SOME ASPECTS OF ANOESTRUS IN NEW ZEALAND DAIRY CATTLE

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SUMMARY

To achieve a concentrated calving most cows should be submitted for mating during the first 4 weeks of the breeding period. A survey of submission rates in Taranaki herds showed that large between-herd differences exist and that the most important single group of animals not being submitted for mating show the "pre-service anoestrous syndrome". The problem was most prevalent in 2-year-old cows and herds with more than 180 cows. Detailed investigations with herds in the Manawatu and Wairarapa areas showed that with the younger 2-year-old cows lack of cyclical activity was the most usual reason for animals not being submitted for mating. With mature cows, "silent heat" and/or failure to detect overt oestrus were also important problems and this even applied to herds where marker bulls were used for oestrus detection. It is suggested that possible factors contributing to this age interaction are those associated with stage of physical maturity, with nutrition, and with social stresses within the herd. Where evidence of ovarian cyclical activity is found in unmated cows, the prognosis is generally favourable and improved methods of oestrus detection are all that is required. Treatment of cows with inactive ovaries is more difficult and several approaches that can be taken are outlined. Single injection therapy with some commonly used drugs has generally been unrewarding.

The number of cows in a herd which will be in calf at the end of 4 weeks of mating is a function of submission rate and conception rate (Macmillan, 1972). This study concerns the first component of the interaction, submission rate, which is "the rate at which individual members of the herd are correctly submitted to mating over the defined service period". Incorrect submissions are another problem resulting in short return intervals and are not considered in this paper.

SUBMISSION RATE

A low submission rate in a herd may arise:

(1) Because of the conscious withholding of animals from mating (usually for the purpose of culling).

(2) Where there are a large number of cows calving close to the mating period for the herd, thus leaving themselves insufficient time to resume normal oestrous cycles (this reflects a problem which arose during the previous year's mating).

(3) Because of failure to show overt oestrous behaviour in spite of adequate time from calving to resume normal oestrous cycles, or if overt oestrus is occurring failure to detect it. It is this particular group of animals that is classified as showing the "pre-service anoestrous syndrome".

Tables 1 and 2 summarize information relating to submission rate collected during the 1972-3 spring breeding season from herds in the Taranaki area. The data do not represent information from a random sample of the herds in the region but are believed to be sufficiently extensive to demonstrate that:

(1) Large differences exist between herds in submission rate (see range between herds within a sub-group in Table 1).

(2) The major reason for cows not being submitted for mating is that they are either not showing overt oestrus or are showing overt oestrus and are not being detected — *i.e.*, they fall into the "pre-service anoestrous syndrome" classification (Table 1).

TABLE 1: SUBMISSION RATE DURING FIRST MONTH OF MATING IN TARANAKI HERDS DURING 1972-3 BREEDING SEASON

Herd Size	*No. of Herds*	*% Submitted for Mating*	*% Not Submitted for Mating** *Late Calvers + Culls*	*"Anoestrous Syndrome"*
<81	53	88.1 (38-100)†	5.6	6.4
81-100	74	88.0 (58-100)	5.4	6.6
101-120	62	89.4 (68-100)	5.2	5.4
121-140	48	89.8 (71-100)	4.2	5.9
141-160	22	89.2 (80-97)	4.5	6.3
161-180	12	87.5 (83-97)	7.8	4.8
>180	23	85.9 (68-95)	5.2	8.9

*Late calvers = any cow calving later than one month before commencement of mating for that herd.
Culls = cows not mated because the farmer wished them to remain non-pregnant.
"Anoestrous syndrome" = cows not mated either because they were not cycling, not showing overt oestrus, or, if they were showing overt oestrus, were not being detected.

†Figures in parentheses represent range of results for herds within this sub-group.

TABLE 2: SUBMISSION RATE DURING FIRST MONTH OF MATING IN TARANAKI HERDS DURING 1972-3 BREEDING SEASON ACCORDING TO AGE AND EXCLUDING LATE CALVING COWS AND CULL COWS*

Herd Size	*No. of Herds*	*% Cows Submitted for Mating*		
		2 yr	*3 yr*	*4 yr+*
<81	53	90.1	94.2	94.8
81-100	74	91.8	93.9	93.9
101-120	62	92.0	94.4	95.8
121-140	48	90.9	93.9	95.3
141-160	22	92.1	94.8	94.1
161-180	12	94.2	96.2	95.2
>180	23	84.2	93.1	93.9

*Late calving cows = any cow calving later than one month before commencement of mating for that herd.
Cull cows = cows not mated because the farmer wished them to remain non-pregnant.

(3) The "pre-service anoestrous syndrome" is more likely to be encountered in younger animals and in larger herds (Tables 1 and 2). The propensity for the 2-year-old animals to show this problem in the larger herds is not the result of difficulties experienced during their first breeding season as yearling heifers since the incidence of late calving animals is similar for all age groups within each herd size category.

THE "PRE-SERVICE ANOESTROUS SYNDROME"

With the emergence of this syndrome as the major cause of animals failing to be submitted for mating, particularly in the larger herds, it is desirable to examine the possibilities that exist with animals that fall into this category. These may be summarized as follows:

(1) Ovaries active with a corpus luteum either present or about to be formed in one or both ovaries:
  (a) Animal cycling and showing overt oestrus which is not detected.
  (b) Animal cycling but not showing overt oestrus — "silent heat".
  (c) Pregnancy.
  (d) Pathological conditions of reproductive tract — *e.g.*, pyometra.

(2) Ovaries inactive or showing minimal activity without corpus luteum development:

(a) Pathological conditions of reproductive tract — *e.g.*, follicular cyst(s).

(b) Failure to return to cyclical activity due to "stress" phenomena — *e.g.*, nutritional inadequacies, behavioural interactions.

Since all or any combination of these possibilities may occur in any one herd, an attempt has been made to establish the relative importance of each of them during the last two breeding seasons. The technique used has been an examination of the reproductive tract *per rectum* of cows which have had a sufficient period of time after calving to show overt oestrus but which have not actually been seen in oestrus. In timing these examinations, the assumption has been made that under New Zealand conditions the majority of milked cows should have experienced their first post-partum ovulation within 42 days of calving (Moller, 1970). Based on these examinations, a decision was made as to whether the animal was already pregnant (rarely was this the case), had detectable abnormalities present (only 22 of 994 cows examined), was cycling as evidenced by ovarian activity or was not cycling (ovaries inactive).

Table 3 summarizes the data obtained from 18 of these herds examined on 4 separate occasions during the 1972-3 breeding season. Again the highest incidence of problem animals was found in the youngest age group; the table also demonstrates an interaction between the type of problem and

TABLE 3: PERCENTAGE OF COWS THAT WERE EXAMINED WHICH HAD INACTIVE OVARIES*

Age	*Visit*†			
	1	*2*	*3*	*4*
2 yr (n = 470)	80	79	76	84
3 yr (n = 212)	68	68	64	65
4 yr and over (n = 335)	43	40	43	30
Total	402	290	228	97

*All the cows examined were in 18 herds in the Manawatu; the examinations were made on 4 separate occasions during the 1972-3 breeding season. Percentage of cows with active ovaries within each age class is the reciprocal of the figure in the table (pregnant cows and cows with detectable pathological conditions of the reproductive tract have been excluded).

†All cows had calved at least 6 weeks prior to their first examination but had not been seen in oestrus 1 week before mating commenced (1); 1 week after mating commenced (2); 4 weeks after mating commenced (3); and 8 weeks after mating commenced (4).

TABLE 4: RELATIONSHIP OF AGE AND OESTRUS DETECTION TECHNIQUE WITH THE RELATIVE INCIDENCE OF OVARIAN ACTIVITY IN 14 HERDS IN THE MANAWATU AND WAIRARAPA AREA DURING THE 1971-2 BREEDING SEASON

Age and Ovarian Status	*Detection Technique Used*	
	Marker Bulls	*Farmer Observation*
2 yr:		
number	68	64
% inactive	91	94
3 yr		
number	23	44
% inactive	87	80
4 yr and over:		
number	91	80
% inactive	63	41

age. With the 2-year-old animals lack of cyclical activity was the greatest single cause of animals not being submitted for service whereas with the mature animals evidence of cyclical activity was present in over 50% of cases, suggesting that "silent heat" and/or failure to recognize overt oestrus were significant problems.

Table 4 shows that, where marker bulls were used, they were relatively more efficient in detecting 3-year-old and mature animals in oestrus than where detection was by farmer observation. It should be noted, however, that an appreciable number of animals judged on examination *per rectum* to be showing ovarian activity were still not recognized as cycling by these bulls, particularly cows in the older age groups. Whether this was a problem of "silent heat" or ineffectiveness or mismanagement of the marker bulls could not be determined.

It is likely that factors contributing to this observed age difference are those associated with stage of physical maturity, with nutrition and with social stresses within the herd. Younger animals may be producing heavily as well as continuing to grow; typically they are at the lower end of the social dominance scale and may therefore suffer in competition for available pasture. Nevertheless, this age trend in the incidence of cows with inactive ovaries does not necessarily indicate a less severe environmental interaction among older animals since cows that exhibit this syndrome will tend to eliminate themselves from the herd. Anoestrous heifers, which eventually commence cycling and conceive, become late calving cows the following year. They then have to be mated following a shorter than normal post-partum period if they are to re-

main in the herd. Any recurrence of anoestrum means they are likely to be culled. If this is the case, a natural selection process will tend to eliminate these animals from the herd.

MANAGEMENT OF THE "PRE-SERVICE ANOESTROUS COW"

Once the various conditions contributing to the "pre-service anoestrous syndrome" have been defined in a herd, management appropriate to each can be instituted. Where large numbers of animals with active ovaries are found, improving methods for detecting cows in oestrus is the obvious remedy. Of 30 animals dealt with in this manner in the 1971-2 breeding season, 27 came into oestrus within 4 weeks of examination and 63% of these conceived. In 1972-3, 75% of the 290 found with active ovaries were mated within 3 weeks of examination and 50% conceived to this mating.

The most important and difficult group to manage are those cows with inactive ovaries. If these animals are left alone a significant proportion are likely to become pregnant late in the breeding season and thus exacerbate the problem the following year. Alternate forms of management must therefore be considered. These include:

(1) Shortening gestation length by the use of corticosteroid drugs in advanced pregnancy as reported by Welch (1972). Certain hazards are associated with this procedure and until more information is available on the use of these drugs caution should be exercised.

(2) Mating of the 15-month-old heifers earlier than the milking herd. This allows these animals, when they calve into the herd as 2-year-old cattle, a longer post-partum period before they should be mated. Provided adequate food supplies can be made available to this group, the technique may have the added advantage of allowing them to be trained to the shed and milking routine before the bulk of the main herd calve.

(3) Preferential treatment of problem animals, as for example by grazing the 2-year-old cattle in a separate group and/or some system of preferential feeding. Management techniques for doing this which yield an economic return for cost and effort involved have yet to be worked out. In particular, methods of recognizing the most susceptible animals at a sufficiently early stage to institute this type of remedial measure may be difficult.

(4) The use of drugs. Although the writers have by no means exhausted the possibilities of drug therapy, single treat-

TABLE 5: RESPONSE TO TREATMENT OF COWS WITH INACTIVE OVARIES IN 27 HERDS IN THE MANAWATU AND WAIRARAPA AREA DURING THE 1972-3 BREEDING SEASON

*Treatment**	*No.*	*% Diagnosed in Calf†*
Control	218	15
E.C.P.	110	16
Benoestrin	102	17
Folligon	93	27
Mu-Se	83	16

*Cows were treated on a within-herd, within-age basis in the following ways:
Control = examination *per rectum* only.
E.C.P. = examination + intramuscular injection of 2 mg oestradiol cypionate (Upjohn).
Benoestrin = examination + intramuscular injection of 300 i.u. serum gonadotrophin and 3 mg oestradiol monobenzoate (Willows Francis).
Folligon = examination + intramuscular injection of 1000 i.u. of serum gonadotrophin (Intervet).
Mu-Se = examination + intramuscular injection of 20 mg sodium selenate and 272 i.u. vitamin E (Veterinary Ethicals).

†Number in calf during the 3 weeks following treatment as a percentage of all cows examined in the sub-group.

ment with a variety of commonly used drugs for this type of condition has been generally unrewarding (see Table 5). Some success has been achieved with Folligon. A higher percentage of cows conceived during the 3 weeks following treatment with this drug than in the control or other treatment sub-groups ($P < 0.01$). Further evaluation of this and of other possible methods of management is obviously indicated and will form the basis of further investigations.

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