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Enhancement of reproductive performance in postpartum Murrah buffaloes treated with prostaglandin and gonadotrophin releasing hormone

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ABSTRACT

Fifty postpartum buffaloes were divided into five groups, treatments (T1, T2, T3, T4) and one control (T5). Prostaglandin (Lutalyse) and gonadotrophin releasing hormone (receptal) were used in combination or alone to induce cyclicity. All the animals were palpated per rectum manually, on days 10, 15, 27, 35, 45, 50 and 60 postpartum to note reproductive status. Treatments (T1, T2, and T3) differed significantly ($P<0.01$) to T4 and T5 treatments. There was no significant difference between T4 and T5. Medium and large sized follicles were observed on days 10 and 15 postpartum in treatment groups and on day 20 in control group. In treated groups (37/38) first heat appeared within 25-111 days and in control group (9/12) within 25-104 days postpartum. Effect of hormonal treatments on occurrence of first heat and service period significantly differed as compared to control groups. Service period was lowest in November calvers. Month of calving and parity had no significant effect on involution of uterus periods. Primiparous animals had highest interval between calving to first heat and conception.

Key Words: Buffaloes, Postpartum, Prostaglandin, Gonadotrophin releasing hormone, Reproductive performance

INTRODUCTION

Long calving interval of buffaloes is one of the major causes contributing to economic loss by hampering reproductive efficiency and lowering lifetime active production period (Basu et al., 1986; Agarwal and Shankar, 1994). During early postpartum there is a marked suppression of pulsatile LH release (William et al., 1982). Postpartum resumption of pulsatile LH release is requisite for normal cyclicity in cows (Rahe et al., 1980). Gonadotrophin releasing hormone (GnRH) and Prostaglandin (PGF2α) can improve herd reproductive performance which depends on many variables, including proper nutritional management (Nobel, 1990). GnRH (Receptal) injected 15 days pp postpartum (pp) had reduced service period and interval of first heat (Barkawi et al., 1995, Saini and Lohan, 2003). Prostaglandin had been used on day 1 and on day 7 postpartum to hasten involution of uterus and occurrence of first estrus in buffaloes (Nasr and Sosa, 1994; Nazir et al., 1994). The present study was undertaken on postpartum buffaloes to see the effect of prostaglandin and gonadotrophin releasing hormone to improve reproductive performance.

MATERIALS AND METHODS

Fifty postpartum buffaloes of different parity from Livestock Production and Management Department, College of Animal Sciences, CCS Haryana Agricultural University Hisar, were taken for this study. All animals were managed and kept as per recommended, standard managerial practices. PGF2α (Lutalyse, 25mg I/m) and GnRH (Receptal 20µg I/m) alone or in combination were used in animals, divided into four treatment groups. A control group T5 (n=12) of randomly selected buffaloes was also maintained. In treatment groups T1 (n=9), were injected PGF2α on day 10 followed by GnRH, on day 15 postpartum (pp); T2 (n=9) PGF2α on day 10 pp; T3 (n=10) GnRH on day 10 and PGF2α on day 27 pp and T4 (n=10) GnRH on day 15 pp. Each animal was rectally palpated on 10, 15, 27, 35, 45 and 60 days postpartum to observe involution of uterus and development of ovarian structures. Teaser bull was daily paraded in the evening and morning to detect animals in heat.

RESULTS AND DISCUSSION

Uterine involution and structural development on ovarian surface were observed per rectally in each animal (n=50), from day 10 to day 60 postpartum. Involution of uterus was completed in treated animals within an average period of 24.44±0.74 to 27.11±0.65 days postpartum and in 27.66±1.04 days in untreated animals. Effect of treatment in T1, T2 and T3 groups differed significantly ($P<0.05$) to T4 and T5 groups. There was no significant difference in uterine involution period between T4 and control (T5) groups. Comparable observations were observed in Arabian and Egyptian buffaloes (Nasr and Sosa, 1994; Barkawi et al., 1995).

Reproductive performance of treated and control group animals is presented in Table 1. Appearance of medium and large follicles (> 8mm) in the treated groups

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could be palpated from day 10 and 15 postpartum and in control group appearance of these follicles was delayed (20dpp). Lohan et al. (2000) reported that in buffaloes the development of dominant follicle was observed early in the period after calving which caused resumption of early estrus activity. Ferguson (1994), observed in cattle that GnRH may be responsible for release of follicle stimulating hormone (FSH) and luteinizing hormone (LH). Luteinizing hormone is responsible for stimulating ovarian activity, including follicular development, ovulation and luteal function. Rahe et al. (1980) noted that in cows, indirect evidence suggests postpartum resumption of pulsatile LH release is mandatory for normal cyclicity. Thirty-one of the 38 Hormonal treated animals were observed in first heat within 25-61 days and another 6 within 62-111 days. In the control group, 4 out of 12 animals exhibited first heat within 25-54 days and another 5 within 72-104 days. Effect of all the four different treatments on occurrence of first heat was significantly superior ($P<0.01$) over the control group. In Treatment-2 (T2), the interval from calving to Ist heat was 37.55±2.06 dpp, which differed significantly to T1, T3 and T4 treatments (40.68±4.54; 45.30±6.83 and 44.00±4.71 dpp), respectively. Nasr and Sosa, (1994) also observed that in buffaloes treated with PGF2α on day after calving had induced heat within 43.0 days as compared to 168.3 days postpartum in untreated animals. When postpartum buffaloes were treated with PGF2α on day 7, heat was induced after 111±29 days as compared to 131±40 days postpartum in untreated animals.

Mean service period of the four treated groups (63.11±15.66, 61.00±12.99, 73.70±8.32 and 59.33±6.33 days pp) were significantly shorter ($P<0.05$) to control group (110.66±20.35 dpp). Service period was lowest in November calvers, i.e. 60.40±10.92 dpp. Barkawi et al. (1995) and Nasr and Sosa, (1994) estimated the service period in postpartum buffaloes treated with GnRH and PGF2α with their counter part control group, as 64.6 and 289.6; 63.3 and 190.0 days pp, respectively. In the present study out of 38 treated animals, 22 conceived (57.80%), whereas in untreated group conception took place only in 3 out of 12 (25% animals). Nobel (1990) observed in cows that GnRH and PGF2α had improved reproductive performance. Saini and Lohan (2003) also observed that treatment of postpartum buffaloes with GnRH during summer and winter months shortened the period from calving to estrus and conception. Month of calving and parity had no significant effect on involution of uterus periods. Baruselli et al. (1996) noted similar results in Brazilian buffaloes. November calvers had lowest interval from calving to first heat (38.30±1.98 dpp). Pipaon et al. (2002) reported that in Cuban buffaloes, the females calving during the rainy season underwent a delayed resumption of the ovarian activity.

Table 1. Reproductive performance of postpartum Murrah buffaloes treated with Receptal and Lutalyse

Treatments	Postpartum days from calving to estrus				Total animals in heat	% in heat	Service period (from calving to conception, DPP)								Total Animals Conceived	% Conceived
	Ist heat	2nd heat	3rd heat	4th heat			Ist Heat	Conceived	2nd heat	Conceived	3rd heat	Conceived	4th heat	Conceived		
T1 (9)	25-55(7) 75-111(2)	110-132(2)	-	-	9	100	25-36 55-75	4 2	110	2	132	1	-	-	9	100
T2 (9)	30-61(9)	49-60(2) 67-92(3)	-	-	9	100	30-37 67	3 1	49-70 92	4 1	-	-	-	-	9	100
T3 (10)	33-60(7) 62-100(3)	41-70(3) 71-104(1)	78-86(2)	-	10	100	33-49 64	4 1	66	1	78	1	-	-	7	70
T4 (10)	27-55(8) 111(1)	210 (1)	130	(1)	9	90	27-55	7	210	1	130	1	-	-	9	90
T5 (12)	25-54(4) 72-104 (5)	42-54(3) 104-162(3)	52-67(2)	71(1)	9	75	54-104	3	54	1	67	1	-	1	6	50

* Values in parenthesis denote number of animals, T5 – Control group (without any treatment) and DPP- Days postpartum.

Primiparous animals had highest (63.53±8.72 days) and fourth time calvers the lowest (35.00±3.77 days) calving to first heat period. Service period was maximum in primiparous animals (89.92±13.75 dpp). PGF2α and GnRH treatment had reduced involution of uterus period by three to four days but month of calving and parity had no significant effect on involution of uterus period. Medium and large sized follicle appeared earlier in hormonal treated animals. Occurrence of first heat and service period was reduced significantly. Service period was lowest in November calvers. Primiparous animals had highest interval period from calving to Ist heat and service period.

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