ENHANCEMENT OF OVARIAN ACTIVITY USING CERTAIN SYNCHRONIZATION PROTOCOLS IN POSTPARTUM GRADED MURRAH BUFFALOES

B CHANDRA PRASAD, G. VENKATA NAIDU, M. SRINIVAS, M. RAGHUNATH AND K ASHWINI KUMAR

Department of Veterinary Gynaecology and Obstetrics
NTR College of Veterinary Science, Gannavaram-521 102, India
Sri Venkateswara Veterinary University, Tirupati.

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ABSTRACT

This study was aimed to observe the effect of various synchronization protocols viz. Double *PGF2α, Pre*synch-Ovsynch, Ovsynch and CIDR-Ovsynch on fertility in postpartum sub-estrus and true anestrous graded Murrah buffaloes under farm and field conditions and during breeding and low breeding seasons. Experimental period comprised from September 2017 to August 2019 (includes breeding and low breeding season). Presynch and Ovsynch protocol improved the conception and pregnancy rate in sub-estrus and true anestrus buffaloes during breeding and low breeding seasons under farm and field conditions.

Keywords: Anestrous, Buffaloes, Conception rate, Breeding season.

INTRODUCTION

Postpartum anestrum is one of the most prevalent, frustrating and challenging reproductive problem encountered in buffaloes resulting into prolonged inter-calving period, reduced milk production and thus greatly affecting the economy of farming community. Higher incidence of postpartum anestrous was due to smooth inactive ovaries in buffaloes and this condition affected the production potential leading to huge economic losses (Ravikumar, 2014 and Kalwar *et al*., 2019). Looking to the high incidence of postpartum infertility in dairy buffaloes, the estrus synchronization and fixed time artificial insemination (FTAI) has been introduced as an alternative to improve reproductive efficiency in buffalo herds.

The current study was planned to augment the fertility using different hormonal therapeutic treatments. Keeping in view the above facts and as limited reports are available on comparative efficacy of double Prostaglandin (PGF2@), Presynch-Ovsynch, Ovsynch and Controlled internal drug release -Ovsynch protocols with FTAI, the present study was undertaken in postpartum lactating anestrous buffaloes under farm and field conditions during breeding and low breeding seasons.

MATERIALS AND METHODS

Graded Murrah buffaloes (n=580) in lactation with varied parity (1 to 6) and good body condition score (BCS) that experienced normal parturition and had not exhibited estrus for the past 3 to 12 months or more selected for the study. These buffaloes were monitored for their ovarian activity by per-rectal examination, trans-rectal ultrasonography (TRUS) and categorized as subestrus and true anestrous buffaloes. Experimental period comprised from September 2017 to August 2019 (includes breeding and low breeding season). Out of the selected animals, 105 buffaloes were maintained at farm, whereas remaining buffaloes where maintained by the local farmers under field conditions.

Out of 580 buffaloes 392 animals categorized as sub-estrus.Among the 392 sub-estrus buffaloes 35 buffaloes reared under farm and 171 buffaloes reared under field conditions. These animals were treated during the breeding season and 25 in farm and 161 buffaloes of villages were synchronized during low breeding seasons.

The postpartum anestrous buffaloes with no palpable structures on the ovaries were grouped under true anestrous. Among these, 12 buffaloes belonging to the farm and 36 buffaloes of the field were treated during the breeding season, while 14 and 44 buffaloes belonging to farm and field conditions, respectively were treated during low breeding season.

The postpartum anestrous buffaloes (farm, n=16 and field, n=45) which had exhibited estrus during breeding and low breeding season before induction of hormonal treatments were kept as control group. The anestrous buffaloes (farm, n=3 and field, n=18) which had palpable abnormalities in the genitalia during breeding (farm, n=1 and field, n=6) and low breeding (farm, n=2 and field, n=12) seasons were excluded from the present investigation.

Subestrus buffaloes were treated with double prostaglandin ($PGF_2\alpha$- $PGF_2\alpha$) and Presynch-Ovsynch ($PGF_2\alpha$-$PGF_2\alpha$-*GnRH*-$PGF_2\alpha$-GnRH), whereas true anestrous buffaloes treated with Ovsynch (GnRH-$PGF_2\alpha$-GnRH) and CIDR-Ovsynch (CIDR-GnRH-$PGF_2\alpha$-GnRH)

*Corresponding author:
cpmail1@rediffmail.com

protocols. FTAI was performed at 16-18 hours or at spontaneous estrus during breeding and low breeding season. Control group buffaloes were inseminated with frozen thawed semen at standing estrus by adopting AM-PM rule.

Conception rate at induced estrus was calculated as the percentage of buffaloes that became pregnant at first insemination as confirmed by trans-rectal ultrasonography on day 28 and per-rectal palpation at days 45 and 60 post insemination. Subsequent AI and conception rate and overall conception, pregnancy rate were also recorded and presented in Table 1 and 2 .

RESULTS AND DISCUSSION:

In the present study, first, second, third service and overall conception rate was recorded in treated and control groups under farm and field conditions were presented in Table 1 and 2.

In the present study, the overall conception rate in Double PG group buffaloes under farm conditions during the breeding season was on par with the observations of Honparkhe *et al*. (2008), who reported the conception rate as 65.6 per cent, whereas the present findings are in contrary with findings of Yendraliza *et al*. (2019) who recorded a higher conception rate of 70.00%. On the contrary, double prostaglandins treated buffaloes of the present study reared under farm conditions during the low breeding season showed lowered conception rate when compared to the previous findings of Phani (2017) who recorded a higher conception rate (86.66%). In the present study, 3 buffaloes had early embryonic mortality during the low breeding season under field conditions, which might be due to reduced secretion of Progesterone by the corpus luteum or due to heat stress during the summer months as opined by Binelli *et al*. (2001).

In the present study, the overall conception rate in Presynch ovsynch group buffaloes from field during the breeding season was in tune with the findings of Konrad *et al*. (2013) who found the conception rate as 55.80%. Ravikumar, (2014) observed a higher conception rates during breeding (70.00%) and low breeding seasons (50.00%) under field conditions. In the present study higher conception rate was recorded in farm buffaloes during the low breeding when compared to the previous study of Tawab *et al*. (2019) who recorded the conception rate as 35.98 and 36.64 per cent for insemination performed at standing heat and FTAI, respectively. Chebel *et al*. (2010) recorded 36.20 and 33.00 per cent conception rate on day 40 and 65 post AI with a pregnancy loss of 8.80 per cent.

In the present study, the overall conception rate in ovsynch group buffaloes of farm conditions during the breeding season was in close agreement with the findings of Kalwar *et al*. (2019) who reported the conception rate as 60.00%. On the contrary, a higher conception rate was recorded in earlier studies of Thorat *et al*. (2012) who recorded the conception rate as 85.71 percent. Recently, Ravikumar *et al*. (2019) recorded a higher conception rate in buffaloes reared under field conditions during the breeding and low breeding season as 70.00 and 50.00 per cent, respectively. The findings from the present study showed improved response to ovsynch during the peak breeding season compared to low breeding season, which might be due to the presence of a large preovulatory follicle at the time of induced estrus.

In the present study, the overall conception rate in CIDR Ovsynch group of buffaloes reared under farm conditions during the breeding season was in close concurrence with the findings of Abhishek *et al*. (2018) who recorded the conception rate (56.94%). Higher conception rate was recorded by Mujawar *et al*. (2019) recorded higher conception rate in buffaloes belonging to farms during the breeding season as 87.50 per cent. In the present study, the overall conception rate for control group buffaloes reared under farm conditions during the breeding season exhibited with the findings of Srinivas Rao (2014) who recorded a higher conception rate (62.50%). The findings of the present study was in accordance with the reports of Ravikumar *et al.* (2019) who observed 20.00 per cent conception rate during the breeding and low breeding seasons, respectively under field conditions.

CONCLUSION:

Based on the conception rates among DPG, POVS, OVS and COVS protocols, POVS hormonal protocol had improved the conception and pregnancy rate in sub-estrus buffaloes, while OVS protocol improved the conception rate in postpartum true anestrous buffaloes during the breeding and low breeding seasons reared under farm and field conditions.

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Table 1: Screening of postpartum lactating anestrous Graded Murrah buffaloes for ovarian cyclicity based on PRE, TRUS and P_4 during experimental period

Total animals screened		Sub estrus		True anestrous	In Heat	Buffaloes with palpable abnormalities
		Screening based on PRE,TRUS and p_4 assay	Screening based on PRE and TRUS	Screening based on PRE and TRUS	Screening based on PRE and TRUS	
Farm	n=105	24	36	26	16	3
Field	n=475	45	287	80	45	18

Table. 2. Conception rate at induced estrus in treated and at spontaneous estrus in control groups in postpartum Graded Murrah buffaloes under farm and field condition:

Reproductive parameters	Type of rearing	Sub-estrus		True anestrous		
		DPG (%)	POVS (%)	OVS (%)	COVS (%)	Control (%)
First service conception rate at induced estrus (%)	Farm	18/46 (39.13)	6/14 (42.85)	5/12 (41.66)	4/14 (28.57)	4/16 (25.00)
	Field	92/286 (32.16)	15/46 (32.60)	14/42 (33.33)	9/38 (23.68)	7/45 (15.55)
Second service conception rate at subsequent estrus (%)	Farm	4/46 (8.69)	2/14 (14.28)	2/12 (16.66)	2/14 (14.28)	2/16 (12.50)
	Field	32/286 (11.18)	7/46 (15.21)	5/42 (11.90)	4/38 (10.52)	4/45 (8.88)
Third service conception rate at subsequent estrus (%)	Farm	1/46 (2.1)	1/14 (07.14)	0/12 (00.00)	1/14 (7.14)	1/16 (6.25)
	Field	9/286 (3.14)	3/46 (6.52)	2/42 (4.76)	1/38 (2.63)	2/45 (4.44)
Over all conception rate (%) at 30 days (TRUS)	Farm	23/46 (50.00)	9/14 (64.28)	7/12 (58.33)	7/14 (50.00)	7/16 (43.75)
	Field	133/286 (46.50)	25/46 (54.34)	21/42 (50.00)	14/38 (36.84)	13/45 (28.88)
Pregnancy rate (%) at 45-60 days by rectal examination	Farm	23/46 (50.00)	9/14 (64.28)	6/12 (50.00)	6/14 (42.85)	6/16 (37.50)
	Field	130/286 (45.45)	25/46 (54.34)	20/42 (47.61)	13/38 (34.21)	12/45 (26.66)

Table. 2. Conception rate at induced estrus in treatment and at spontaneous estrus in control groups in postpartum Graded Murrah buffaloes under farm and field condition during high and low breeding seasons

Reproductive parameters	Type of rearing	HB and LB	Sub-estrus		True anestrous		
			DPG	POVS	OVS	COVS	Control
First service conception rate at induced estrus (%)	Farm	HB	12/18 (66.66)	4/8 (50.00)	4/8 (50.00)	3/8 (37.50)	1/6 (16.66)
		LB	6/28 (21.42)	2/6 (33.33)	1/4 (25.00)	1/6 (16.66)	3/10 (30.00)
	Field	HB	53/125 (42.40)	9/28 (32.14)	9/28 (32.14)	6/23 (26.08)	5/26 (19.23)
		LB	39/161 (32.23)	6/18 (33.33)	5/14 (35.71)	3/15 (20.00)	2/19 (10.52)
Second service conception rate at subsequent estrus%	Farm	HB	3/24 (12.50)	2/7 (28.57)	1/7 (14.28)	2/9 (22.22)	2/9 (22.22)
		LB	1/22 (4.54)	0/7 (00.00)	1/5 (20.00)	0/5 (00.00)	0/7 (00.00)
	Field	HB	21/126 (16.66)	5/25 (20.00)	4/23 (17.39)	3/27 (11.11)	3/19 (15.78)
		LB	11/160 (6.87)	2/21 (9.52)	1/19 (05.26)	1/11 (09.09)	1/26 (3.84)
Third service conception rate at subsequent estrus%	Farm	HB	1/25 (6.66)	1/7 (14.28)	0/4 (00.00)	1/8 (12.5)	1/7 (14.28)
		LB	0/21 (00.00)	0/7 (00.00)	0/1 (00.00)	0/6 (00.00)	0/9 (00.00)
	Field	HB	7/165 (7.29)	3/27 (11.11)	2/22 (9.09)	1/17 (5.88)	1/19 (5.26)
		LB	2/121 (3.03)	0/19 (00.00)	0/20 (00.00)	0/21 (00.00)	1/26 (3.84)
Over all conception rate (%) at 30 days (TRUS)	Farm	HB	14/23 (60.86)	6/9 (66.66)	4/6 (66.66)	4/7 (57.14)	4/8 (50.00)
		LB	9/23 (39.13)	3/5 (60.00)	3/6 (50.00)	3/7 (42.85)	3/8 (37.50)
	Field	HB	74/133 (55.63)	13/21 (61.90)	13/22 (59.09)	7/14 (50.00)	8/20 (40.00)
		LB	59/153 (38.56)	12/25 (48.00)	8/20 (40.00)	7/24 (29.16)	5/25 (20.00)
Pregnancy rate (%) at 45-60 days by rectal examination	Farm	HB	14/23 (60.86)	6/9 (66.66)	4/6 (66.66)	4/7 (57.14)	4/8 (50.00)
		LB	9/23 (39.13)	3/5 (60.00)	2/6 (33.33)	2/7 (28.57)	2/8 (25.00)
	Field	HB	74/133 (55.63)	13/21 (61.90)	13/22 (59.09)	7/14 (50.00)	8/20 (40.00)
		LB	56/153 (36.60)	12/25 (48.00)	7/20 (35.00)	6/24 (25.00)	4/25 (16.00)