FERTILITY IN COWS AFTER SYNCHRONISATION OF OESTRUS WITH PROSTAGLANDIN $F_{2\alpha}$ AND OESTRADIOL BENZOATE

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If luteolysis in the cow is induced by prostaglandin $F_{2\alpha}$ (PG $F_{2\alpha}$), oestrus generally occurs within 48 to 96 hr after treatment (Cooper, 1974; Hafs, Manns & Drew, 1975; Welch, Hackett, Cunningham, Heishman, Ford, Nadaraja, Hansel & Inskkeep, 1975). A similar variation between animals is apparent in the time at which the pre-ovulatory release of luteinising hormone (LH) and ovulation occur after prostaglandin treatment (Cooper, 1974; Dobson, Cooper & Furr, 1975; Lamming, Hafs & Mann, 1975). In order to achieve conception rates equivalent to artificial insemination in naturally-cycling cows, there are two alternatives. Cows can be inseminated either at a time relative to oestrus, or on two occasions, 16 to 20 h apart, at fixed times after PG $F_{2\alpha}$ injection. (Roche, 1974; Hafs et al., 1975; Turman, Wetteman, Rich and Totusek, 1975). In comparison one insemination at a fixed time after PG $F_{2\alpha}$ treatment results in significantly lower fertility (Cooper and Jackson, 1975; Lamming et al., 1975).

Regimes for synchronisation of oestrus would be simplified if normal fertility resulted from one insemination given at a pre-determined time after PG $F_{2\alpha}$ treatment, without regard to behavioural oestrus. It is more likely that normal fertility could be achieved if variation in the time of ovulation after luteolysis was reduced. Exogenous gonadotrophin-releasing hormone has been used in an attempt to induce ovulation at a set time, but subsequent conception rates have been lower than controls (Graves, Short, Randel, Bellows, Kaltenbach and Dunn, 1974; Rodriguez. Fields, Burns, Franke, Hentges, Thatcher and Warnick, 1975). However, injections of oestrogen (oestradiol benzoate) in cows synchronised with PG $F_{2\alpha}$ have been shown to reduce the variation in the time of LH release (Nancarrow and Radford, 1975; Welch et al., 1975). Moreover, fertility of such animals has been improved compared to untreated controls, if inseminated at a fixed time relative to oestrus (Inskkeep, Welch, McClung, Linger and Heisham, 1975; Welch et al., 1975). The present trial was designed to determine conception rates in cows in which oestrus was synchronised with PG $F_{2\alpha}$. One group was also injected with oestradiol benzoate and inseminated 48 h thereafter.

Eighty-eight non-lactating Africander (Bos indicus) cows, in which the presence of a corpus luteum had been confirmed by rectal palpation, were allocated at random to 2 equal treatment groups. All animals received two intramuscular injections of an analogue of PG $F_{2\alpha}$ (Estrumate, I.C.I. Ltd) 11 days apart. In Treatment 1, cows were inseminated once approximately 74 h after the last PG $F_{2\alpha}$ injection. Treatment 2 received an intramuscular injection of 500 mg oestradiol benzoate at 28 h after the second PG $F_{2\alpha}$ injection, and were inseminated approximately 45 h later. All cows were inseminated whether or not they exhibited oestrus. Conception was estimated by rectal palpation 3 months after insemination.

Signs of behavioural oestrus were observed before insemination in 86, 4 and 100% of the cows in treatments 1 and 2, respectively. There was little variation in the timing of insemination between groups, and the use of oestradiol benzoate did not improve conception rate to one insemination (Table 1). The conception rate in Treatment 1 was similar to that obtained from one insemination in other studies (e.g. Lamming et al., 1975).

Although there may be many explanations for the low conception rate in cows receiving oestradiol benzoate, the fact that some conceived would suggest that serum hormone levels were not abnormal in all cases. It is likely that the timing of either the oestradiol benzoate injection or insemination was not optimal, and in this respect breed differences in the temporal relationships between luteolysis, follicular development, oestrus and ovulation cannot be discounted.

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<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of cows</th>
<th>Hours from 2nd PG $F_{2\alpha}$ injection to Oestradiol injection</th>
<th>Oestradiol injection</th>
<th>Insemination</th>
<th>Conception rate</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>44</td>
<td>74.52 ± 0.14</td>
<td>28.6</td>
<td>72.70 ± 0.08</td>
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<tr>
<td>2</td>
<td>44</td>
<td>27.66 ± 0.29</td>
<td>28.6</td>
<td>72.70 ± 0.08</td>
<td>20.5</td>
<td></td>
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</tbody>
</table>

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REFERENCES