ABSTRACT

Features of the Reproductive System of the Male Agouti (*Dasyprota leporina*): A Neo-Tropical Rodent with the Potential for Domestication

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This thesis addressed four questions: (1) What are the morphologies of the male agoutis' (*Dasyprocta leporina*) reproductive system? (2) Can semen be collected from the agouti by electro-ejaculation? (3) Can the agouti be trained to serve the artificial vagina (AV)? (4) Can the agouti's semen be extended and stored?

Male agoutis were dissected for macro-anatomy description and tissue samples taken for hematoxylin-eosin histological analysis. Various electrical stimulations were applied from an electro-ejaculator to identify a protocol for electro-ejaculation of the agouti. A three (3) phase training program was employed to train the male agouti to serve an artificial vagina. Three (3) available substances (UHT Milk, pasteurized and un-pasteurized coconut water) were evaluated as semen extenders for extension and storage of the agouti's semen.

The male agouti had a U-shaped penis and a paired lateral penile cartilage which were only identified in *D. leporina*. Electro-ejaculation success improved from 30% (initially) to 75% when xylazine (40mg/kg live body-weight) was used as an anesthetic. This latter success was attributed to the muscle relaxing

properties of xylazine. Mean spermatozoa concentration, motility and percentage abnormalities were $106.7\pm31.1\times10^6$ spermatozoa/ml, 50.44±4.44%, and 35.14±2.76%, respectively during the development of the electro-ejaculation protocol. However, in later trials the mean spermatozoa concentration improved to 431±180 and $306.6\pm64.9 \times10^6$ spermatozoa/ml during two continuous experiments. Eleven (11) spermatozoa morphologies were identified. The vast majority (68.5%) of spermatozoa showed no known defects and were considered normal. Mean lengths for head, mid piece, tail and total length of the agouti spermatozoa were 5.23±0.04µm, 5.18±0.08µm, 37.52±0.24µm and 47.96±0.25µm, respectively. There was a direct relationship between fructose concentration in agouti ejaculate and abnormal spermatozoa. Results suggested that the agouti may need more time in training before serving the AV. Agouti semen samples extended with UHT milk and stored at spermatozoa concentration of 100×10^6 spermatozoa/ml produced the best results ($P<0.05$), for motile cell % and forward progressive motility % after storage at 5^oC for five days. It was concluded that the survival of spermatozoa in a given volume (0.25ml) of extended agouti semen stored at 5^oC is dependant on the stored spermatozoa concentration. After thawing semen pellets frozen at -195^0C for 20 seconds at 30^0C the means for MC% (9.615±0.499) and FPM% (12.18±1.33) were concluded too low to be fertile. It was suggested that other thawing protocols should be evaluated for agouti semen frozen at -195^oC in 025ml pellets.

Keywords: agouti, *Dasyprocta leporina*, ejaculate, ketamine, morphology, motility, semen, spermatozoa, xylazine