Luteolytic Effects of two types of prostaglandin (Lutalyse and Fenprostalene) for synchronization of Estrus in postpartum Buffalo Cows

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Abstract

Thirty cyclic water buffaloes were assigned to two types of PGF2 alpha (Fenprostalene and Lutalyse) for estrus synchronization. All animals were given two injections of the PGF2 alpha 11 days apart (1mg fenprostalene or 25mg lutalyse per injection). Results indicated that there were no significant difference in the luteolytic potency of the two types of PGF2 alpha tested (100% response). All animals came on estrus 3 to 4 days after given either of the two types of prostaglandin. Among the ten symptoms of estrus monitored, swollen vulva and mucus discharge were found to be expressed by all the buffaloes. The least common symptom is licking other buffaloes which was never expressed by any of the animals.

Keywords: Luteolytic, prostaglandin, lutalyse, fenprostalene, synchronization, estrus, postpartum

Introduction

One of the current priorities in the efforts to develop the Buffalo industry is the improvement in the reproductive efficiency of buffalo cows. It is within this area that tremendous improvement can be made since the level of productivity particularly with respect to calving rate is alarmingly low. In addition to the well-known problem of lack of good breeding bulls (in the Philippines) in the field, the inherent physiological responses of the buffalo to poor nutrition and low level of management has made the over-all situation quite complicated.

Water buffaloes have been shown to have prolonged calving interval extending up to 3 years. One of the major reasons for such abnormally long period between calvings is the inability of the farmer to bring the animals into pregnant status at the soonest possible time after delivery. Of course this particular item may be traced from the relatively long period of ovarian inactivity of the buffalo cows postpartum. It would therefore appear that it is very essential for the animal to regain normal ovarian function postpartum so that successful breeding can be made. This would require that after the period of uterine involution, the ovary should initiate follicular development which should result to behavioural estrus and ultimately to successful ovulation.

There are various schemes to initiate resumption of ovarian function postpartum. These would include early weaning, limited nursing, and hormonal manipulation. To date there is enough evidence to indicate that the physiological responses of water buffalo and cattle to PGF2α
alpha treatments are similar (Cruz et al., 1985; Cruz, 1986; Cruz et al., 1987; Rao and Sreemannaryana, 1983; Herschler, 1983; Maffeo et al., 1983). Because these compounds cause luteolysis, they can be used to synchronize estrus in water buffalo.

The interest of this study was to know the luteolytic potency of two types of prostaglandin for the synchronization of estrus in postpartum buffalo cows.

Materials and Methods
Experimental animals and treatments. Thirty cyclic buffalo cows with normal reproductive records and with an average age of 8.0 ± 1.3 years were used for the experiment. The experiment took place at the experimental farm of the Philippine Carabao Center (PCC) Carranglan, Digos, Philippines (PCC was formerly PCRDC, Philippine Carabao Research and Development Center).

The general physical condition of the cows was satisfactory. The animals were allowed to graze freely and corralled at night. In addition, the animals were given mineral concentrate and molasses as supplements. The cows were grouped randomly into two with 15 animals in each group. They were treated with PGF2 alpha regardless of the status of their estrous cycle. Each group was given two injections of either 1mg fenprostalene (Synthex Animal Health Inc., West Des Moines, USA) or 25mg Lutalyse (The Upjohn Co., Kalamazoo, MI, USA) 11 days apart. The animals were regularly checked for signs of estrus.

Clinical investigation. The clinical investigations comprised detailed observation of the animals. All results were immediately recorded on a form, separate for each individual animal. Daily observations of the external heat symptoms were performed on all buffalo cows in the morning, noon-time and in the evening. Sometimes the animals were observed also at night-time in order to check the behaviour and heat symptoms. Visible symptoms of heat recorded were:
(a) Swollen vulva. Vulva were examined everyday. Emphasis was on the wrinkles of the vulva,
(b) Mucus discharge. Observations were carried out of spontaneous mucus discharge from vulva and discharge at rectal palpation. Presence of mucus discharge on the ground which was left behind by recumbent animals, especially during night-time, was included in the observations.
(c) Raised tail and lowered back either spontaneously or when the animal was pressed with a hand on the lumbar region, were recorded.
(d) Other recorded heat symptoms were frequent urination, bellowing, mounting of other animals, restlessness, loss of appetite and licking of other animals.

Results and Discussion
Out of the thirty water buffaloes synchronized with the two kinds of prostaglandin (Lutalyse and fenprostalene) all came into estrus (Table 1) and the symptoms of heat were exhibited by individual water buffaloes.

<table>
<thead>
<tr>
<th>Type of Prostaglandin</th>
<th>No. of animals Treated</th>
<th>No. of animals in Estrus</th>
<th>Estrus Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutalyse</td>
<td>15</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td>Fenprostalene</td>
<td>15</td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

The luteolytic properties of prostaglandin and its analogues are well established in cows (Lauderdale, 1972; Louis et al., 1972; Rowson
Two types of progestagens for estrus synchronization in Buffalo

et al., 1972; Roche, 1974; Hafs and Manns, 1975; Jackson et al., 1979).

In general, PGF₂α and its analogues are ineffective in causing luteolysis in the early stage of the estrous cycle (Battista et al., 1984; Kiracofe et al., 1985). Estrus synchronization systems involving the giving of all animals two injections 11 or 12 days apart was developed to circumvent this problem. Usually the animals are not observed for estrus until after the second injection of prostaglandin. This is because the double-injection scheme takes care of buffaloes that are in the early and late luteal phases.

Therefore, if the buffaloes are distributed equally across the day of the estrous cycle, approximately 70% of the cycling buffaloes should show estrus after the first injection. These buffaloes and the remainder of the cycling buffaloes should be at a stage of the estrous cycle to respond to the second injection. After the second injection, animals are checked for estrus and bred at estrus or given fixed time inseminations at 80 hours after the single insemination or at 72 and 96 hours (double insemination).

This system also has the advantage of maintaining a fairly high degree of synchrony of estrus for animals that return to heat in the subsequent cycle. In fact, the animals will remain fairly well synchronized for about three estrous cycles after treatments. The result further establish that prostaglandins are effective only in the presence of a CL. This is because the time of estrus is controlled by secretion of progesterone from the CL. Progesterone exerts negative feedback on LH secretion so that the endocrine events that lead to the maturation of preovulatory follicle and their subsequent ovulation are inhibited until progesterone decline at the time of CL regression. Synchronization of estrus really means controlling the life span of the CL.

Burfcening et al., 1978 reported that among cattle known to be cycling prior to a two-injection system, only 71% showed estrus following the second injection. This may be due to an effect of stage of estrous cycle. Research with beef heifers has shown that stage of the estrous cycle within the luteal phase when prostaglandin is given affects the proportion of cattle showing estrus and the time interval from prostaglandin injection to the onset of estrus (King et al., 1982). Cattle injected during d 10 to 15 of the estrous cycle had a greater estrus response (percentage of females showing estrus following treatment) than cattle injected d 5 to 9 of the estrous cycle. Similar results have been reported in lactating dairy cows (Macmillan, 1983; Macmillan and Henderson, 1984) and stage of the estrous cycle at the time of prostaglandin injection influences interval to estrus in dairy heifers (Johnson, 1978; Refsal and Seguin, 1980; Stevenson et al. 1984). Furthermore, conception rate may be higher following late luteal phase injections compared with early luteal phase injections (Watts and Fuquay, 1985).

Detection of estrus

The occurrence of different heat symptoms by clinical inspection is presented in Table 2.
Table 2 The occurrence of different heat symptoms in 30 water buffalo postpartum

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No. of buffaloes</th>
<th>% of total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swollen vulva</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Mucus discharge</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Raised tail</td>
<td>12</td>
<td>40.0</td>
</tr>
<tr>
<td>Frequent urination</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td>Bellowing</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>Mounting other buffaloes</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>Allowing mounting</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>Restlessness</td>
<td>3</td>
<td>10.0</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Licking other buffaloes</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

(a) Swelling of vulva was found in all the buffaloes at estrus. This was a reliable symptom provided the appearance of vulva was compared to the conditions the previous day. There are great individual variations and therefore the size of the vulva cannot be expressed in absolute figures but only relative to other days in the same animal. It is especially important to observe the wrinkles of the vulva.

(b) As with swelling of the vulva, mucus discharge was found in all examined buffaloes at estrus. The animals were checked very carefully for mucous discharge, also at night-time. However, the mucus was not always discharged spontaneously but sometimes only at rectal palpation.

(c) As seen in Table 2, the other visible heat symptoms were seen in comparatively low numbers of animals. The third most frequently seen symptom was raised tail. This symptom was seen when the lumbar region of the buffaloes was pressed by a hand. In the 12 positive cases in the table there was a clear reaction with lifting of the tail and lowering of the back. In a number of additional cases there was a weak positive reaction. In cattle, a positive reaction is obtained when the clitoris is touched but the buffalo react negatively when the vulva lips were touched.

(d) Frequent urination and bellowing were seen in about one buffalo out of four and was therefore less reliable as a heat symptom than the ones mentioned above.

(e) About 20% of the buffaloes in heat would try to mount other buffaloes and an equal number of animals would allow mounting by others. No bulls were present among the experimental animals.

(f) The remaining symptoms that could be observed at inspection were found in only 10% or less of the buffaloes.

References

Two types of prostaglandins for estrus synchronization in Buffalo


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