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COMPARATIVE EVALUATION OF THREE RECTAL PALATATION BASED ESTRUS SYNCHRONIZATION PROTOCOLS AT FIELD LEVEL IN RAJASTHAN BUFFALOES

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ABSTRACT

Three different estrous synchronization protocols were evaluated. Treatment included an injection of prostaglandin ($PGF_2\alpha$;1 ml VSM - Vulva-sub mucosal route) on palpation of CL; status of the estrous cycle was evaluated by rectal palpation and addition of gonadotropin releasing hormone (GnRH 2.5ml), fixed time insemination (FTAI) was done 72 h post $PGF_2\alpha$ injection. Similar was the second protocol in which, in gonadotropin releasing hormone (GnRH; 2.5 ml.) 7 days addition to $PGF_2\alpha$; 1 ml VSM administration and 9 days GnRH; 2.5 ml was administered 48 h post PGF2α ; 1 ml VSM injection and FTAI was done. For the third protocol, GnRH treated buffaloes were observed for 7 days and then $PGF_2\alpha$; 14 days injection and GnRH;16 days was administered and at the time of A.I. Three different groups of animals were maintained for three different protocols respectively. Statistical data analysis (using chi-square) showed that first and second protocol have been found significantly ($P<0.05$) better than third protocol used in field buffaloes of Rajasthan.

Key words : Estrus, Synchronization, GnRH, $PGF_2\alpha$, Buffaloes, Reproduction.

The gonadotropin releasing hormone (GnRH) and prostaglandin ($PGF_2\alpha$) method of estrous synchronization has proven to be very successful in estrus synchronizing in buffaloes Although many studies have been carried out with $PGF_2\alpha$ alone[2,4] or in combination with GnRH, the use of artificial insemination technique has been successfully used in breeding farms for genetic improvement of animals. In buffalo there is difficulty in identification of estrus manifestations and for application of A.I. at the accurate time. The use of protocol that does not require the identification of estrus, allow for the increase use of A.I. at fixed time and are more efficient in buffalo for increasing productivity. It has been observed that when $PGF_2\alpha$ is administered on palpation of functional CL, about 60-70% of treated animals were detected in estrus within 3 days post $PGF_2\alpha$ injection. The pregnancy rate achieved in relation to the usage of different protocols with fixed time artificial insemination in buffaloes was observed to range between 30-50per cent[1]. Ovulation and estrus activity after calving are delayed when the positive feedback effects of estradiol on release of LH from the pituitary are reduced due to various factors.

Estrus synchronization protocol improves reproductive efficiency by reducing the length of breeding and calving seasons and increasing calf

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weaning weights. Artificial insemination technique can also be used more efficiently. In some of the synchronization protocols GnRH has been included along with $PGF_2\alpha$, either single GnRH injection prior to $PGF_2\alpha$ (i.e. seven days earlier to $PGF_2\alpha$ injection) and for the other one double GnRH injections i.e. seven days prior to $PGF_2\alpha$ and second injection, 48h post $PGF_2\alpha$. administration. The later protocol is better known as rectal palpation based estrus synchronization protocol. Under these two protocols fixed time insemination is done 72h post $PGF_2\alpha$ injection[3,6,11].

Surti, Murrah and non-descript buffaloes were considered for treatment. The body weights of the buffaloes ranged between 300-400kg. Body weights of the animals below 300kg were not considered for the study. Animals suffering from clinical reproductive problems were also excluded. Total 33 animals were considered for application of three different protocols.

For the first protocol (Figure-1), five buffaloes were selected. They were subjected to rectal palpation. On palpation of CL, $PGF_2\alpha$; 1 ml, VSM was administered, GnRH; 2.5 ml injected and inseminated at fixed time, i.e. 72 h post $PGF_2\alpha$ administration and the animals were subsequently inseminated 12h post first Artificial Insemination.

	48h/72 h	12h
$PGF_2\alpha$ _____	1st A.I. ____	2nd (A.I.)
	+GnRH	

Figure-1.Prostaglandin and FTAI based protocol $PGF_2\alpha$-Prostaglandin, 3rd day GnRH+ 1st A.I. –Artificial Insemination and 2nd AI 12h post 1st Artificial Insemination.

For the second protocol (Figure-2) 22 buffaloes were selected. On palpation of non functional CL, 1 day GnRH 2.5; ml and 7 day $PGF_2\alpha$; 1 ml VSM were administered and GnRH; 2.5 ml /animal was injected 48h post $PGF_2\alpha$ administration, and FTAI was done 12h post GnRH injection.

	7days	9 days	12h
GnRH ___	$PGF_2\alpha$ ____	1st A.I.____	2nd A.I.
		+GnRH	

Figure 2. GnRH, Prostaglandin and FTAI based protocol A.I. –Artificial Insemination with GnRH administered 48h post $PGF_2\alpha$ 1st AI and 2nd AI at 12h post 1st Artificial Insemination

For the third protocol 6 buffaloes were selected. The protocol is similar to the second protocol except that, GnRH; 2.5 ml is administered at the time of A.I.

	14 days	16days	12h
7 days	GnRH___	$PGF_2\alpha$___	1st A.I.___2nd A.I.
		+ GnRH	

Figure 3. Administer 7 day GnRH, 14 days $PGF_2\alpha$ and 16days GnRH 1st A.I. – Artificial Insemination and 2nd FTAI 12h post 1st Artificial Insemination.

These animals were either repeat breeding or were suffering from reproductive problems like, silent heat, persistent CL and also anoestrus condition (as informed by farmer). By rectal palpation, the status of CL and uterine tone could be judged. $PGF_2\alpha$ was administered on palpation of functional CL and 72h post $PGF_2\alpha$, leutolysis of CL was confirmed. About 90% of the animals were confirmed in heat as observed by swollen vulva and uterine tone on rectal palpation. Buffaloes were diagnosed for pregnancy via rectal palpation on day 60 post Artificial Insemination by a trained technician.

It was observed that for all the three protocols, 100% animals conceived. Out of total 33 animals, 16 animals have calved. All the three protocols are prostaglandin based. Fixed time insemination, estrus synchronization protocols are found to be effective at field conditions in both the categories, resulting significant successful pregnancy rate. The selection of protocol depends on cost, labor facilities. Success requires a buffalo herd with a close calving interval, good nutrition, facilities, high quality semen and accurate heat detection.

Table 1: Conceive and pregnancy rates in buffalo on application of three different protocols

Protocol	No. of buffalo	Conception rate*		Pregnancy rate		Rank and Chi-Sq		
		Number	%	Number	%	Rank	X^2	2 d.f. (0.05)
1st	5	5	100	3	60**	1st	0.8	9.34
2nd	22	22	100	12	55**	2nd	4.54	
3rd	6	6	100	1	17	3rd	4.0	

*There was no significant difference between the three protocols when analyzed for total number of conceived animals for each protocol

**The number of buffaloes confirmed to be pregnant by 1st and 2nd protocol to first service was significantly more ($P<0.05$) than the third protocol.

The results for percentage of pregnant animals to first service resulting on application of first protocol for buffaloes were 60% (3/5) followed by 55% (12/22) for the second protocol respectively; and similarly for the third protocol it was 17% (1/6). On statistical analysis, it was observed that on application of first and second protocol, number of pregnant buffaloes was significantly higher ($P<0.05$) in comparison to the third protocol. Similar reports have been published by earlier researchers[5,7] in buffaloes. Prostaglandin (PGF2α) causes CL to regress during the responsive phase and a consequent decrease in the levels of progesterone leading to the development of follicles of the next wave[5].

The major limiting factor for optimum reproductive performance on many farms is failure to detect estrus in a timely and accurate manner. A number of controlled or breeding programs have been developed for synchronizing groups of lactating buffaloes. Controlled breeding can be directed to buffaloes that confirms a corpus luteum test as determined by rectal palpation of the ovaries and for further administering $PGF_2\alpha$ to these animals. An important requirement in this study was the presence of functional CL as confirmed by an expert veterinary officer. It was observed that all the buffaloes were in heat 72h post $PGF_2\alpha$ injection. It has been observed that buffalo in early and late stages of the cycle tend to exhibit heat within 48-72h after $PGF_2\alpha$ administration.

There are different protocols like rectal palpation based synchronization in which GnRH is injected 7 days prior to $PGF_2\alpha$ treatment, causes development of follicles or ovulation of the dominant follicle depending on the stage of the estrous cycle. The second GnRH is administered 48h post $PGF_2\alpha$ injection[10,12]. The Co-synch protocol is the same as the Ovsynch protocol except that second GnRH is being injected at the time of fixed time A.I. post $PGF_2\alpha$ injection[8,9]. In GnRH + $PGF_2\alpha$ program, GnRH is injected in all buffalo and $PGF_2\alpha$ is injected at an interval of 7 days post GnRH injection. Animals which are observed in heat 3-5 days post $PGF_2\alpha$ injection are inseminated or alternatively they can be inseminated at fixed time i. e. 3days post $PGF_2\alpha$ injection. In a modified targeted breeding GnRH + $PGF_2\alpha$ program eligible buffaloes receive $PGF_2\alpha$ injection and further GnRH is injected 14 days post $PGF_2\alpha$ injection and they are again injected with PGF_2á 7 days post GnRH injection. They all were inseminated 3-4 days post $PGF_2\alpha$ injection. Out of 33 animals, 16 animals have calved; the calving rate was recorded as 48%. As the computed value of chi-square is more than table value, the chi-square is significant ($P<0.05$). Perusal of table-2 shows that first protocol got first ranking. Thus, it is concluded that first and second protocol are better than the third protocol.

The gonadotropin releasing hormone (GnRH) and prostaglandin ($PGF_2\alpha$.) method of estrous synchronization has proven to be very successful in synchronizing estrus in buffaloes. Estrus synchronization protocol improve reproductive efficiency by reducing the length of breeding and calving seasons and improves body weight of calves at weaning. Surti, Murrah and non-descript buffaloes were considered for treatment. Total 33 animals were considered for application of three different protocols. Selected animals were either repeat breeder or were suffering from reproductive problems like, silent heat, persistent CL and also anoestrus condition (as informed by the farmer). Out of 33 animals, 16 animals showed calving rate as 48% in this study. Hence, it might be concluded that first and second protocol proved better than third protocol.

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