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## Attempts to Achieve Semen Collections from Incapacitated Boer Bucks by Electro-ejaculation

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**Abstract:** This study accounts the attempts made to collect semen by electro-ejaculation from genetically superior but incapacitated Boer goats. The bucks were in the age group of 2 to 3 years and were in use for upgrading local goats. The bucks became incapacitated with partial paralysis of hindquarters and could not mount to donate semen. A total of 35 semen collections, 20 and 15 from the 2 bucks respectively were done. The means±SE for ejaculate volume, mass activity, sperm motility, sperm concentration, live sperm percent and abnormal sperm percent were the semen characteristics analyzed. Except for ejaculate volume the mean values for all semen characteristics were very poor. Electrical stimulation using a battery-operated ejaculator was successful in achieving semen collections without any apparent injury to the incapacitated bucks.

**Key words:** Boer goat, incapacitated bucks, electro-ejaculation, semen quality

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### INTRODUCTION

Semen collection technique is an important aspect of Artificial Insemination (AI) technology especially for achieving fruitful ejaculations from AI sires. Among several methods developed for semen collection in domestic animals, artificial vagina and electro-ejaculation (EE) are more commonly used. Although use of artificial vagina is considered as the best suited for semen collection in domestic animals, EE is still used as it does not require mount animals, is not physically demanding and is easily adaptable (Wulster-Radcliffe *et al.*, 2001; Palmer, 2005). Further, EE does not warrant training of AI sires (Belibasaki and Kouimtzis, 2000). It has been shown that semen of acceptable quality could be harvested by EE from small ruminants (Oyeyemi *et al.*, 2001; Al-Ghalban *et al.*, 2004; Kridli *et al.*, 2006a,b). According to Marco-Jimenez *et al.* (2005), EE could be even a preferable method to use of artificial vagina for semen collection as semen from EE provides superior post-thaw quality. Furthermore, EE may be the best option to collect semen from valuable sires, which are incapable of service because of age or injury.

In recent years, use of South African Boer goat was attempted for upgrading the local non-descript goats in India. Considering the high cost of the Boer goats, only a limited number of Boer bucks could be used for breeding. To start with, 2 purebred Boer bucks were used on experimental basis at Livestock Research Station, Kattupakkam, situated in the state of Tamilnadu in South India. Over a period of time, both the bucks suffered from progressive paralysis of hind limbs, which later on developed as a chronic illness. The bucks became incapacitated and disabled to serve the does in estrus, despite having reasonably good sex drive. Since the prognosis for recovery was not good, to salvage atleast some of the superior germplasm by way of cryopreservation of semen from the bucks before culling, electro-ejaculation method was attempted.

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## MATERIALS AND METHODS

This study was conducted during September-October-November 2001. The Boer bucks involved in this study were aged 2 to 3 years and maintained at Livestock Research Station, Kattupakkam in South India.

Electrojac IV (minitub-Germany), a battery-operated ejaculator was the equipment employed for semen harvest. The equipment was prepared as per the instructions prior to beginning of sex stimulation of bucks. The rectal probe was lubricated, moistened and inserted in to the anus of the restrained buck so that the three brass electrodes on the probe were facing down and firmly touched the floor of the rectum. By using the manual control knob of the instrument the power output was increased from 0 to 1 volt and held for 2 to 3 sec. The power output was again brought to 0. This procedure was repeated after a rest period, equal to the duration of electrical stimulation, by increasing the power output by one volt on every attempt until ejaculation took place. The filiform appendix and end of the penis were held in a semen collection cup for the ejaculate to collect. A total of 35 semen collections were taken at the rate of one collection schedule per week.

The semen samples were evaluated immediately after collection for ejaculate volume (mL), colour, consistency, mass activity (0 to 5 scale). To assess the sperm concentration (million/mL) by photoelectric colorimetric method 0.1 mL of undiluted semen was used. Equal volume of Tris-egg yolk-fructose-citric acid dilutor was added and sperm motility (percent) on dilution was assessed. Semen smears were prepared and stained with Eosin-Nigrosin and Rose Bengal for estimation of live (percent) and abnormal spermatozoa (percent) respectively. The data on percentages were transformed to arcsin values for analysis. The data were analyzed by one-way analysis of variance using 'Microstat' computer software (Ecosof Inc., 1984; Baltimore, USA).

## RESULTS AND DISCUSSION

The bucks were able to ejaculate after reaching 3-5 volts of electrical stimulation. The mean (Table 1) ejaculate volume of semen collected by electro-ejaculation was within the normal range for goats (Oyeyemi *et al.*, 2001; Al-Ghalban *et al.*, 2004). The difference between the individual bucks for ejaculate volume was highly significant ( $p \leq 0.01$ ) which might be due to the genotypic difference between individual bucks. The mass activity of the samples ranged from 0 to 3 with a very low mean value of 1.11. Sperm motility was also generally very poor with occasional samples showing 40%. Sperm concentration was lower than the normal values for goats, which reiterates the earlier findings in bucks (Austin *et al.*, 1968; Memon *et al.*, 1986) rams (Mattner and Voglmayr, 1962; Marco-Jimenez *et al.*, 2005). Like the motility characters namely mass activity and sperm motility on dilution, the live sperm values also were in wide range of 4 to 57.5%. The abnormal sperm (percent) was very

Table 1: Characteristics of semen collected by electro-ejaculation from incapacitated Boer bucks

Buck ID	Ejaculate volume (mL)		Mass activity (0 to 5 scale)		Sperm motility on dilution (%)	
	Mean±SE	Range	Mean±SE	Range	Mean±SE	Range
N 16	1.02±0.13 <sup>a</sup> (20)	0.2 to 2.2	0.90±0.30 (11)	0 to 2	13.00±2.42 (20)	0 to 40
N 9	0.55±7.61 <sup>b</sup> (15)	0.2 to 1.1	1.38±0.26 (8)	1 to 3	19.30±3.30 (15)	10 to 40
Overall	0.82±8.84 (35)	0.2 to 2.2	1.11±0.20 (19)	0 to 3	15.70±2.02 (35)	0 to 40
Buck ID	Sperm concentration (million mL <sup>-1</sup> )		Live sperm (%)		Abnormal sperm (%)	
	Mean±SE	Range	Mean±SE	Range	Mean±SE	Range
N 16	1524±391.28 (10)	100 to 3300	29.1±4.82 (10)	5.9 to 57.5	51.2±5.26 (10)	28.7 to 78.0
N 9	1609±257.38 (10)	400 to 2600	20.7±4.10 (10)	4.00 to 44.4	38.1±6.41 (10)	13.6 to 66.4
Overall	1567±228.13 (20)	100 to 3300	24.9±8.23 (20)	4.00 to 57.5	44.6±4.30 (20)	13.6 to 78.0

Figures in parenthesis indicate number of observations. Means in the same column with different superscripts differ significantly ( $p \leq 0.01$ )

high well above the permissible level of 20% required to pass the semen for AI purpose. The differences found between bucks for all semen characteristics were not significant except for ejaculate volume, indicating that the response of the bucks for electrical stimulation in terms of quality of semen donated were similar.

### CONCLUSION

Notwithstanding the fact that the mean values for almost all semen characters except for ejaculate volume were very low, electro-ejaculation did help to harvest a few samples with moderate quality except for abnormal sperm percent from incapacitated bucks. Since the hindquarters of the bucks were involved in the disease condition, the sperm production potential of the testes may have been affected. Further the bucks were under a prolonged treatment schedule, which may have also contributed for increase in abnormal sperm percent, as toxicant exposure has been shown to affect morphology of spermatozoa (Davis *et al.*, 1993).

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