

## **Sperm attributes and morphology on *Rusa timorensis*: light and scanning electron microscopy**

### **ABSTRACT**

This study provides standard information on the attributes of sperm and describes the surface structure of normal and abnormal spermatozoa of *Rusa timorensis*. Two fertile stags were used as the source of semen collected during the first breeding season commencing from April 5 to July 2, 2012. Another five stags were used as the source of semen collected during the second breeding season commencing from April 1 to June 27, 2013. Semen samples were collected from the stags using an electro-ejaculator. The ejaculate was processed and samples prepared for light and scanning electron microscopy (SEM) according to standard methods. No significant difference ( $P > 0.05$ ) was found between sperm attributes in comparison between different stags and different months of the fertile seasons. The results of this study have also demonstrated that there are no differences in size, shape and surface structure between spermatozoa of the different stags and different months of the fertile seasons. Sperm attributes (volume, pH, sperm concentration, general motility, progressive motility and viability) were  $2.2 \pm 0.29$  ml,  $7.2 \pm 0.17$ ,  $886.3 \pm 39.7 \times 10^6$  spermatozoa/ml,  $78.7 \pm 2.01\%$ ,  $80.8 \pm 1.85\%$  and  $83.2 \pm 0.85\%$ , respectively. Morphological analysis showed low percentage of abnormal spermatozoa  $13.9 \pm 2.88\%$ . Scanning electron microscopy revealed spermatozoa which consisted of a flat paddle-shaped head, short neck and a tail, which was subdivided into midpiece, principal piece and endpiece. The average spermatozoon was  $66.2 \pm 0.69$   $\mu$ m in total length. The flat paddle-shaped head was  $7.8 \pm 0.28$   $\mu$ m long,  $4.2 \pm 0.15$   $\mu$ m at its widest width,  $2.4 \pm 0.18$   $\mu$ m basal width and  $0.7 \pm 0.02$   $\mu$ m thick. As for the tail, the midpiece length was  $13.2 \pm 0.14$   $\mu$ m,  $0.6 \pm 0.04$   $\mu$ m in diameter; the principal piece was  $42.6 \pm 0.04$   $\mu$ m, and  $2.8 \pm 0.06$   $\mu$ m for the endpiece. Abnormal spermatozoa such as tapered head, microcephalic head, decapitated spermatozoa and bent tails were observed. Results provide standard information useful for development of strategies for semen cryopreservation and assisted reproductive technology in this species.

**Keyword:** *Rusa timorensis*; Sperm attributes; Morphology; Scanning electron microscopy; Light microscopy