Improvement of fertility in post-partum beef cows by treatment with PMSG and progestagen

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Many studies have shown that suckling beef cows have an extended anoestrous period after parturition (Wiltbank & Cook, 1958; Foote & Hunter, 1964; Chupin, Pelot, Alonso de Miguel & Thimonier, 1976). The interval from parturition to first oestrus has been shown to be prolonged by low-energy intake before or after parturition (Wiltbank, 1970) and also by suckling (Oxenreider 1968; Graves, Lauderdale, Hauser & Casida, 1968; Wiltbank, 1970). Fertility following artificial insemination of nursing beef cows is lower than in non-nursing cows and in the former the fertility level increases with the interval from parturition (Graves *et al.*, 1968). The use of exogenous steroids to induce oestrus in suckling cows has generally resulted in a decrease of the post-partum interval to oestrus but fertility levels have been low (Ulberg & Lindley, 1960; Foote, Weeth & Hunter, 1960; Foote & Hunter, 1964; Smith & Vincent, 1972). In cyclic animals, normal fertility has been obtained after administration of progestagen for oestrous cycle control (Wiltbank & Kasson, 1968; Wishart & Young, 1974; Roche, 1974; Sreenan & Mulvehill, 1975). Using progestagens, Sreenan & Mulvehill (1974) reported a calving rate of 48% in suckling beef cows following a fixed-time insemination. Stimulation of follicular growth following the use of PMSG has been reported to result in a higher oestrous response and improved degree of synchronization in heifers when administered in combination with a short-term oestrous synchronization treatment (Thimonier, Pelot & Chupin, 1976).

The present work was carried out to determine the effect of treatment with exogenous gonadotrophin (PMSG) and progestagen on calving rate in suckling beef cows.

Multiparous suckling beef cows of the Hereford and Aberdeen Angus breeds were used. The date of calving before treatment was available for 89 of the cows. The 262 animals were treated on 22 farms between June and September 1975 as follows. *Group 1.* Progesterone (3.0 g)-impregnated intravaginal sponges were inserted into 142 cows for 9 days. On the day of insertion an i.m. injection of 250 mg progesterone + 7.5 mg oestradiol benzoate was given. *Group 2.* Cronolone (0.2 g SC-9880; G. D. Searle & Co.)-impregnated intravaginal sponges were inserted into 120 cows for 9 days and an i.m. injection of 20 mg Cronolone + 7.5 mg oestradiol benzoate was given on the day of sponge insertion. Approximately half of the cows in each group received 750 i.u. PMSG (Folligon: Intervet) i.m. at the time of sponge removal. All treatments were represented on each farm and the animals were randomly allocated to the treatments. All animals were artificially inseminated (with frozen-thawed semen) on a fixed-time basis at 48 and 72 h after sponge removal and without reference to the occurrence of oestrus. On each farm, all inseminations were carried out by the same technician.

In agreement with previous findings (Sreenan, 1975; Sreenan & Mulvehill, 1975), sponge retention rates were 90% and 94% for progesterone and Cronolone sponges respectively, and fertility data, based on the calving rate from the fixed time inseminations, are presented for those cows retaining sponges.

Table 1. Calving rate (%) after the administration of PMSG in conjunction with a 9-day progestagen treatment for inducing oestrus and ovulation in post-partum beef cows

	Progesterone		Cronolone	
	-PMSG +PMSG		-PMSG +PMSG	
No. of cows	65	62	54	59
Calving rate (%)	57	71	48	73
No. of twin births	—	2	—	11

The fertility levels are shown in Table 1. Calving rates were slightly higher (9%) in the progesterone-treated animals, but this difference was not significant. The administration of PMSG, however, significantly increased the calving rate in both groups separately (progesterone— $\chi^2 = 2.71$; $P < 0.10$; Cronolone— $\chi^2 = 7.24$; $P < 0.01$) and together (72% compared with 52.5%: $\chi^2 = 9.20$; $P < 0.05$). Administration of PMSG also resulted in an overall twin-birth rate of 15% with most of these (84.6%) occurring in the Cronolone + PMSG group.

In the cows for which the parturition to treatment intervals were known, the calving rates were 33% (N = 9) and 58% (N = 28) for animals treated with progestagen only before and after 60 days *post partum* respectively, and 72.7% (N = 11) and 73% (N = 41) when PMSG was also given. Twin births occurred only after the progestagen + PMSG treatment, one set before 60 days and 8 after 60 days.

This high incidence of twin births among cows treated after 60 days *post partum* suggests that the endocrinological state of these animals is similar to that of cyclic cows and that PMSG given at this time results in an increased ovulation rate by augmenting the endogenous FSH concentrations. A reduced secretion of gonadotrophins from the beginning until the 8th month of pregnancy in the cow has been reported by Nalbandov & Casida (1940) while a slight increase has been recorded in the last month (Labhsetwar, Collins, Tyler & Casida, 1964). After parturition there is a decline in pituitary levels of FSH during the first 3 weeks *post partum* (Labhsetwar *et al.*, 1964; Saiduddin, Riesen, Tyler & Casida, 1968). Recent work by Chupin *et al.* (1976) has shown that ovarian activity, based on plasma progesterone levels, is resumed in less than 20% of nursing Charolais cows and in only 31% of nursing Salers cows by 60 days *post partum*. Graves *et al.* (1968) showed that a higher proportion of silent ovulations (70.6%) occurred in suckling beef cows compared with non-suckling cows (42.4%) in the post-partum period and that suckling also delayed the interval to first oestrus by 35–54 days.

The present results for suckling beef cows suggest that the gonadotrophin administration in conjunction with a short-term progestagen treatment is an effective method of inducing ovulation in these animals.

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