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Separate grazing does not shorten the postpartum anoestrous interval in anoestrous cows

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ABSTRACT

The aim of this study was to compare the rate of resumption of oestrous cycles and fertility to first insemination between anoestrous cows grazed separately (Split) or grazed in the main herd (Control) for 28 days and untreated or treated with progesterone (CIDR) and ODB from 7 days before the planned start of mating.

Oestrus was detected in 54.7%, 46.3%, 93.5% and 86.8% of cows (Control, Split, CIDR and Split+CIDR, respectively) by 28 days after start of treatment ($p < 0.05$). Compared to controls conception to first insemination was no different in Split and CIDR groups, but was reduced in the Split+CIDR group ($p < 0.05$). The percentage of cows pregnant by 28 days after examination was 26.4%, 18.9%, 42.1% and 31.4% for Control, Split, CIDR and Split+CIDR groups, respectively ($p < 0.05$). There was no overall effect of separate grazing on milksolids production or cow liveweights, but milksolids did vary between herds ($p < 0.001$). Separate grazing did not enhance the reproductive performance of anoestrous cows.

Keywords: Dairy cows; anoestrus; separate grazing; fertility; production.

INTRODUCTION

Postpartum anoestrus is the most common form of infertility in pasture grazed New Zealand dairy cows and is a result of interacting managerial, physiological, pathological and nutritional factors (Macmillan and Clayton, 1980). The currently recommended treatment regime for anoestrous cows involves a 5 or 6 day period of intravaginal progesterone treatment, followed by an injection of 1 mg oestradiol benzoate (ODB) 24 h later. This protocol results in 87% of treated animals being detected in oestrus and inseminated within 7 days of the end of treatment (Rhodes *et al.*, 1998a). As an alternative to this hormonal treatment, a variety of management strategies have been used by herd owners in an effort to induce oestrus and ovulation. One such strategy is milking cows once a day instead of twice a day. A study to examine the effectiveness of once daily milking demonstrated that it did increase the percentage of cows detected in oestrus compared to twice daily milking, but at the cost of reduced milk production (Rhodes *et al.* 1998b).

Separating anoestrous cows from the main herd is another management strategy used by herd owners. This is done on the assumption that it reduces social pressures, enabling less dominant cows a greater chance of consuming their feed allowance and thus enhancing their reproductive performance. Anoestrous cows are younger and likely to be lighter and lower in the social dominance hierarchy than cycling cows. This strategy has not been formally evaluated, although there are reports concerning social relationships and the effects of social rank on the behaviour and performance of dairy cattle. Socially dominant animals move and graze at will and spend more time feeding than subordinate animals which are forced to move away and seek new grazing areas (Friend and Polan, 1974; Hasegawa *et al.*, 1997). This 'social stress' may result in long term endocrinological and immunological changes, production losses and lowered reproductive rates, with at-

tendant costs (Mench *et al.*, 1990).

The aim of the current study was to examine the effect of separate grazing, with or without concurrent hormonal treatment, on the reproductive performance of anoestrous cows. It was hypothesised that separate grazing would allow lower order anoestrous cows to increase feed intakes, increase liveweight and hence resume oestrous cycles sooner compared to anoestrous herd mates in the main herd.

MATERIALS AND METHODS

The study was conducted in 8 spring calving dairy herds in the Waikato region. Cows which had not been detected in oestrus, but which had calved at least 21 days previously, were examined by a veterinarian 7 days before the date of the herd's planned start of mating (PSM). Those animals with no detectable corpus luteum ($n = 676$) were diagnosed anovulatory anoestrus (AA) and were allocated to four groups, balanced for age and post-partum interval, in a 2x2 factorial design. Half the cows were treated with intravaginal progesterone (CIDR™ device; InterAg, Hamilton) for 6 days and an injection of 1 mg ODB (CIDIROL™; InterAg, Hamilton) given 24 h after device removal and half remained untreated. Within these two groups half were grazed in a separate group for approximately 28 days and half remained in the main herd. Those animals identified with a corpus luteum (CL+) prior to the start of the experiment were balanced for age and post-partum interval and were allocated to either the separate group or remained in the main herd. Among herds, the separate grazing group ranged between 36 and 69 animals, or 13% to 33% of the herd.

Cows were observed for behavioural oestrus twice daily from the day of veterinary examination until the end of the mating period for all cows. Oestrus was identified as the time when the cow was seen standing to be ridden by another cow and was aided by the use of a tailpainting tech-

nique (Macmillan *et al.*, 1988). Commencing at the PSM, all cows which were detected in oestrus were artificially inseminated. Any cow not detected in oestrus by 28 days after first examination was re-examined by rectal palpation and cows which were still AA were treated with a CIDR device and ODB, as before. Cows with a palpable corpus luteum were treated with prostaglandin $F_{2\alpha}$. Natural mating using herd bulls commenced between 4 and 5 weeks after the start of the mating period. Conception dates were confirmed by manual palpation *per rectum* or transrectal ultrasonography performed 6 weeks after the end of the period of artificial insemination. Conception rate to first insemination was evaluated only in cows inseminated during the 28 days after examination.

The separate grazing group and main herd were allocated the same pasture area per cow so that average pasture allowance per cow was equal for the two groups. Cows were weighed before allocation to groups and at the end of the 28 day period. Milk volume and composition of individual cows was also measured before allocation to groups and at the end of the 28 day period.

Differences between treatment groups in dichotomous variables were assessed using logistic regression analysis and analysis of variance was used for continuous variables. Models included the main effects of herd, hormone treatment and separate grazing, age and interval from calving to examination; interactions were included if significant ($p < 0.05$).

RESULTS

More AA cows were inseminated by 28 days after examination following hormone treatment ($p < 0.05$) than untreated cows, but separate grazing had no effect (Table 1). There was a significant age by treatment interaction on the proportion of cows detected in oestrus by 28 days after examination due largely to a low submission rate among two year olds in split herds ($p = 0.03$, Figure 1). Conception rate to first insemination was reduced in hormone treated cows which were grazed separately when compared to untreated cows in the main herd ($p < 0.01$). However, there was no effect of separate grazing or hormone treatment alone on conception rate to first insemination ($p > 0.05$, Table 1).

FIGURE 1: Effect of separate grazing (Split) and/or hormone treatment (CIDR) 7 days before the PSM, compared with no treatment (Control) on the percentage of 2 year old, 3 year old and >3 year old cows seen in oestrus by 28 days after first examination.

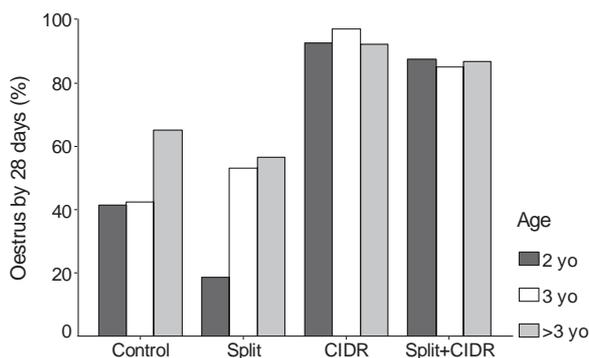


TABLE 1: Effect of separate grazing (Split) and/or hormone treatment (CIDR) on submission, conception and pregnancy rates compared with untreated anoestrous cows (Control) in the main herd.

	Control	Split	CIDR	Split+CIDR
Number of cows	172	177	168	159
Inseminated by 28 days after examination (%)	54.7	46.3	93.5*	86.8*
Conceived to 1st insemination (%)	40.4	33.3	36.1	26.9*
Pregnant by 28 days after examination (%)	26.4	18.9*	42.1*	31.4

*Significantly different from Controls ($p < 0.05$)

Separate grazing decreased the percentage of cows pregnant by 28 days when compared to their main herd counterparts ($p < 0.05$, Table 1). Hormone treatment increased the percentage pregnant by 28 days for cows in the main herd ($p < 0.05$, Table 1).

Separate grazing had no significant effect on submission rates, conception rates to first insemination or percentage of cows pregnant by 28 days in the cows diagnosed CL+ at first examination ($p > 0.1$, Table 2).

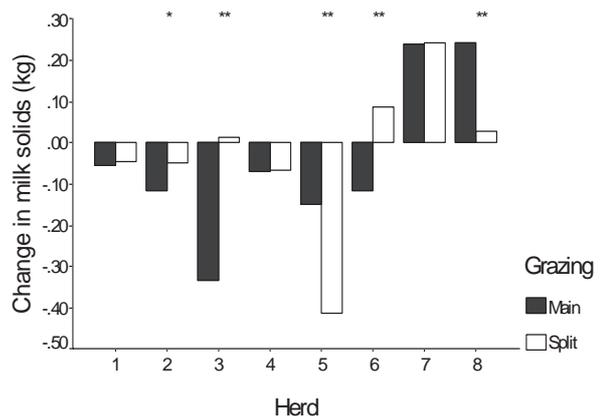
The effect of separate grazing on milk solids production varied among herds ($p < 0.001$). In 3 herds there was a positive effect, in 2 herds there was a negative effect and in the remaining 3 herds there was no significant effect (Figure 2).

Separate grazing resulted in an average liveweight increase of 16.3 ± 1.7 kg, over the 28 day period, which was not significantly different from the 14.9 ± 1.8 kg increase in cows remaining in the main herd ($p > 0.1$).

TABLE 2: Effect of separate grazing (Split) on submission, conception and pregnancy rates compared with cows in the main herd in cows having a corpus luteum (CL+).

	CL+	CL+Split
Number of cows	89	72
Inseminated by 28 days after examination	76.4%	84.7%
Conceived to 1st insemination	58.2%	48.3%
Pregnant by 28 days after examination	51.7%	45.1%

FIGURE 2: Effect of grazing anoestrous cows in the main or a separate herd (Split) on the change in milk solids production over a 28 day period, in eight herds. *Difference between Main and Split groups ($p = 0.08$). **Difference between Main and Split groups ($p < 0.01$).



DISCUSSION

This study presents data from the first controlled field trial examining the effects of separate grazing over a 28 day period on resumption of oestrous cycles in anoestrous dairy cows. Separate grazing tended to reduce submission rates and conception rates to first insemination. The hormone treated group which were grazed separately had a particularly poor conception rate. An explanation for this apparent decrease in fertility cannot be determined from the results of this study. However, it may have been the result of increased oestrus detection difficulties, due to the smaller sized group of predominantly AA cows. Alternatively, the stress of the hierarchical disruption caused by regrouping itself may have effected conception rate. Gabr (1973) showed that ranking did not effect the interval to post-partum oestrus or conception rate, but did not comment on the effect of regrouping on these variables. There were significant differences between age groups in their response to separate grazing. The percentage of two year old animals detected in oestrus was reduced by separate grazing, whereas there was an increase in three year old animals. Social dominance rank in dairy cattle has been highly associated with age, body weight and height, and seniority (Friend and Polan, 1974). When regrouping occurs in cows an increase in aggressive acts is observed in dominant cows and this is not seen to decrease until 10-14 days after first regrouping (Hasegawa *et al.*, 1997). Thus the two year old cows were probably subject to increased aggression following regrouping which could have influenced their reproductive behaviour. In addition to being the lowest ranking animals in a herd, the two year olds also have high energy demands to meet their growing needs unlike older age cows.

Separate grazing had no significant effect on the reproductive activity of cows diagnosed CL+ at first examination. Numerically, submission rates were increased, but conception rates were decreased in CL+ cows in the separate herd. In comparison with untreated AA cows, both submission rates and conception rates of the CL+ cows were higher, as would be expected for cows which had spontaneously resumed oestrous cycles (Macmillan, 1997). The CL+ cows were included in this study since herd owners using a separate grazing policy for cows not detected in oestrus do so without veterinary examination of cows. The higher reproductive performance of these animals would increase the submission rate of the whole group and help explain the apparently good response to separate grazing reported by some herd owners.

It was hypothesised that the separately grazed group would increase production due to reduced social stresses. However, separate grazing resulted in varied milk production responses between herds. This variation probably reflects different management practices on the eight farms, and differences in pasture availability. Hasegawa *et al.*, (1997) found that the milk yield of regrouped animals significantly decreased in the second week after regrouping. In this study we were only able to look at milk yield change

over a 28 day period, however, in the majority of herds separate grazing did not have a detrimental effect on milk production.

There was no difference in liveweight change between cows grazed in separate or main herds. Although we hypothesised that individual cows in the separate herd may have had more time for grazing, any resultant increase in intake was not converted to liveweight gain or improved reproductive performance.

In conclusion, separate grazing from 7 days before, to 21 days after, the PSM did not increase the percentage of cows resuming oestrous cycles during this period. In agreement with previous studies treatment with progesterone and ODB increased submission rates. The percentage of cows pregnant within 28 days of examination was reduced in separately grazed cows by 7% and increased in the hormone treated group by 16% compared to controls. From these results it can be concluded that separate grazing, commencing 7 days before the start of mating, does not enhance the reproductive performance of anoestrous cows.

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REFERENCES

- Friend T H; Polan C E (1974). Social rank, feeding behaviour and free stall utilization by dairy cattle. *Journal of Dairy Science* **57**: No. 10 1214-1220
- Gabr, H (1973). Social ranking of cows in a covered yard and its effect on behaviour and production characters. *Schriftenreihe-des-Max-Planck-Instituts-fur-Tierzucht-und-Tierernahrung* **70**: 103
- Hasegawa N; Nishiwaki A; Sugawara K; Ito I (1997). The effects of social exchange between two groups of lactating primiparous heifers on milk production, dominance order, behaviour and adrenocortical response. *Applied Animal Behaviour Science* **51**: 15-27
- Macmillan K L (1997). Why don't cows cycle?. *Proceedings of the Ruakura Farmers' Conference* **49**: 90-95
- Macmillan K L; Clayton, D G (1980). Factors influencing the interval to post-partum oestrus, conception date and empty rate in an intensively managed dairy herd. *Proceedings of the New Zealand Society of Animal Production* **40**: 236-239
- Macmillan K L; Taufā V K; Barnes D R; Day A M; Henry R (1988). Detecting oestrus in synchronised heifers using tailpaint and an aerosol raddle. *Theriogenology* **30**: 1099-1114
- Mench J A; Swanson J C; Stricklin W R (1990). Social stress and dominance among group members after mixing beef cows. *Canadian Journal of Animal Science* **70**: 345-354
- Rhodes F M; Clark B A; Nation D P; Taufā V K; Day M L; Day A M; Macmillan K L; McDougall S (1998a). Factors influencing the prevalence of *postpartum* anoestrus in New Zealand dairy cows. *Proceedings of the New Zealand Society of Animal Production* **58**: 44-46
- Rhodes F M; Clark B A; Macmillan K L; McDougall S (1998b). Use of once daily milking or treatment with progesterone and oestradiol benzoate in anoestrous cows. *Proceedings of the New Zealand Society of Animal Production* **58**: 44-46