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Brief communication

THE HORMONAL INDUCTION OF LACTATION
IN DRY DAIRY COWS

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It has been demonstrated that the twice-daily injection of oestradiol-17 β and progesterone for seven days successfully induced lactation in dry dairy cattle (Smith and Schanbacher, 1973). A number of studies have since been carried out to define and improve the efficacy of such a treatment. Dexamethasone (Fulkerson and McDowell, 1975) or reserpine (Collier *et al.*, 1977) injections as adjuncts to the steroid regime enhance the success rate (% cows brought 'into milk'). However, regardless of type of treatment, cows brought 'into milk' produce on average at about 60% of their normal rate Tervit *et al.*, 1979). All such trials are characterised by a high degree of variability in response between cows.

If the practical benefits of the induced lactation technique are to be realised the need for multiple injections must be minimised. Thus an alternative method has been developed to deliver the requisite hormones from an intra-vaginal sponge. The major criteria considered in the design of the intra-vaginal sponge were retention rate and the ability to release the required quantity of hormone. The retention rate of the device (loaded with 500 mg oestradiol-17 β and 1000 mg progesterone) was 97% (35/36) when tested in mature, dry, non-pregnant cows. This retention rate was achieved by attaching the sponge to a plastic retaining ring 9 cm in diameter.

Four experiments were carried out using this type of device in the autumn and spring of 1979/80 using mature cows which had not been lactating for at least two months. All cows were leniently grazed on ryegrass/white clover pasture. The protocol adopted in the first three trials was similar, viz. a sponge was inserted for a 10-day period in each of 20 to 25 cows. One-third of the cows were injected with 20 mg dexamethasone (Opticortenol, Ciba-Geigy (NZ) Ltd.) 6 days after sponge insertion. A further third of the cows was injected with 2.5 mg reserpine (Sigma Chemical Co., Missouri, USA) on days 6, 8 and 10, while the remaining cows were untreated. In the fourth trial (spring 1980) all 23 cows were injected with dexamethasone. Cows brought into milk were selected for machine milking avoiding animals culled from dairy herds for reason of poor udder conformation or persistent mastitis.

The success rate of each treatment for bringing cows into milk was judged by the subjective assessment of intra-mammary fluids. All cows designated 'in milk' exhibited some degree of milk accumulation. The initiation of milk secretion began between days 8 and 12 after sponge insertion. The dexamethasone and reserpine treatments significantly ($P < 0.001$) increased the proportion of cows coming into milk (Table 1) although there was no evidence that any of the treatments had any advantage in terms of milk production. Milk composition (fat, protein, lactose) was normal.

TABLE 1: THE SUCCESS RATE OF SPONGE ALONE, SPONGE PLUS DEXAMETHASONE AND SPONGE PLUS RESERPINE TREATMENT FOR INDUCING LACTATION IN DRY DAIRY COWS

Trial	Cows 'in milk'/Cows treated		
	Sponge alone	Sponge plus dexamethasone	Sponge plus reserpine
Autumn 1979	1/6	6/7	7/7
Spring 1979	3/6	5/6	8/8
Autumn 1980	1/8	7/8	8/9
Spring 1980	—	21/23	—
	5/20	39/44	23/24

Note: Each sponge contained 500 mg oestradiol-17 β and 1.0 g progesterone. Dexamethasone (20 mg) and reserpine (2.5 mg) were given by intramuscular injection on day 6 and days 6, 8 and 10 respectively.

Milk yield rose to a peak 4 to 7 weeks after treatment (Fig. 1). This peak was greater in the spring trials than in the autumn trials (11-12 kg/cow/d v 5.8 and 3.2 kg/d [$P < 0.001$]) although pasture availability was similar in all experiments. Kensinger *et al.*, (1979) have reported a similar seasonal variation in milk production response using the injection regime of Smith and Schanbacher (1973).

Peak milk production following induction in the spring was $58 \pm 6\%$ (S.E.M.) of the peak yield in the previous 'normal' lactation in 14 cows where records were available. In these cows induced and 'normal' peak yields were positively correlated ($r = 0.37$ $P > 0.10$). Highest production was achieved by a Jersey cow 7 weeks after treatment (spring 1979) at 23.0 kg/d.

It is estimated that this technique would cost approximately \$20 per cow (materials, hormones and veterinary visits) for an expected average return of approximately \$200 (80 to 100 kg milkfat).

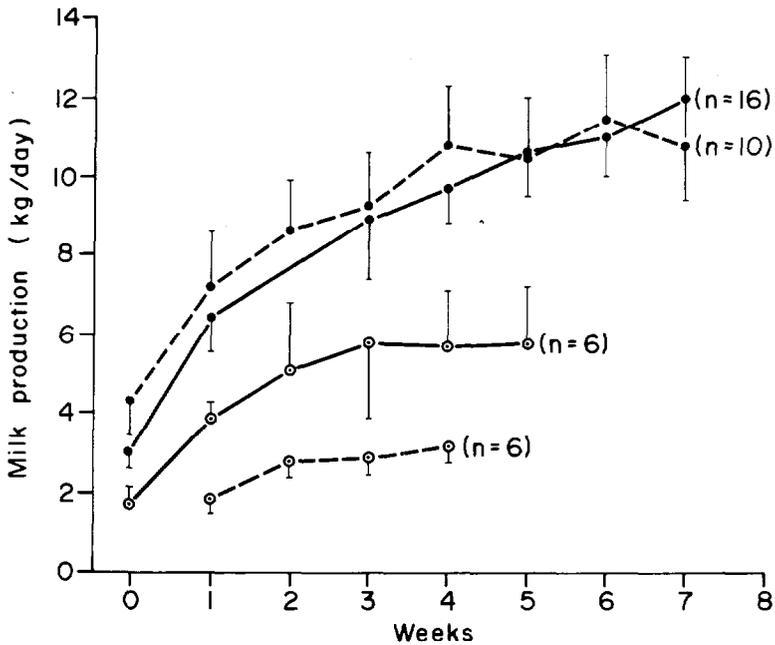


FIG 1: Milk production following induction of lactation using the intra-vaginal sponge, in spring (●) and autumn (○) of 1979 (—) and 1980 (---).

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