

## USE OF GnRH TO IMPROVE CONCEPTION RATE IN REPEAT BREEDER BUFFALOES DURING THE LOW BREEDING SEASON

Ghulam Ahmad., Muhammad Amir Saeed and Isma Nazli Bashir

Department of Animal Reproduction, College of Veterinary Sciences, Lahore-54000, Pakistan.

### ABSTRACT

Twenty one repeat breeder Nili-Ravi buffaloes were randomly divided into three groups (n=7 each) A, B and C on the basis of treatment schedule. Group A received 2 ml Dalmarelin injection (GnRH synthetic analogue) IM at the time of insemination, group B received 1ml of Dalmarelin injection IM each at the time of insemination and 12 hrs post insemination, while group C (control) received an injection of 2ml normal saline IM at the time of insemination. The mean progesterone concentration in group A was  $0.95 \pm 0.01$  ng/ml, in group B, it was  $0.94 \pm 0.01$  ng/ml and in group C,  $0.93 \pm 0.02$  ng/ml on the day of estrus (day 0). On 10<sup>th</sup> day of estrus cycle it was  $1.16 \pm 0.06$  ng/ml in group A,  $1.08 \pm 0.05$  ng/ml in group B and  $1.07 \pm 0.03$  ng/ml in group C. The conception rate was recorded as 42.8% in group A, 28.6% in group B and 14.3% in group C. Dalmarelin injection in a single dose at the time of insemination effectively improved the conception rate in repeat breeder Nili-Ravi buffaloes during the low breeding season.

**Key Words:** Buffalo, GnRH, repeat breeder, conception rate.

### INTRODUCTION

The water buffalo (*Bubalus bubalis*) is generally considered to be a seasonal breeder, although it is not clear how far the seasonal breeding trait is of genetic origin or as a result of climatic and/or nutritional stress. Female buffaloes are not sexually active during the hot summer months as during the winter (Pandey and Razada, 1979). Lower reproductive efficiency of buffaloes is widely accepted as a constraint. Some of the factors affecting reproductive efficiency of the buffaloes are late maturity and resumption of postpartum estrus, silent heat, anoestrus, repeat breeding and seasonal influence on reproduction adding to longer calving interval (Sajid, 1998). Repeat breeding in buffalo is a sub-fertile condition, which results in delayed conception and severely affects the economy of the dairy industry. One of the major factors of repeat breeding in bovines may be delayed ovulation.

Gonadotropin-releasing hormone (GnRH) increases pregnancy rate of repeat breeders (Jeffrey *et al.* 1990). The hormones of hypothalamus, anterior pituitary and ovary play important role in the occurrence of estrus and ovulation which is governed by the increased secretion of FSH and LH during pro-estrus and estrus under the influence of GnRH (Janakiraman, 1988). The pre-ovulatory LH peak is too low and ovulation may take place later after insemination. GnRH administered at the time of insemination and after the insemination may bring the

pre-ovulatory LH peak back again and synchronize ovulation with insemination.

This study was designed to evaluate the efficacy of GnRH synthetic analogue (Dalmarelin, FATRO) with different doses during the estrus period in repeat breeder Nili-Ravi buffaloes to improve their conception rate during the low breeding season i.e. May to July.

### MATERIALS AND METHODS

This project was carried out at Livestock Production and Research Institute, Bahadarnagar, Okara during the months from May to July, 1999. A total of 21 Nili-Ravi repeat breeder buffaloes exhibiting regular estrus were used. The experimental animals were selected on the basis of history, observation of behavioral symptoms and rectal palpation and divided into 3 equal groups (n=7 each) A, B and C. The buffaloes in group A received single IM injection of 2ml Dalmarelin (50 mcg Lecirelin) at the time of insemination, whereas, the buffaloes in group B received two IM injections of 1ml Dalmarelin (25 mcg Lecirelin) each at the time of insemination and 12 hours post insemination. The buffaloes in group C served as control (received 2ml of normal saline).

The progesterone concentration in serum was determined to confirm estrus at the time of insemination and presence of corpus luteum after 10 days of insemination. Approximately, 6 to 8 ml of blood was drawn from each animal. The serum was harvested by centrifugation at 1000 rpm for 10 minutes and stored frozen at -20°C until analysis. The quantitative

measurement of progesterone in serum was carried out according to the method adopted by Cheema (1996) by using commercial OVUCHECK plasma serum progesterone ELISA kits. Group means for progesterone concentrations and conception rate percentage were compared by using ANOVA and Chi Square Test, respectively.

## RESULTS AND DISCUSSION

The mean serum progesterone concentrations in buffaloes of groups A, B and C were  $0.95 \pm 0.01$ ,  $0.94 \pm 0.01$  and  $0.93 \pm 0.02$  ng/ml, respectively on the day of estrus. The difference was statistically non-significant ( $P > 0.05$ ) among the groups. Similar progesterone concentrations have been reported by Barkawi *et al.* (1986) and Hussain (1992).

The mean progesterone concentrations in animals of groups A, B and C were  $1.16 \pm 0.06$ ,  $1.08 \pm 0.05$  and  $1.07 \pm 0.03$  ng/ml, respectively on day 10 of estrus cycle. The difference was statistically non-significant ( $P > 0.05$ ) among the groups. These findings correspond with Cheema (1996) but are in only partial agreement with Hussain (1992), who reported the progesterone concentration as 2.6 ng/ml.

Rectal palpation was carried out after 60 days of insemination to confirm the pregnancy. In group A three out of 7 animals (42.8%) were found pregnant, while in group B two out of 7 animals (28.6%) and in group C one out of 7 animals (14.3%) was found pregnant. Statistically significant ( $P < 0.05$ ) difference was observed for conception rate among groups A, B and C. In this study, the conception rate in group A was 42.8%. This finding is congruent with the observation of Rao and Rao (1984) and Jeffrey *et al.* (1990) who recorded 32.3 to 53.4% and 37.2% conception rate in cows, respectively. Ryan *et al.* (1994) and Rayos (1995) reported improved conception rate in cows (61.6 and 70%) through administration of GnRH analogue at the time of insemination. Administration of GnRH at the time of insemination did not increase pregnancy rate (6 and 11 to 15 percent) as mentioned by Mee *et al.* (1990) and Ryan *et al.* (1991), respectively. The conception rate (28.6%) of Group B is in complete accordance with 21% recorded by Stevenson *et al.* (1984).

In conclusion, the present study revealed that GnRH analogue improved the conception rate in repeat breeder Nili-Ravi buffaloes when administrated as a

single dose at the time of insemination rather than using in spilt doses. Further studies are indicated to ascertain the suitable dose of GnRH to improve the conception rate in repeat breeder Nili-Ravi buffaloes during low breeding season.

## REFERENCES

- Barkawi, A.H., M.M. Shafie, Y. Mekawy and M.E. Aboul-Ela. 1986. The use of serum and milk progesterone concentration to monitor postpartum ovarian activity in Egyptian buffaloes. *Buffalo. J.*, 2: 125-134.
- Cheema, R.N., 1996. Progesterone and LH profile of Nili-Ravi buffaloes in low breeding season. M.Sc. Thesis. Dept. Anim. Reprod., College of Veterinary Sciences, Lahore, Pakista
- Hussain, A., 1992. A study to determine the time of ovulation in relation to estrus in Nili-Ravi buffaloes. M.Sc. Thesis. Dept. Anim. Reprod., College of Veterinary Sciences, Lahore, Pakistan.
- Janakiraman, K., 1988. Some aspects of reproductive problems in buffaloes. *Proc. 2<sup>nd</sup> World Buffalo Cong. New Delhi.* 2: 260-264.
- Jeffrey, S.S., P.C. Edward and K.S.A. Richard. 1990. Double insemination and gonadotrophin releasing hormone treatment of repeat-breeding dairy cattle. *J. Dairy Sci.*, 73: 1766-1772.
- Mee, M.O.S., K.S. Richard and Y. Folman. 1990. Influences of GnRH analogue and timing of insemination relative to estrus on pregnancy rates of dairy cattle at first service. *J. Dairy Sci.*, 73: 1500-1507.
- Pandey, M.D. and B.C. Razada. 1979. Overcoming summer-sterility in buffalo bulls and cows. In: *FAO Seminar on Buffalo Reproduction and A.I.*, Karnal, India, pp: 235-246.
- Rao, A.R. and K.S. Rao. 1984. Improved conception rate in buffaloes after administration of Receptal. *Indian Vet. J.*, 61: 12.
- Rayos., A.A., 1995. Conception rate in repeat breeder cows after treatment with GnRH analogue (Bursurelin) during estrus. *Philippine Vet. Med. J.*, 32(1): 10-13.
- Ryan, D.P., E. Kopel, M.P. Boland and R.A. Godke. 1991. Pregnancy rates in dairy cows following the administration of GnRH analogue at the time of artificial insemination or at mid-cycle. *Theriogenology*, 63: 367-377.

- Ryan, D.P., S. Snijders, J. Condon, M. Grealy, J. Sreanan and K. J. O. Farrell. 1994. Endocrine and ovarian response and pregnancy rates in dairy cows following the administration of GnRH analogue at the time of artificial insemination or at mid-cycle post insemination. *Anim. Reprod. Sci.*, 34 : 179-191.
- Sajid, I., 1998. Role of single injection of prostaglandin F<sub>2</sub> alpha on breeding efficiency of buffaloes. M.Sc. Thesis. Dept. Anim. Reprod. College of Veterinary Sciences, Lahore, Pakistan.
- Stevenson, J.S., M.K. Schmidt and E.P. Call. 1984. Gonadotrophin-releasing hormone and conception of Holsteins. *J. Dairy Sci.*, 67: 140-145.