

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

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If luteolysis in the cow is induced by prostaglandin F_{2α} (PG F_{2α}), oestrus generally occurs within 48 to 96 hr after treatment (Cooper, 1974; Hafs, Manns & Drew, 1975; Welch, Hackett, Cunningham, Heishman, Ford, Nadaraja, Hansel & Inskeep, 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 PGF_{2α} injection. (Roche, 1974; Hafs *et al.*, 1975; Turman, Wetteman, Rich and Totusek, 1975). In comparison one insemination at a fixed time after PG F_{2α} 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_{2α} 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_{2α} 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 (Inskeep, 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_{2α}. One group was also injected with oestradiol benzoate and inseminated 45 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_{2α}

(Estrumate, I.C.I. Ltd) 11 days apart. In Treatment 1, cows were inseminated once approximately 74 h after the last PG F_{2α} injection. Treatment 2 received an intramuscular injection of 500 mg oestradiol benzoate at 28 h after the second PG F_{2α} 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 1

Conception rates of cows inseminated after oestradiol injection (500 mg) following PFG_{2α} treatment

Number of cows	Hours from 2nd PGI _{2α} injection to:		Conception rate %
	Oestradiol injection	Insemination	
Treatment 1 44		74.52 ± 0.14	31.8
Treatment 2 44	27.66 ± 0.29	72.70 ± 0.08	20.5

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