

## Treatment with progestagen and PMSG to prevent prolonged anestrus in buffaloes

HARENDRA KUMAR<sup>1</sup>, NEERU BHOOSHAN<sup>2</sup>, M K PATRA<sup>3</sup> and M C YADAV<sup>4</sup>

Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh 243 122 India

Received: 5 October 2009; Received: 15 January 2010

### ABSTRACT

The trial was conducted under field conditions to study the effectiveness of a treatment with progestagen in combination with PMSG on estrus induction, prevention of prolonged anestrus and fertility in noncycling buffaloes. Non cycling buffaloes (72) with average of  $120 \pm 17.6$  days postpartum were randomly allotted to one of the following treatments: progestagen + PMSG (n =44), 250 mg of P Depot im daily for 5 days and 500 iu folligon on seventh day of initiation of treatment and control group (CG, n = 28) without hormonal treatment. The progestagen + PMSG group showed higher estrus and synchronization rates (59.1 and 36.4%) than CG (14.28 and 3.5%). Buffaloes receiving progestagen + PMSG had higher overall pregnancy rate than CG (45.5 vs 14.28%, respectively). The treatment-first service period and calving-conception interval was shorter in hormonal treated ( $8.8 \pm 2.5$  and  $192.5 \pm 16.8$  days) than CG ( $25.2 \pm 3.3$  and  $238.9 \pm 24.7$  days), respectively. In conclusion, treatment with progestagen + PMSG at 120 days postpartum was effective to induce estrus, prevent prolonged anestrus and reduce the calving-conception interval, improving reproductive performance in buffaloes.

**Key words:** Buffalo, Calving-conception interval, Postpartum anestrus, Progestagen, PMSG, Prolonged anestrus

Missing of one cycle incurs a loss of Rs 500 to 800 in a lactating cow (Kutty 2000) and buffalo (Kumar and Mandape 2005) in India. It is essential to develop some improved practices under rural management systems to bring the buffaloes in estrus throughout the year and to reduce the calving interval. Many workers have reported that administration of progesterone in the form of CRESTAR implant or use of PRID during postpartum period induces fertile estrus in buffaloes (Saini *et al.* 1988, Kumar and Mandape 2004). However, these preparations are costly for farmers' use. Therefore, there is an urgent need to follow a low cost therapy for induction of estrus and with this aim a study was designed to observe the effect of progesterone injections in combination with pregnant mare serum gonadotrophin (PMSG) on estrus induction, prevent prolonged anestrus and improve fertility in noncycling buffaloes under rural conditions.

### MATERIALS AND METHODS

The study was conducted in 2 villages located nearby IVRI, Izatnagar, Bareilly. Noncycling buffalo cows (72) of

Present address: <sup>1</sup>Principal Scientist, <sup>4</sup>Head, Division of Animal Reproduction.

<sup>3</sup>Scientist, NRC on Mithun, Jharnapani, Medziphema, Nagaland.

<sup>2</sup> Scientific Officer, UP Council of Agricultural Research, Vibhuti Khand, Gomti Nagar, Lucknow (email: neerubhooshan@gmail.com).

one or more calving, in moderate '3' and good '3.5' body condition score (scale 1 to 5; 1- very thin, 5- very fat; Prasad 1994) at average of  $120 \pm 17.6$  days postpartum were randomly selected and allotted to 1 of 2 experimental groups. In treatment group (n=44) the progesterone was administered by im @ 250 mg daily for 5 days followed by single injection of 500 iu of PMSG on day 7 of initiation of treatment. The other group (n=28) was not given any hormonal treatment and considered as control.

All the animals were detected for estrus by visual observation for 1 h each morning (6: 00 to 7: 00 AM) and afternoon (6: 00 to 7: 00 PM). The buffalo cows were artificially inseminated 12 h after estrus. Pregnancy diagnosis was performed by palpation per rectum 60 days post AI.

Non cycling condition of buffalo cows was determined by estimation of plasma progesterone by RIA kit. The blood samples were collected at weekly interval and plasma was separated within few hours of blood collection by centrifugation at 3 000 rpm for 15 min and stored at  $-20^{\circ}\text{C}$  until assayed for progesterone. Only animals with progesterone values below 0.5 ng/ml in 2 consecutive samples were considered for the study. Before the beginning of assay, the animals were palpated per rectum at weekly intervals to determine the ovarian structures and uterus condition. Only buffalo cows with normal reproductive tract and without corpus luteum were considered for the experiment.

Table 1. Effect of treatment with progestagen +PMSG on synchronization rate, estrus rate, conception rate and overall pregnancy rate in 120 days post partum anestrus buffaloes

Treatment	Variables							
	Synchronization rate <sup>1</sup>		Estrus rate <sup>2</sup>		Conception rate <sup>3</sup>		Overall pregnancy rate <sup>4</sup>	
	n	%	n	%	n	%	n	%
P <sub>4</sub> +PMSG	16/44	36.4 <sup>a</sup>	26/44	59.1 <sup>a</sup>	14/26	53.9 <sup>a</sup>	20/44	45.5 <sup>a</sup>
CG	1/28	3.5 <sup>b</sup>	4/28	14.28 <sup>b</sup>	2/4	50.0 <sup>a</sup>	4/28	14.28 <sup>b</sup>

<sup>a, b</sup> values in the same column without a common letter differ ( $P < 0.05$ ); <sup>1</sup>number of buffalo cows in estrus within 5 days/total treated; <sup>2</sup>number of buffalo cows in estrus within 30 days/total treated; <sup>3</sup> number of pregnant buffalo cows/first service buffalo cows; <sup>4</sup>number of first and second service pregnant buffalo cows/total treated.

The statistical analysis was performed as per Snedecor and Cochran (1994). The analysis of variance was used to compare the means of intervals from treatment to first service and calving to conception. The data of estrus rate, synchronization rate, conception rate, overall pregnancy rate were compared by using chi-square test.

## RESULTS AND DISCUSSION

The administration progesterone (P<sub>4</sub>) and PMSG induced estrus in a larger proportion ( $P < 0.05$ ) of animals than control (59.1 vs 14.28%, Table 1). The buffaloes treated with P<sub>4</sub> and PMSG showed a low synchronization rate, but greater ( $P < 0.05$ ) than that exhibited by CG. This, increased estrus and synchronization rates in our experiment were similar to earlier reports in buffaloes treated with norgestomet or CIDR (Saini *et al.* 1988, Singh *et al.* 1988), however, Khan *et al.* (1995) observed a lower estrus induction rate in non cycling buffaloes. Such differences in estrus rate could be due to PMSG administration, which binds FSH and LH follicular receptors, stimulating follicular maturation, estrus behaviour and ovulation. Other factors like different managemental conditions and season that reportedly affect the reproductive performance of buffaloes in tropical conditions (Khan *et al.* 1995, Markandeya and Patil 2003) could have been associated with low estrus and synchronization rates. It is important to document that the inclusion of PMSG in the progesterone protocol could increase the cost of treatment (around 50%); however, the reported benefits of this hormone on estrus and pregnancy rates would justify its use.

Progestagen treatment did not improve conception rate (53.9 vs 50.0%,  $P > 0.05$ , Table 1) but as the estrus rate was increased the proportion of pregnant buffaloes of those available for treatment was also increased. In earlier studies, ((Kumar and Mandape 2004) reported a higher conception rate (80%). This is difficult to explain that why there was a greater conception rate in bovines treated at 90 days or later post partum period. Although it has been suggested that such differences can be explained by a great sensitivity of the hypothalamo-hypophyseal system at different post partum period (Williams *et al.* 1983).

The higher pregnancy rate (45.5 vs 14.28%, Table 1)

Table 2. Effect of treatment with progestagen +PMSG on treatment-first service interval and calving-conception interval in 120 days post partum anestrus buffaloes

Treatment	Intervals (days)			
	Treatment - first service		Calving - conception	
	n	mean ± SEM	n	mean ± SEM
P <sub>4</sub> +PMSG	26	8.8±2.5 <sup>a</sup>	20	192.5±16.8 <sup>a</sup>
CG	4	25.2±3.3 <sup>b</sup>	4	238.9±24.57 <sup>b</sup>

<sup>a, b</sup> Values in the same column with different superscripts differ significantly ( $P < 0.05$ ).

following P<sub>4</sub>+PMSG treatment in the present experiment suggested that this treatment was able to induce the growth of new follicular wave, and the ovulation of a dominant follicle. Though, follicular growth and ovulation were not studied in the present experiment.

Further, treatment-first service interval and calving-conception interval were significantly shortened in P<sub>4</sub>+PMSG treated group (8.8±2.5; 192.5±16.8 days,  $P < 0.05$ ) as compared to CG (25.2±3.3; 238.9±24.7 days, Table 2). These observations are similar to studies in buffaloes by Kumar and Mandape (2004).

The progestagen + PMSG group had a decreased calving to conception interval compared to the CG (difference of about 46 days), which indicates the advantage of using this hormonal treatment to reduce days open in anestrus buffaloes. This shortening the period of days open determines a good improvement in reproductive performance of buffaloes treated with P<sub>4</sub> + PMSG. Considering that after 90 days post partum, the cost of each additional day open is approximately 1.5 \$ per cow (Meadows *et al.* 2005) and Rs 40/buffalo ((Kumar and Mandape 2005) it is reasonable to suggest the use of hormones for success of estrus induction programme in noncycling buffaloes. This would allow reducing the economical losses caused by the prolonged anestrus period that characterizes buffalo reproductive performance under tropical conditions.

Our results demonstrated that treatment with progestagen in combination with PMSG provides an alternative to prevent

prolonged anestrus and improving reproductive performance in buffaloes.

#### ACKNOWLEDGEMENTS

We are thankful to the Director of IVRI, Izatnagar, for providing necessary facilities to conduct this study. The funds and facilities extended by Director General, Uttar Pradesh Council of Agricultural Research, Lucknow, through sanction of the UPCAR project on “Modern Approaches to Control Infertility in Buffaloes” in the Division of Animal Reproduction, IVRI, Izatnagar is gratefully acknowledged.

#### REFERENCES

- Khan A H, Chohan K R, Chaudhry R A and Naz N A. 1995. Comparison of two different doses of PMSG for estrus induction in non cycling buffalo heifers. *Pakistan Veterinary Journal* **15** (1): 34–37.
- Kumar H and Mandape M K. 2004. Fertility management in rural buffaloes by hormonal therapies during summer season. *Buffalo Bulletin* **23** (2): 30–33.
- Kumar H and Mandape M K. 2005. Techno-economics of reproductive disorders among bovines in Tarai zone of Uttar Pradesh. *Proceedings of National Seminar on entrepreneurship development for livelihood security- experiences, prospects and strategies for rural India*. pp 88 IVRI, Izatnagar.
- Kutty C I. 2000. How economic is Milk Production in Kerala Situation. *Journal of Indian Veterinary Association Kerala* **1**: 11–14.
- Markandeya N M Patil A D. 2003. Use of progesterone for induction of estrus and fertility response in buffaloes. *Intas Polivet* **4**: 167–69.
- Meadows C, Rajala-Schultz P Z and Frazer G S. 2005. A spread sheat- based model demonstrating the nonuniform economic effects of varying reproductive performance in Ohio dairy herds. *Journal of Dairy Science* **88**: 1244–54.
- Prasad S. 1994. ‘Studies on body condition scoring and feeding management in relation to production performance of crossbred dairy cattle.’ Ph.D Thesis, National Dairy Research Institute, Karnal, India.
- Saini M S, Galhotra M M, Sangwan M L and Razdan M M. 1988. Use of PRID in inducing estrus and its effect on the sexual behaviour of Murrah buffalo heifers. *Indian Journal of Dairy Science* **41** (1): 40–42.
- Singh G, Dhaliwal G S, Sharma R D and Biswas R K. 1988. Treatment of summer anestrus buffalo with progesterone releasing intravaginal device plus pregnant mare serum gonadotropin. *Theriogenology* **29** (5): 1201–06.
- Snedecor G W and Cochran W G. 1994. *Statistical Methods*. 8th edn. The Iowa State University Press, Ames, Iowa, USA.
- Williams G L, Talavera F, Peterson B J, Kirseh J D and Tilton J E. 1983. Coincident secretion of follicle stimulating hormone and luteinizing hormone in early postpartum beef cows: effects of suckling and level increases of systemic progesterone. *Biology of Reproduction* **29**: 362–73.