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EVALUATION OF PHYSICAL AND MORPHOLOGICAL CHARACTERISTICS OF FRIESWAL BULL SEMEN

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ABSTRACT : The present investigation was carried out to study the semen characteristics of Frieswal bulls. In the present investigation a total of 181 ejaculates seminal collected from six bulls were studied and out of these 82.30 per cent were creamy in colour. The density of Frieswal bulls' semen was found to be thick (93.92%). The overall mean ejaculate volume (ml), individual motility (%), sperm concentration (millions/ml), live sperms (%) and Hypo-osmotic swelling (HOS) positive spermatozoa in neat semen of Frieswal bulls were 5.60±0.16, 60.39±0.04, 1076.1±32.56, 78.93±0.004 and 73.76±0.47, respectively. The differences in mean values of ejaculated semen volume, sperm concentration, live sperm count and progressive motility of semen were highly significant (*P*<0.05) among the bulls. It was concluded that the, Frieswal bull produced better quality semen in comparison to another breed. So that, present findings suggested that, Frieswal crossbred bull could be suitable as breeding bull to be used for AI.

Key words : Ejaculate volume, Frieswal bulls, hypo-osmotic swelling test, progressive motility, sperm concentration.

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INTRODUCTION

Frieswal is an important crossbred strain of cattle kept for milk production across India. It was developed at Central Institute for Research on Cattle (CIRC), Meerut, India by crossing Sahiwal with Holstein Friesian (62.5% exotic inheritance). Semen quality parameters such as motility, sperm number and sperm morphology are of value in identifying bulls of low fertility in pastoral herds (Parkinson, 2004). The morphological characteristics of spermatozoa are influenced by several factors including the genetic make-up and physiological stage of the animal, nutrition, season, climatic factors, and disease (Dowsett and Knott, 1996). The measurement of motility of spermatozoa is known as dependable parameter of good quality of semen (Kjaestad *et al*, 1993). Due to high importance of plasma membrane in the process of fertilization, the evaluation of plasma membrane integrity has got the significant attention in the semen evaluation of male animal. Eosin and nigrosin staining measures simply structural integrity of plasma membrane of spermatozoa, while Hypo-osmotic swelling test give functional active of membrane (Sliwa, 1993). The aim of present investigation was to determine the seminal characteristics of Frieswal bulls.

MATERIALS AND METHODS

The present investigation was carried out at Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India. The average highest ambient temperature during the study was recorded to be 33.4 °C in the month of June, followed by 30.8 °C in the month of July and lowest average ambient temperature was observed to be 15.7°C in December. The average relative humidity was maximum in July (65.46%) and minimum in June (43.59%). Six Frieswal bulls (nearly 2-5 years of age, body weight 350 kg) were selected randomly from Central Institute for Research on Cattle, Meerut, to study seminal characteristics of 181 ejaculate (at least six ejaculates from each bull) collected

Table 1 : Physical and morphological characteristics of neat Frieswal bull semen (Mean±SE).

Bull name	Bull numbers	Volume (ml)	Sperm concentration (million/ml)	Live sperm (%)	Individual Motility (%)	HOST (%)
Gera	WAM-717	4.76±0.54^{ab} (8)	1193.62±96.8^{bc} (8)	81.17±0.018 (6)	71.44±0.16^{c} (8)	73.74±0.90 (6)
Hola	CJH-669	5.31±0.3^{cb} (38)	1028.45±64.77^{b} (38)	78.31±0.021 (6)	57.99±0.15^{ab} (38)	74.62±0.59 (6)
Karu	CMT-628	5.92±0.34^{cbd} (29)	1317.72±94.78^{c} (29)	77.86±0.012 (6)	56.05±0.53^{a} (29)	73.38±0.46 (6)
Soman	WAM-754	3.92±0.23^{a} (36)	1220.67±50.19^{bc} (36)	78.18±0.028 (6)	67.3±0.06^{bc} (36)	72.68±1.71 (6)
Soti	WAM-705	6.70±0.35^{dc} (32)	1212.12±68.15^{bc} (32)	81.4±0.012 (6)	63.36±0.13^{abc} (32)	74.59±1.57 (6)
Tirshul	CJH-640	6.47±0.38^{d} (38)	663.11±48.57^{a} (38)	76.49±0.018 (6)	54.39±0.19^{a} (38)	73.56±1.42 (6)
Overall	-	5.60±0.16 (181)	1076.1±32.56 (181)	78.93±0.004 (36)	60.39±0.04 (181)	73.76±0.47 (36)

Individual motility (IM)

The overall mean of individual motility (IM) was 60.39±0.04 per cent and it varied from 54.39±0.19 to 71.44±0.16 per cent (P<0.05) between bulls. The average values of IM were comparable with the findings of Panmei *et al* (2015) in Karan Fries and Saha *et al* (2011) in Holstein Friesian Bulls. Mandal *et al* (2012) reported that the highest individual sperm motility in Jersey (65.83±7.96%), Holstein Friesian (64.50±4.12%) while, lowest values reported by Bratton *et al* (1954) in Frieswal bulls (50.25±0.87%). However, average individual motility of bovine semen was reported as 63.3 per cent and range from 50 to 80 (Martins *et al*, 2013), which were almost similar to the average individual motility of the present investigation. There was a significant difference in individual motility of semen produced by different bulls. This variation might be due to age and climatic condition.

Hypo-osmotic swelling positive spermatozoa (HOSPS)

The overall mean Hypo-osmotic swelling positive spermatozoa was found to be 73.76±0.47 per cent and it varied from 72.68±1.71 to 74.62±0.59 per cent. The average values of IM were comparable with the findings of Ray and Ghosh (2013), Bhakat *et al* (2014), Panmei *et al* (2015) reported that the lowest HOST 65.5±1.81% and 40.88±0.03%, respectively in Karan Fries. On the other hand, significant difference between bulls was reported by in this present investigation seminal quality of Frieswal bull may be affected by the various factors like hygienic and managemental condition of a herd.

CONCLUSION

From the results of present investigation, it was concluded that, ejaculate volume, progressive motility and sperm concentration of Frieswal bull semen were well comparable with other breeds of Indian cattle. However, higher individual motility, live sperm count and lower abnormal sperm count were recorded in the Frieswal bull semen. So that, present findings suggested that, Frieswal crossbred bull could be suitable as breeding bull to be used for artificial insemination.

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