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## Effect of season on the sexual behaviour parameters of Marwari stallion

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### Abstract

The present research was undertaken to study the effect of season on the sexual behaviour parameters *viz.* Reaction time, Erection time, Ejaculation time and Number of thrusts of Marwari stallions. The work was conducted in the Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Bikaner, Rajasthan and ICAR-NRCE, Equine Production Campus, Bikaner, Rajasthan. A total of six Marwari Stallion were maintained under uniform and standard conditions for the research. The overall mean values of reaction time was observed  $64.17 \pm 3.02$  seconds in the breeding season and  $166.31 \pm 5.17$  seconds in the non-breeding season for Marwari stallions which was significantly ( $p < 0.01$ ) higher in the non-breeding season than the breeding season. The overall mean erection time was significantly ( $p < 0.01$ ) higher in the non-breeding season as compare to breeding season with the range of  $38.09 \pm 2.04$  seconds in the breeding season and  $52.12 \pm 4.35$  seconds in the non-breeding season. A non-significant difference was recorded among breeding and no breeding season and overall mean values of ejaculation time for the Marwari stallions was  $25.72 \pm 0.89$  seconds in the breeding season and  $29.48 \pm 2.55$  seconds in the nonbreeding season. The overall mean numbers of thrusts were  $3.75 \pm 0.24$  in the breeding season and  $5.08 \pm 0.28$  in the non-breeding seasons which was non-significant among the seasons. The study concluded that sexual behaviour parameters are affected by seasons and give better performance in breeding season comparatively.

**Keywords:** Sexual behaviour, Marwari stallion, season

### 1. Introduction

The Marwari horse breed (*Equus ferus caballus*) is an important and unique Indian equine breed originated from the Marwar area of Rajasthan state, in India. Because horses are seasonal breeders, the characteristics of their semen vary markedly between season to season. Classical seminal parameters (motility, vitality and acrosomal status level) vary significantly between the seasons in fertile stallions (Blottner *et al.*, 2001) [1]. In the stallions (long-day breeders), germinative testicular functions are influenced by season therefore during the breeding season, male gametogenesis, reproductive tract function, and consequent sperm functionality are probably at their peak. According to Johnson and Thompson (1987) [7], during the non-breeding season, stallions undergo physiological changes such as reductions in serum testosterone concentrations and testicular size. Throughout the winter a decrease in sperm production has been reported (Johnson, 1991) [6]. Seasonal fluctuations have also been observed for semen volume, total sperm count, hypo-osmotic swelling test (HOST) positive sperm and motility in fresh semen (Janett *et al.*, 2003) [5]. In the study area there is no data available on the season's impact on Marwari stallion's sexual behaviour characteristics. Therefore understanding and considering the above facts the aim of this study was to estimate the effect of season on the sexual behaviour parameters of Marwari stallion.

### 2. Materials and Methods

#### 2.1 Experimental location and climatology

The work was conducted in the Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Bikaner and Animal Reproduction Laboratory, Equine Production Campus (EPC), ICAR-National Research Centre on Equines, Bikaner.

The research area (Bikaner) is located in the northwestern part of the state of Rajasthan, India, in the middle of the Thar desert at an altitude of 238 meters above sea level at 28.0229°N latitude and 73.3119°E longitude. The temperature in this arid region registers its extreme, rising above 48 °C in summer and coming down to near 4 °C during winter. The mean annual relative humidity ranges between 25 to 61% (average 42.7%). The average day length during the summer and winter remains approximate 13 and 11 hrs, respectively (<https://en.wikipedia.org/wiki/Bikaner>)

## 2.2 Experimental procedures

A total of six Marwari stallions were located at EPC and were maintained under management guidelines that were consistent and uniform. Various sexual behaviour parameters; Reaction time, Erection time, Ejaculation time and Number of thrusts were recorded for each of the stallion during breeding and the non-breeding seasons.

## 2.3 Sexual behaviour parameters

### 2.3.1 Reaction time

Reaction time was estimated utilizing a stop watch as how much time starting when the stallion entered the breeding facility and finishing when stallion mounted the dummy as reported by Cavinder *et al.* (2010) [2].

### 2.3.2 Erection time

Erection time, as defined by Waheed *et al.* (2015) [10], was measured in the present study as time between the stallion's initial sight of the dummy mare and the stallions complete erection of penis.

### 2.3.2 Ejaculation time

In the current study ejaculation time was defined as the interval between the stallion's intromission of the penis and the first semen emission as reported by Waheed *et al.* (2015) [10].

### 2.3.3 Number of thrusts

In the current research, the mean number of thrusts given by the Marwari stallions to evoke the ejaculation was noted as recorded by McDonnell (1992) [8].

## 2.4 Statistical analysis

The SPSS 20.0 software was utilized to conduct statistical analysis, employing standard statistical method to perform one-way or two-way analysis of variance and correlation (Snedecor and Cochran, 1994) [9]. According to Duncan's description in 1955, the mean values were compared using the multiple range test (DMRT).

## 3. Results and Discussion

In the present study, we recorded mean reaction time, erection time and number of thrusts from six different Marwari stallions during the time of breeding non-breeding season (Table.1).

### 3.1 Reaction time

The present study revealed that the mean values of reaction time for Marwari stallions was in the range of 55.3±2.81 (S3) to 69.01±6.73 (S6) with an overall mean of 64.17±3.02 seconds in the breeding season and in the range of 157.31±6.78 (S3) to 200.23±11.68 (S4) with an overall mean of 166.31±5.17 seconds in the non-breeding season (Table-2 and Fig.1). Regarding the mean reaction time, there was a

statistically non-significant difference was recovered between the stallions during the breeding and non-breeding season. Compared to the breeding season, the non-breeding season's mean reaction time was significantly ( $p<0.01$ ) higher. Moreover, the results of the mean reaction time during current report are in agreement with the Waheed *et al.* (2015) [10]. The observation of Cavinder *et al.* (2010) [2] differed from the present study who have reported non-significant difference among the stallions during the time period of breeding season and significant ( $p<0.05$ ) difference among the stallions in the non-breeding season for the mean reaction time. The mean reaction time was significantly ( $p<0.01$ ) higher during the non-breeding season as compare to the breeding season reflected that in the non-breeding season stallions needed more time to expose their penis and perform the mount.

### 3.2 Erection time

The results of the mean values of erection time was revealed in the range of 33.65±2.98 (S4) to 44.17±3.33 (S6) with an overall mean of 38.09±2.04 seconds in the breeding season and in the range of 37.83±5.91 (S2) to 97.37±13.05 (S4) with an overall mean of 52.12±4.35 seconds in the non-breeding season (Table-3 and Fig. 1). No significant difference was observed among the different stallions for the mean erection time in the breeding season. However, erection time was significantly ( $p<0.01$ ) higher in one stallion (S4) as compare to the others in the non-breeding seasons with significantly ( $p<0.01$ ) higher erection time in the non-breeding season than the breeding season. In comparison to the breeding season, the non-breeding season's mean erection time was found to be significantly ( $p<0.01$ ) higher. The findings of the mean erection time during research are confirmatory with the similar conclusion of Waheed *et al.* (2015) [10]. However, Waheed *et al.* (2015) [10] also reported significant difference among the stallions during the breeding season for the mean erection time. One stallion had a significantly ( $p<0.01$ ) higher mean erection time than the others during the time period of breeding and non-breeding season. In the non-breeding season, stallions likely needed more time to fully erection their penis than in the breeding season, may be probably due to that the stallions required more time to get the penis fully erected in the non-breeding season compare to the breeding season. The most possibly reason of the observation may be extreme low environmental temperature (8-10 °C) during the time of non-breeding season.

### 3.3 Ejaculation time

During the present study the mean ejaculation time (sec.) was reported in the range of 21.71±1.07 (S5) to 29.67±2.65 (S1) with an overall mean of 25.72±0.89 seconds in the breeding season and in the range of 22.81±3.46 (S4) to 33.47±7.88 (S3) with an overall mean of 29.48±2.55 seconds in the non-breeding season (Table-4 and Fig.1). No significant difference was observed among the stallions and between the seasons for mean ejaculation time. The possible explanation for the finding is that the season has no effect on the ejaculation time.

### 3.4 Number of thrusts

The mean number of thrusts was reported in the range of 3.34±0.33 (S6) to 4.5±0.99 (S1) with an overall mean of 3.75±0.24 in the breeding season and in the range of 4.67±0.33 (S2) to 5.84±1.14 (S6) with an overall mean of 5.08±0.28 in the non-breeding season (Table-5 and Fig.2). Non-significant difference was recovered among the stallions during the study in the both breeding and non-breeding

seasons. However, overall mean number of thrusts was significantly ( $p<0.01$ ) higher in the non-breeding season than the breeding season. Similar results have been obtained by McDonnell (1992) [8] who reported that the number of thrusts in the range of 2-12 which support the findings of the current study. It indicates that the stallion require more number of thrust to ejaculate in the non-breeding season as compare to the breeding season.

**Table 1:** The overall (Mean ±SE) reaction time, erection time, ejaculation time and number of thrusts recorded in Marwari stallions during the breeding and non-breeding seasons

Parameters	Breeding season	Non-breeding season
Reaction time (Sec.)	64.17±3.02 <sup>x</sup>	166.31±5.17 <sup>y</sup>
Erection time (Sec.)	38.09±2.04 <sup>x</sup>	52.12±4.35 <sup>y</sup>
Ejaculation time (Sec.)	25.72±0.89	29.48±2.55
Number of thrusts	3.75±0.24 <sup>x</sup>	5.08±0.28 <sup>y</sup>

Mean values with different superscripts (x, y) within a row differ significantly ( $p<0.01$ ).

**Table 2:** Reaction time (Mean± SE) recorded for Marwari stallions during the breeding and non-breeding seasons

Marwari stallions	Reaction time (Sec.)	
	Breeding season	Non-breeding season
S1	68.17±4.78 <sup>x</sup>	168.39±9.20 <sup>by</sup>
S2	68.46±2.78 <sup>x</sup>	171.67±6.43 <sup>by</sup>
S3	55.30±2.81 <sup>x</sup>	157.31±6.78 <sup>by</sup>
S4	65.45±16.25 <sup>x</sup>	200.23±11.68 <sup>ey</sup>
S5	58.67±1.19 <sup>x</sup>	128.87±16.41 <sup>ay</sup>
S6	69.01±6.73 <sup>x</sup>	171.38±2.80 <sup>by</sup>
Overall	64.17±3.02 <sup>x</sup>	166.31±5.17 <sup>y</sup>

Note<sup>1</sup>: Mean values with different superscripts (a, b, c) within a column differ significantly ( $p<0.05$ ).

Note<sup>2</sup>: Mean values with different superscripts (x, y) within a row differ significantly ( $p<0.01$ ).

**Table 3:** Erection time (Mean± SE) recorded for Marwari stallions during the breeding and non-breeding seasons

Marwari stallions	Erection time (Sec.)	
	Breeding season	Non-breeding season
S1	39.34±8.08	41.95±1.73 <sup>a</sup>
S2	34.37±5.02	37.83±5.91 <sup>a</sup>
S3	35.92±5.83	40.03±3.50 <sup>a</sup>
S4	33.65±2.98 <sup>x</sup>	97.37±13.05 <sup>by</sup>
S5	41.10±3.55	44.60±5.78 <sup>a</sup>
S6	44.17±3.33	50.97±5.35 <sup>a</sup>
Overall	38.09±2.04 <sup>x</sup>	52.12±4.35 <sup>y</sup>

Note<sup>1</sup>: Mean values with different superscripts (a, b, c) within a column differ significantly ( $p<0.01$ ).

Note<sup>2</sup>: Mean values with different superscripts (x, y) within a row differ significantly ( $p<0.01$ ).

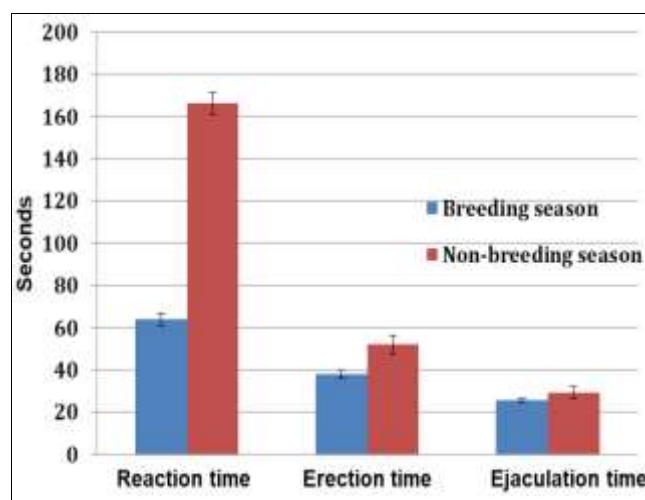
**Table 4:** Ejaculation time (Mean±SE) recorded for Marwari stallions during the breeding and non-breeding seasons

Marwari stallions	Ejaculation time (Sec.)	
	Breeding season	Non-breeding season
S1	29.67±2.65	31.67±2.95
S2	28.67±2.20	32.40±5.23
S3	23.75±1.48	33.47±7.88
S4	22.92±2.25	22.81±3.46
S5	21.71±1.07	24.99±5.09
S6	27.59±1.38	31.55±10.85
Overall	25.72±0.89	29.48±2.55

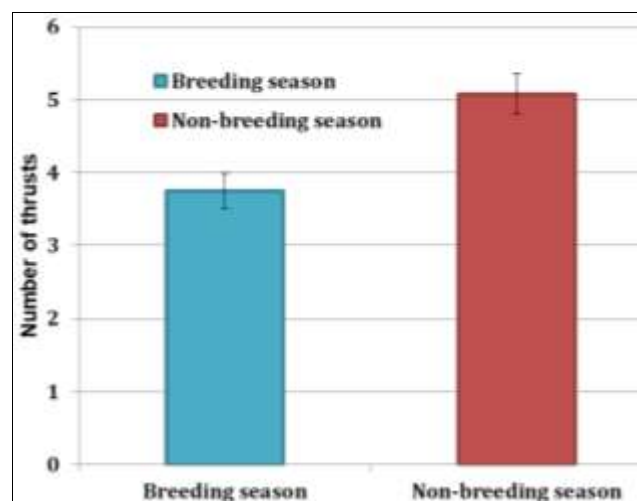
**Table 5:** Number of thrusts (Mean± SE) to evoke ejaculation in Marwari stallions during the breeding and non-breeding seasons

Marwari stallions	Number of thrusts	
	Breeding season	Non-breeding season
S1	4.50±0.99	5.00±0.52
S2	3.50±0.43	4.67±0.33
S3	3.50±0.56	5.00±0.68
S4	3.67±0.42	5.00±0.63
S5	4.00±0.73	5.00±0.82
S6	3.34±0.33	5.84±1.14
Overall	3.75±0.24 <sup>x</sup>	5.08±0.28 <sup>y</sup>

Note: Mean values with different superscripts (x, y) within a row differ significantly ( $p<0.01$ ).



**Fig 1:** The overall (Mean± SE) reaction time, erection time and ejaculation time recorded in Marwari stallions during the breeding and non-breeding seasons



**Fig 2:** Number of thrusts (Mean±SE) to evoke ejaculation in Marwari stallions during the breeding and non-breeding seasons

#### 4. Conclusion

The overall mean reaction time was recovered as 64.17±3.02 seconds in the breeding season and 166.31±5.17 seconds in the non-breeding season. The mean reaction time was significantly ( $p<0.01$ ) higher in the non-breeding season as compare to the breeding season. The overall mean erection time was significantly ( $p<0.01$ ) higher in non-breeding season than the breeding season with the range of 38.09±2.04 seconds in the breeding season and 52.12±4.35 seconds in the non-breeding season. A non-significant difference was recorded among breeding and no breeding season of overall mean values of ejaculation time for the Marwari stallions was

25.72±0.89 seconds in the breeding season and 29.48±2.55 seconds in the non-breeding season. The overall mean numbers of thrusts were 3.75±0.24 in the breeding season and 5.08±0.28 in the non-breeding seasons that was non-significant among the seasons. Data generated in the present study provides key information about the sexual behaviour parameters in Marwari stallion. The research may be helpful in strategizing the effective performance of Marwari stallion between the seasons.

### 5. Acknowledgement

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