

## ASSESSMENT OF SEMINAL TRAITS AND SUITABILITY OF SEMEN FOR CRYOPRESERVATION OF EXOTIC STALLIONS REARED UNDER INDIAN CONDITIONS

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### ABSTRACT

Semen was collected from seven exotic stallions for the evaluation of seminal characteristics and freezability of semen. The appearance of fresh semen was milky-white to creamy and consistency of gel-free semen was variably thick. The total volume of semen, gel-free semen and gel in semen was  $50.28 \pm 8.34$ ,  $43.57 \pm 8.14$  and  $6.71 \pm 3.32$  ml, respectively. The mass and progressive sperm motility in gel free semen was  $88.71 \pm 1.70\%$  and  $75.71 \pm 1.70\%$ , respectively. Mean sperm concentration in fresh semen was  $205.37 \pm 12.65 \times 10^6$  ml<sup>-1</sup>. The post-thaw sperm motility was recorded up to an acceptable  $>30\%$  ( $40.00 \pm 2.43\%$ ). The study indicated that the semen from exotic stallions reared in India can be cryopreserved using conventional vapor freezing technique for encouraging artificial insemination and study of their fertility potential.

**Keywords:** Equine, Exotic stallion, HOST, Semen cryopreservation, Seminal parameters

Horse is an integral part of Indian army, security forces, police and various socio-cultural activities. Equine semen cryopreservation represents an important tool to improve the genetics of species by maximizing the use of good breeding potential. However, the use of frozen equine semen is very limited due to particular differences in sperm freezing and individual ejaculation among stallions. Another factor that limits the utilization of frozen semen is the reduced tolerance of equine spermatozoa to freezing and thawing processes (Fagundes *et al.*, 2011). Nevertheless, the objective of present study was to know the fertility status and seminal characteristics of exotic stallions that were brought for the purpose of breeding. This will help in selection of potent and fertile stallion and will assist in planning the future breeding strategies.

The semen was collected from seven exotic stallions kept under uniform management and housing

conditions. The semen from stallions was collected (4 collections / stallion) using an artificial vagina (Colorado model) equipped with a disposable liner (Talluri *et al.*, 2012a). Soon after the semen collection, seminal parameters like appearance, volume, colour and consistency were recorded by visual observation. The semen was cryopreserved through traditional method of vapor freezing (Talluri *et al.*, 2012b).

The fresh semen of exotic stallions was milky white to creamy and consistency was variably thick. The appearance of semen was in agreement with previous observations (Pal *et al.*, 2009), however, consistency was reported thick to thin in Marwari stallions.

In an earlier study, the total volume of stallion semen varied between 30 and 250 ml (Ricketts, 1993). In present study, the average total semen volume, gel-free semen and gel in semen was recorded (Table 1) less than Marwari stallions (Talluri *et al.*, 2012a) and Zanskari Stallions (Talluri *et al.*, 2012b).

In present study, sperm concentration varied ( $p > 0.05$ ) between individual stallions (Table 1).

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However, the mean sperm concentration in exotic stallions observed in this study was higher (Table 1), compared to Marwari stallions (Pal *et al.*, 2009), Kathiawari stallions (Ravi *et al.*, 2013) and Zanskari stallions (Talluri *et al.*, 2012b). The sperm concentration in horse semen samples was reported to vary widely, ranging 100 - 200 × 10<sup>6</sup> ml<sup>-1</sup> (Ricketts, 1993). Furthermore, the mass or initial sperm motility observed in gel-free semen of present study was higher (Table 1), than the values for Marwari stallions (79.76%; Pal *et al.*, 2009).

**Table 1: The attributes of fresh and post-thaw semen of exotic stallions**

Seminal attributes	Mean±SE
Total volume, ml	50.28±8.34
Gel volume, ml	6.71±3.32
Gel-free volume, ml	43.57±8.14
pH	7.31±0.09
Sperm concentration, x10 <sup>6</sup>	205.37±12.65
Initial mass motility, %	88.71±1.70
Progressive motility, %	75.71±1.70
Pre-freeze motility, %	80.25±1.88
Post-thaw motility, %	40.00±2.43

The progressive sperm motility in gel-free semen of exotic stallions (Table 1), was near to values observed in Marwari stallions (73.33%; Pal *et al.*, 2009). The pre-freeze motility in extended semen after 2 h of equilibration at 4°C was between 60-75% (Table 1), which was slightly lower than earlier reports for Marwari stallions (Tejpal *et al.*, 2016). The range of post-thaw sperm motility (37.32-45.78%, Table 1) was almost similar to trend reported in Marwari stallions (Talluri *et al.*, 2012b; Tejpal *et al.*, 2016), Kathiawari stallions (Ravi *et al.*, 2013) and Zanskari Stallions (Talluri *et al.*, 2012b). The variation observed in semen freezability in the present study is well supported by earlier studies (Tischner, 1979; Vidament *et al.*, 1997).

In conclusion, the exotic stallions have seminal traits similar to related breeds and Indian breeds, as well as compatible with artificial insemination and semen technologies. Thus, the semen from the exotic

stallions can be cryopreserved under Indian conditions.

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