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OESTRUS SYNCHRONIZATION IN CATTLE

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INTRODUCTION

A practical method of oestrus synchronization appears to be essential for the large-scale application of artificial breeding in the beef industry.

To date the most commonly used method of synchronization has been that of extending the cycle length by the administration of progesterone. This necessitates either daily administration (by injection or orally) or continuous administration by some form of depot system such as subcutaneous implants or intravaginal sponges.

A recent development has been the use of prostaglandin $F_{2\alpha}$ to synchronize oestrus by shortening the cycle length. This is normally administered by intra-uterine infusion.

This paper presents the results of three trials in which two techniques for the synchronization of oestrus were compared on 464 head of beef or dairy cattle.

MATERIALS AND METHODS

SYNCHRONIZATION

The two techniques compared were:

- (1) Progestagen impregnated intravaginal sponges containing 400 mg "Cronolone" and inserted for a period of 21 days.
- (2) Prostaglandin $F_{2\alpha}$ infused into the ipsilateral uterine horn, either 1 mg/day on two consecutive days (Trials 1 and 2) or 4 mg on one day (Trial 3).

ANIMALS

Table 1 shows the number of animals in each treatment for the various trials. Trials 1 and 2 were carried out on lactating dairy cows and Trial 3 with both suckling and dry beef cows.

OESTRUS DETECTION

Two techniques for the detection of oestrus were employed in conjunction with visual observations. All animals were fitted with "Matemaster" heat detectors and run with vasectomized bulls fitted with chin-ball harnesses. They were inspected for oestrus twice daily.

TABLE 1: SUMMARY OF RESULTS FOR EACH TRIAL

<i>Trial</i>	<i>Treatment</i>		<i>No. of Cows</i>				
			<i>Treated</i>	<i>Cycl¹ (a)</i>	<i>Sync.² (b)</i>	<i>Conceived to First Service Sync. (c)</i> <i>Cycl (b)</i>	
(1) Spring 1972	Sponge		48	38 (79)	35 (92)	21 (60)	22 (58)
	PGF		54	44 (81)	34 (77)	15 (44)	24 (55)
	Control		54	44 (81)	10 (23)	5 (50)	27 (61)
(2) Autumn 1973	Sponge		15	14 (93)	12 (86)	5 (42)	7 (50)
	PGF		15	12 (80)	4 (33)	1 (25)	3 (25)
	Control		19	16 (84)	4 (25)	1 (25)	7 (44)
(3) Spring 1973	Sponge	Suck.	56	35 (63)	32 (91)	10 (31)	12 (34)
		Dry	33	31 (94)	23 (74)	4 (17)	5 (16)
	PGF	Suck.	51	35 (69)	20 (57)	11 (55)	21 (60)
		Dry	32	29 (91)	18 (62)	10 (56)	14 (48)
	Control	Suck.	53	35 (66)	9 (26)	3 (33)	15 (43)
		Dry	34	26 (76)	6 (23)	2 (33)	11 (42)

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¹ On heat within 21 days after treatment or commencement of mating: cycling.

² On heat within 5 days after treatment or commencement of mating: synchronized.

(a) Percentage of No. treated; (b) Percentage of No. cycling; (c) Percentage of No. synchronized.

SEMEN AND INSEMINATION

Inseminations were carried out once daily. Cows in heat before noon were inseminated that day while cows in heat after noon were inseminated the next day. Fresh semen was used in Trials 1 and 2 and deep frozen semen in Trial 3.

Mating in the control animals commenced on the day after withdrawal of the intravaginal sponges or infusion of prostaglandin.

RESULTS

Table 1 presents a summary of the results for each trial.

INCIDENCE OF OESTRUS

There was no difference between treatments in the numbers of animals cycling in the first 21 days after treatment or commencement of mating in Trials 1 (80%) and 2 (86%). While there was no difference between treatments in Trial 3 (73%), there were significantly ($P < 0.001$) more dry (87%) than suckling (66%) animals cycling.

SYNCHRONIZATION OF OESTRUS

Trial 1: There were significantly ($P < 0.001$) more animals on heat in the first five days of mating in the treated groups than in the control group. While the difference between the two synchronization treatments was not significant, a more precise synchronization was achieved with the intravaginal sponges.

Trial 2: There was a difference ($P < 0.05$) between treatments in this trial. The intravaginal sponges gave a high degree of synchronization (86%) but the response to prostaglandin (33%) was poor.

Trial 3: As in the previous trials there was a higher ($P < 0.001$) proportion of animals from the treated groups on heat in the first five days of mating. The intravaginal sponges (83%) were significantly ($P < 0.01$) better than prostaglandin (59%) in both efficiency and precision of synchronization. There was no effect of lactational status on response to treatment and no interaction between treatment and lactational status.

CONCEPTION TO FIRST SERVICE

Trial 1: There was no difference between treatments in conception to first service.

Trial 2: The conception rate of the prostaglandin-treated group (25%) was lower than that for the intravaginal sponges (50%).

Trial 3: There was a significant ($P < 0.01$) effect of treatment on conception to first service. Conception in the group treated with intravaginal sponges (25%) was lower than that in the group treated with prostaglandin (55%).

DISCUSSION

While both treatment techniques were able to synchronize oestrus, the degree and precision of synchronization following intravaginal sponges was superior to that following prostaglandin. This is most probably due to the inactivity of prostaglandin when administered before day 5 or after day 17 of the cycle. Intravaginal sponges, however, appear to be effective at all stages of the cycle.

The accurate detection of oestrus is a major factor in the success of any artificial breeding programme and none of the detection techniques employed in these trials has proved completely reliable, especially under conditions where many cows are on heat at any one time. This problem could be overcome by a programme in which insemination was performed on a time basis after treatment. The present data suggest that the intravaginal sponge technique would be the most suitable for such a programme.

Conception rates to first service have varied between treatments from trial to trial. The reasons for this variation are as yet unresolved but undoubtedly reflect problems in the management and nutrition of the animals, variations in insemination technique and semen quality, as well as that due to the treatment itself.

Conception rates at subsequent cycles were similar for all groups.

The high proportion of animals not cycling in the first 21 days of the mating period could reflect another major problem. This is particularly so in the case of the suckling cows in Trial 3. Both treatments were ineffective in alleviating this problem of anoestrus and it appears that some modification of the techniques is essential for these cases.

It is concluded that, while still at an experimental stage, both techniques are potentially suitable for oestrus synchronization as part of an artificial breeding programme in beef cattle.

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