RESEARCH ARTICLE

Effect of Vaccination on Sexual Behavior of Pandharpuri Buffalo Bulls

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Abstract

The present investigation was carried out to study the effect of vaccination on the sexual behavior of six Pandharpuri buffalo bulls. The bulls were vaccinated against HS-BQ in July and FMD-I in September and FMD-II in February. The work was divided into four periods, viz., control/pre-vaccination period (Nov-Jan), and post-HS-BQ, FMD-I and FMD-II vaccination periods. Overall mean libido and sexual behavior score of bulls during the pre-vaccination period was 90.76±0.19 percent, which significantly decreased for first three (76.65±2.79 to 79.17±2.39), two (77.50±1.71, 76.67±3.07) and one (79.15±2.71) week after FMD-II, FMD-I, and HS-BQ vaccination, respectively. Mean reaction time (seconds) of bulls during vaccination free period was 46.25±0.14, it increased significantly in first four (59.17±2.01 to 56.67±2.11), three (56.67±2.11 to 57.50±2.14) and one (57.50±2.81) week post-FMD-II, FMD-I, and HS-BQ vaccination, respectively. FMD-II (February) vaccination had a more harmful effect on sexual behavior and reaction time compared to FMD-I (September) vaccination, perhaps due to the succeeding summer season. It was concluded that sexual rest should be recommended for three, two and one-week post-FMD-II, FMD-I and HS-BQ vaccination, respectively, return to normal sexual behavior in Pandharpuri buffalo breeding bulls.

Keywords: Pandharpuri buffalo bulls, Prophylactic vaccination, Reaction time, Sexual behavior.

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Introduction

The buffalo male plays an important role in any successful reproductive management program. With the development of frozen semen technology for buffalo breeding, the demand for superior males has increased significantly. Good libido and proper mating ability of a buffalo bull are important traits for successful artificial insemination (AI) program to produce maximum semen of acceptable quality (Anzar *et al*., 1993). The sexual behavior pattern of the breeding bulls used in AI is highly valuable in maximizing semen production. The prophylactic vaccination of bulls against diseases like FMD, HS, and BQ is followed regularly at frozen semen station and breeding farms. But there is scanty information about the effect of vaccination on sexual behavior during the post-vaccination period in indigenous buffalo breeds like Pandharpuri bulls. Keeping this in mind, the present investigation was planned to study the effect of HS-BQ and FMD vaccination on sexual behavior in Pandharpuri bulls and its trend over different post-vaccination periods.

Materials and methods

Six mature, healthy Pandharpuri buffalo breeding bulls aged 5-8 years weighing 480 to 550 kg were selected for this study conducted in 2016–2017. The bulls were maintained at frozen semen center, Kharkee, Pune under ideal housing, feeding and management conditions as per central monitoring unit (CMU) guidelines. The bulls were tested every six-monthly against TB, JD, Brucellosis, IBR, Campylobacteriosis, and Trichomoniasis and dewormed quarterly. All the bulls were vaccinated against contagious diseases like HS and BQ in July, and FMD-I in September and FMD-II in February. The study was divided into four groups/ periods, *viz.,* control group (pre-vaccination or vaccination-free period, Nov-Jan), and post-HS-BQ, FMD-I and FMD-II vaccination groups. The semen was collected from each bull at weekly interval for 10 weeks during the pre-vaccination period and 10 weeks after each vaccination. The reaction time, libido and sexual behavior scores were recorded at the time of semen collection.

Two dummy buffalo bulls were used on the day of semen collection to minimize sexual satiation of a breeding bull from the same dummy. Each bull was sexually stimulated

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and prepared by 10 min restraint and two false mounts on a dummy before semen collection. The libido and sexual behavior scoring based on various sexual events were adopted as described by Elrabie *et al*. (2008) with some modifications as given in Table 1 and each event was assigned a numerical value. The total of the maximum score for each sexual event used for measurement of libido and sexual behavior was 20 (i.e.,100%) and thereby the calculated score was expressed in percentage. The time-lapse between the appearance of bull to the dummy and its first mount or mounting attempt was recorded as reaction time in seconds. The mount may or may not result in successful ejaculation (Elrabie *et al*., 2008).

The post-vaccination week wise and overall 10 weeks results were analyzed statistically using completely randomized design for analysis of variance on the computer by using SPSS software version v. 20, Chicago. The mean values were compared between the pre-vaccination and post-vaccination periods (Snedecor and Cochran, 1994).

Results and discussion

Libido and Sexual Behaviour of Bulls

Reproductive capacity of the bull is one of the important measures to assess the reproductive performance of the breeding bull. The maximum score for measurement of libido and sexual behavior at the time of semen collection was given 20 and expressed as 100 percent. On perusal of Table 2, the overall mean libido and sexual behavior score during the pre-vaccination period (control) were 90.76± 0.19 percent in Pandharpuri buffalo bulls. The libido in group IV (FMD-II) continued to decrease significantly (p <0.05) up to 3rd and numerically up to 8th weeks and then after started increasing and reached normal value. Similarly, the libido decreased significantly (p <0.05) in group III (FMD-I) and II (HS-BQ), but up to 2nd and 1st week, respectively and decreased numerically up to 6th week and then started increasing and gained pre-vaccination values at 7th-week post-vaccination. The overall mean libido and sexual behavior score percentage decreased significantly (p <0.05) post-FMD-I and FMD-II vaccination period, however it decreased non-significantly after HS-BQ vaccination.

The present observations were similar to Singh (2000), who reported a significant decrease in libido as well as sexual behavior score in buffalo bulls up to three weeks after FMD vaccination, however, in present case vaccination decreased libido and reaction time up to 6 to 8th weeks. Vaccination causes stress in the animal body affecting the Leydig cell function and in turn reducing testosterone concentration (Bhakat *et al*., 2010), a reduced level of oxytocin and testosterone changes sexual behavior score and reaction time in animals.

Reaction Rime of Buffalo Bulls

Reaction time is the time lapse between the appearance of bull to the dummy and its first mount or mounting attempt.

Table 1: Libido and sexual behavior score

No.	*Sexual events*	*Sexual behavior observations*	*Scores*
1	Libido/aggressiveness	Shy- Weak	1
		Sluggish -Medium	2
		Active - Good	3
		Aggressive -Excellent	4
2.	Approach to dummy	Sluggish	1
		Eager to mount	2
3	Mounting on dummy	False mount without protrusion	1
		Half mount with protrusion of penis	2
		Full mount with protrusion of penis	3
4	Penile protrusion	Partial	1
		Complete	2
5	Penile erection and penile movement	Short and poor	1
		Partial and weak	2
		Complete and vigorous	3
6	Seeking movement (grasping of dummy at pelvic)	weak	1
		Intermediate	2
		Intense	3
7	Ejaculatory thrust intensity	Weak and slow	1
		Intermediate	2
		Strong and rapid	3
Total of the highest score of each event			20

Table 2: Effect of vaccination on mean± SE sexual behaviour score (%) and reaction time (sec) of Pandharpuri buffalo bulls

Vaccination group		Group IV (FMD – II)		Group III (FMD – I)		Group II (HS-BQ)	
		Sexual beh. score (%)	*Reaction time (sec)*	*Sexual beh. score (%)*	*Reaction time (sec)*	*Sexual beh. score (%)*	*Reaction time (sec)*
Group I (control) (n = 60)		90.76 ± 0.19^{ax}	46.25 ± 0.14^{ax}	90.76 ± 0.19^{ax}	46.25 ± 0.14^{ax}	90.76 ± 0.19^{ax}	46.25 ± 0.14^{ax}
Pos -vaccination weeks (n = 6)	1	76.65 ± 2.79^{cd}	59.17 ± 2.01^{b}	77.50 ± 1.71^{bc}	56.67 ± 2.11^{b}	79.15 ± 2.71^{b}	57.50 ± 2.81^{b}
	2	75.00 ± 1.29^{d}	60.83 ± 2.39^{b}	$76.67 \pm .07^{c}$	60.00 ± 2.58^{b}	80.00 ± 2.24^{ab}	55.83 ± 3.00^{ab}
	3	79.17 ± 2.39^{bcd}	58.33 ± 2.47^{b}	80.83 ± 2.39^{abc}	57.50 ± 2.14^{b}	83.33 ± 3.07^{ab}	55.00 ± 2.24^{ab}
	4	81.67 ± 3.07^{abcd}	56.67 ± 2.11^{b}	82.50 ± 2.81^{abc}	53.33 ± 2.79^{ab}	85.00 ± 2.89^{ab}	53.33 ± 2.11^{ab}
	5	85.00 ± 3.16^{abcd}	53.33 ± 2.79^{ab}	85.83 ± 2.71^{abc}	52.50 ± 2.81^{ab}	86.67 ± 2.79^{ab}	52.50 ± 2.14^{ab}
	6	86.67 ± 3.57^{abc}	52.50 ± 2.14^{ab}	87.50 ± 2.81^{ab}	51.67 ± 3.33^{ab}	88.33 ± 3.07^{ab}	50.83 ± 2.39^{ab}
	7	88.33 ± 2.11^{ab}	51.67 ± 2.11^{ab}	89.17 ± 2.01^{a}	49.17 ± 2.71^{a}	90.00 ± 2.24^{a}	46.67 ± 2.79^{a}
	8	90.00 ± 2.24^{ab}	45.83 ± 2.39^{a}	90.83 ± 2.39^{a}	46.67 ± 2.11^{a}	90.83 ± 2.71^{a}	46.67 ± 2.11^{a}
	9	90.83 ± 2.39^{a}	46.67 ± 2.11^{a}	90.00 ± 3.16^{a}	47.50 ± 2.14^{a}	91.67 ± 2.47^{a}	45.83 ± 2.39^{a}
	10	90.00 ± 2.24^{a}	46.67 ± 2.79^{a}	90.83 ± 3.27^{a}	46.67 ± 3.07^{a}	90.83 ± 2.39^{a}	46.67 ± 2.11^{a}
Overall mean (n = 60)		84.33 ± 1.85^{y}	53.17 ± 1.75^{y}	85.17 ± 1.72^{y}	52.17 ± 1.50^{y}	86.59 ± 1.45^{xy}	51.08 ± 1.38^{y}

Mean bearing different superscript (^{a,b,c,d}) in column and (^{x,y}) in row differ significantly at p <0.05; Beh, behaviour

The mount may or may not result in successful ejaculation (Elrabie *et al.*, 2008). The reaction time was measured in seconds. On perusal of Table 2, the overall mean reaction time for the pre-vaccination period in Pandharpuri buffalo bulls was 46.25 ± 0.14 seconds. Similar findings were reported by Kumare (2004) in HF bulls. However, Singh *et al.* (2004) reported longer reaction time in buffalo bulls. The reaction time is influenced by age (Ahmed *et al.*, 2005), as well as season, management practices and the environmental condition in which the bulls are reared (Bhakat *et al.*, 2009).

The mean reaction time increased significantly (p <0.01) over the pre-vaccination/control period in the first four, three and one-week post-FMD-II, FMD-I and HS-BQ vaccination, respectively. It gradually declined thereafter attaining control levels by 8th, 7th and 7th week after FMD-II, FMD-I and HS-BQ vaccination, respectively. Hence, it is indicative that FMD-II (February) vaccination had a more adverse effect on reaction time and the recovery period was also one week more than the FMD-I (September) and HS-BQ (July) vaccination in Pandharpuri buffalo bulls. This difference could perhaps be attributed to succeeding summer and winter seasons following FMD-II and FMD-I vaccination that are known to affect the breeding behavior of buffalo bulls rather than vaccine alone. The significant increase in reaction time following the vaccination corroborated well with the findings of Gowda (1993) in Jersey, Kammar and Gangadhar (1998) in Surti, Singh *et al.* (2004) in Murrah, Kumare (2004) in HF, Perumal *et al.* (2013) in Mithun and Rao *et al.* (2017) in Karan Fries bulls following FMD vaccination. Pankaj *et al.* (2007) also found a highly significant increase in reaction time two days after combined FMD + HS + BQ oil adjuvant vaccination in Murrah bulls. The differences in results of the present study and earlier workers can be due to the difference in animal species, breed, vaccines used, a dose of vaccine, etc.

Conclusion

It was concluded from the study that the mean reaction time, and libido and sexual behavior score in Pandharpuri buffalo bulls were significantly affected following HS-BQ (in July), FMD-I (September) and FMD-II (February) vaccinations for one, two and three weeks, respectively, as compared to pre-vaccination period (Nov-Jan). Therefore sexual rest should be recommended accordingly for post-FMD-II, FMD-I, and HS-BQ vaccination to get optimum output and regularize libido, sexual behavior score and reaction time in Pandharpuri buffalo bulls.

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