis axis)* measured in this study using the same computer automated equipment.

Table : Morphometric characteristics of epididymal spermatozoa of spotted deer *(Axis axis)*

Morphometric characteristics	Mean ± S.E	Range
Major Axis (μ m)	8.35 ± 3.24 -107	7.5 to 9.1
Minor Axis (μ m)	4.92 ± 2.31 -107	4.3 to 5.7
Elongation (per cent)	58.8 ± 0.24 -107	53.2 to 66.1
Head Area (μm^2)	33.41 ± 0.26 -107	27.3 to 41.3
Perimeter (μ m)	21.96 ± 7.87 (107)	19.9 to 23.9
Tail Length (μ m)	51.90 ± 0.64 -51	43.4 to 63.2

Figures in parenthesis indicate number of spermatozoa analyzed.

The sperm morphometric traits viz. head area and perimeter recorded in this study could not be compared with other reports as no publication on morphometric traits of sperm of wild ruminants by computer automated equipment could be traced. However, the mean values for these traits in this study for spotted deer *(Axis axis)* were higher than those reported by CASA for Boer grade domestic goats (Sundararaman and Edwin, 2002).

The mean value for tail length of sperm of spotted deer *(Axis axis)* indicated its similarity (50.8 ± 0.09) to that of Boer grade domestic goat (Sundararaman and Edwin, 2002). However, it was lower than those for Chital *(Axis axis,* 56.8 ± 0.26) and Barking (54.9 ± 0.47) but higher than the value for Sambar (48.1 ± 0.50) deers (Ahmed *et al.*, 1991).

It may be concluded that the present findings of morphometric charactreristics of spotted deer *(Axis axis)* by computer assisted semen analyser (CASA) relate well with already available reports in other types of deers by conventional method of measurement. The results obtained in this study by CASA could not be compared with findings of other workers as morphometry of deer spermatozoa by CASA could not be traced in literature. Nevertheless, the findings in this study indicate the reliability of the sophisticated equipment namely, HT-IVOS System (CASA) perhaps for more precise assessment of morphometry of mammalian spermatozoa especially for certain traits like head area and perimeter for which direct measurement by conventional methods may be cumbersome.

The variation in the morphometric characteristics of spermatozoa for spotted deer *(Axis axis)* observed between different workers may be due to different methods of evaluation advocated for measurement. The differences in sperm morphometric traits between domestic and wild ruminants by similar methods of measurement (CASA) indicated the genotypic difference between the species.

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