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Oestrus Response and Pregnancy rate Following Prostaglandin and short term Progesterone Intravaginal Device Treatment in Buffaloes (*Bubalus bubalis*)

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Abstract : Eighteen cycling buffalo cows having functional corpora lutea were treated with a single intramuscular injection of 30 mg of prostaglandin $F_{2\infty}$. The oestrus response and pregnancy rate following treatment were 16.6% and 11.1%, respectively. Sixteen randomly selected post partum cows were treated with a progesterone intravaginal device, for 12 days. 10 mg of oestradiol 17 β in 5 ml of ether was also injected at the time of insertion of the device. The retention rate under field conditions was 72% and 100% when housed. Seventy seven percent of the cows which retained the device for 12 days, returned to oestrus within 4 to 5 days after removal of the device. The pregnancy rate at 90 days after mating was 62%. The results indicate that short term progesterone intravaginal device treatment is more reliable than prostaglandin for synchronising oestrus in buffaloes.

1. Introduction

Prostaglandins and short term progesterone intravaginal device treatments are both effective in synchronising oestrus in cattle. Fixed time inseminations after either or these treatments result in normal fertility.[2,9,11] These results suggest that the above treatments can be used to synchronise or induce oestrus in Asian water buffaloes (*Bubalus bubalis*), where oestrus detection is often difficult due to poor manifestation of external signs of oestrus. Limited research studies on the efficacy of prostaglandin and its analogues in buffaloes have shown that a single injection given between day 5 and 14 of the cycle or the double injection regime given 11 or 12 days apart, irrespective of the stage of cycle, are effective in synchronising or inducing oestrus. However, the fertility rates following natural service or fixed time inseminations at induced oestrus were only about 33%.[4,5,7] The use of short term progesterone intravaginal device treatment for synchronising or induction of oestrus in buffaloes has hitherto not been investigated.

The purpose of this study was to determine whether single intramuscular injection of prostaglandin $F_{2}\alpha$ and short term progesterone intravaginal device treatments were as effective in inducing oestrus in buffaloes as in cattle and to examine pregnancy rates by natural service at induced oestrus.

2. Experimental

Experiments were conducted at the National Livestock Development Board Farm, Ragedera, Malsiripura, in the Kurunegala District. Two hundred females and 11 males, pure Surti buffaloes imported from India in two batches in May 1976 and July 1977, are maintained in this farm. There is adequate green pasture/fodder of improved varieties for feeding and grazing. Milking animals are fed with a concentrate ration made of 35% coconut poonac and 65% rice bran along with mineral mixture. Adequate water is available for wallowing and drinking. The method of breeding is by observation for oestrus symptoms such as swelling of the vulva, vaginal discharges, etc, by an experienced farm Superintendent. Regularly bulls are taken round the females, morning and evening, to aid in heat detection. Females that are in oestrus are detained and served by these bulls. A wooden travice is used to facilitate stud services. Initially rectal examination of 65 buffalo cows were performed randomly to determine their cyclical state and pregnancy status. Based on this, 34 animals were selected for this study.

2.1. Experiment 1.

Eighteen non pregnant buffalo cows with palpable corpora lutea in their ovaries were selected. All animals were treated intramuscularly with a single injection of 30 mg of prostaglandin $F_2\alpha$ (Upjohn, U.S.A.). All treated cows were housed and observed continuously over a period of 5 days for signs of oestrus. Different bulls were taken round these cows thrice a day, also two bulls at a time sometimes, to provoke jealousy. The flehmen, mounting, vaginal discharges, etc, were noted. If a bull showed sexual excitement after flehmen, the cows were taken to the travice and served naturally. Rectal palpations were done 90 days after mating to determine the pregnancy.

2.2. Experiment 2.

The study involved 16 non pregnant buffalo cows randomly selected without reference to their ovarian activity. A 6.75% progesterone impregnated Silastic intravaginal device (Abbott Laboratories) was inserted into the vagina with a help of a plastic speculum and a plunger lubricated with hibitane cream (ICI). The external genitalia was scrubbed and a disinfectant was applied before inserting the device. Ten mg of oestradiol 17 β in 5 ml of ether was also injected at the time of insertion of the device to cause early luteal regression. The devices were left in place for 12 days and were removed by pulling the string attached to the device which was left protruding from the vulva. All cows were sent for free grazing and wallowing after insertion of the device except for 5 cows which had to be housed due to management problems. The cows were observed for signs of oestrus during the treatment period and after removal of the device. The heat detection procedure was similar to experiment 1. All cows which showed external signs of oestrus and receptivity to the bull were naturally served at the induced oestrus. Rectal palpations were done 90 days after mating to determine the pregnancy.

3. Results

3.1. Experiment 1.

The results are summarised in Table 1. Of the treated animals only 16.6% showed receptivity to the males. The vaginal discharges were scanty or none at all. The mean interval to oestrus after prostaglandin injection was 54 hours. A lack of interest was shown by the bulls to mount the rest of the cows. Pregnancy rate was 11.1%.

TABLE 1. The incidence of oestrus and pregnancy rate following single intramuscular injection of 30 mg of prostaglandin $F_{2\infty}$ in buffaloes

No. of animals treated ...	18
No. exhibited oestrus	3
Mean interval to oestrus in hours	54
No. diagnosed pregnant at 90 days	2

3.2. Experiment 2.

The results are summarised in Table 2. None of the cows showed signs of oestrus while the device was in place. The overall retention rate of the device was 81%. Seventy three percent of the cows which were sent for free grazing and wallowing retained the device while all animals that were housed, retained. Seventy seven percent of the cows which retained the device for 12 days returned to oestrus between the 4th and 5th day after removal of the device with a mean interval to oestrus of 102 ± 10 hours. The fertility rate based on pregnancy diagnosis by rectal palpation 90 days after mating were 62%.

TABLE 2. Retention rate, incidence of oestrus and pregnancy rate following progesterone intravaginal treatment in buffaloes

No. of animals treated	16
Proportion retaining device (%) ...	81.2
Proportion showing oestrus signs (%)	
(*a*) Overall	62.5
(*b*) Among those retaining device ...	77.0
Mean interval to oestrus (hours) ...	102 ± 10
Pregnancy at 90 days (%)	
(*a*) Overall	50.0
(*b*) Among those retaining device ...	62.0
(*c*) Among those served	80.0

4. Discussion

The results of this study indicate that the oestrus response following single intramuscular injection of prostaglandin $F_{2\alpha}$ was very poor contrary to that reported by Jainudeen.[4] It was reported by many workers that the single injection of prostaglandin $F_{2\alpha}$ could be used successfully to synchronise oestrus in dairy and beef cattle, with adequate heat detection programmes[6] and also to induce fertile oestrus in cattle.[3] However, Cooper[1] has pointed out in his experiments that synchronisation of oestrus after the second injection of prostaglandin $F_{2\alpha}$ was more precise than after the first or single injection. This has some important practical implications especially in buffaloes, since oestrus symptoms under normal physiological conditions are very vague, short or irregular. If this appears to be so, as indicative from this study, the strategic double dose prostaglandin treatment regime will be more practical for use in buffaloes[7] for effective oestrus synchronisation programmes than the single injection.

The fertility rate following single intramuscular injection of prostaglandin $F_{2\alpha}$ was also very poor and only 11.1%. However, Jainudeen[4,5] and Pereira *et al*[7] reported a fertility rate of 33% following single and double injection regime, with natural service and fixed time inseminations at induced oestrus. The low fertility observed with prostaglandin treatments in buffaloes warrant further investigation, to elucidate the constraints, to obtain high fertility rate in this species.

The retention rate observed in the present study following short term progesterone intravaginal device treatment is comparable to results reported in cattle.[8,10] The device caused hardly any irritation to the vaginal wall as judged by the rectal palpation at the end of treatment, although in many cases a milky discharge was observed during the treatment period and after removal. In this study the oestrus response observed following short term progesterone treatment was 77%. This observation is in agreement with that reported for cattle.[9,11] Bulls showed a better response in mounting females after progesterone treatment than with cows treated with prostaglandins. A similar situation was also observed in goats, where the male goats showed a lack of interest to mount prostaglandin induced oestrus females.[9]

The mean interval to oestrus, after removal of the device was 102 $\pm$ 10 hours. This observation is in contrast to that observed in cattle, where most of the animals returned to oestrus by 48 hours after removal of the device.[8,10] However, the low variability in the period to oestrus after removal of the device, indicates that artificial insemination is feasible at pre-determined time without the need to detect oestrus.

The fertility rate observed after progesterone intravaginal device treatment was much higher than the normal calving rate for post partum buffalo cows in the farm, where it was found to be around 32%. Further, the fertility rate obtained is better than observed after prostaglandin treatment in buffaloes[4,5,7] and comparable to that reported for cattle.[9,10].

In conclusion, the results of this study indicate that the 12 day progesterone intravaginal device treatment is more effective in inducing fertile oestrus in post partum buffalo cows. This synchronisation treatment is more applicable under field conditions than prostaglandin as the need for prior examination to determine the stage of cycle does not arise. Further work on large number of cows and heifers is being carried out to evaluate the retention rate under free grazing and wallowing, and to determine fertility rate following fixed time inseminations without reference to oestrus.

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