

## THE EFFECT OF OESTRUS SYNCHRONISATION ON CONCEPTION RATE OF LACTATING BEEF COWS

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**OPSOMMING:** DIE INVLOED VAN ESTRUSINCHRONISASIE OP DIE KONSEPSIESYFER VAN LAKTERENDE VLEISRAS-KOEIE.

Agt-en-negentig lakterende Bonsmarakoeie is verdeel in 'n eksperimentele groep van 66 en 'n kontrolegroep van 32 koeie. Die 66 koeie was gesinchroniseer d.m.v. die onderbroke metode van progesterontoediening en daarna geïnsemineer tydens die eerste twee gegroepeerde brongstigheidsperiodes. Die 32 kontrole koeie is waargeneem vir tekens van brongstigheid en geïnsemineer vanaf die begin van die behandelings tydperk in die gesinchroniseerde groep. Na die behandelingsperiode was die kumulatiewe persentasie van die koeie wat brongstigheid vertoon het tot op enige stadium feitlik identies in die twee groepe. Netso was die kumulatiewe persentasie koeie wat op die verskillende stadiums na inseminasie dragtig was ook dieselfde in die twee groepe. Alhoewel die inseminasiedatums van die gesinchroniseerde groep binne twee kort periodes gekonsentreer was, was hulle kalfdatums niks meer as dié van die kontrole groep gesinchroniseer nie. Die gevolgtrekking word gemaak dat die persentasie koeie wat brongstigheid vertoon en die dragtigheids persentasie nie deur die sinchronisasiebehandeling beïnvloed word nie. Dit skyn asof ovulasiesinchronisasie in vleisbeeste alleen 'n doel dien om die koeie se brongstigheid te groepeer om observasies onder veldtoestande te vergemaklik.

### **SUMMARY:**

Ninety eight lactating Bonsmara cows were divided into an experimental group of 66 and a control group of 32 cows. The 66 cows were synchronized by means of the interrupted method of progesterone administration and thereafter inseminated during the first two grouped heat periods. The 32 control cows were observed for signs of oestrus and inseminated after the beginning of the progesterone treatment started in the experimental group. After the period of treatment the cumulative percentage of cows that had exhibited oestrus at any stage was very similar in the two groups. Likewise the cumulative conception rate at any stage was also alike in both groups. Although the insemination dates of the synchronized cows were concentrated during two short periods, their calving dates were no better synchronized than those of the control cows. It is concluded that neither the number of cows that exhibit oestrus nor the number of conceptions are affected by the synchronization treatment. It appears that synchronization of ovulation in beef cows is useful only to group the cows' heat periods for solving some of the managerial problems associated with observation for oestrus under extensive conditions.

The synchronization of the oestrous cycles of farm animals has attracted a great deal of attention over the past 20 or more years since Christian & Casida (1948) demonstrated that exogenous progesterone could emulate the natural hormone of the corpus luteum in the cow. During this time many publications on synchronization trials in beef cattle have appeared in the literature but reports on the general fertility of the experimental herds in their normal environment have been neglected. In cattle most of the trials have been performed on heifers, while, according to Lamond (1964), the most urgent need is for synchronization of lactating cows. The object of this paper is to demonstrate that lactating cows can be synchronized successfully without adversely affecting calving rate.

### **Materials and methods**

Ninety eight Bonsmara cows with calves at foot were divided into two groups of 66 and 32 cows respectively on the basis of their calving dates so that the ratio of cows with older and with younger calves were evenly distributed between the two groups. The ages of the calves in both groups varied from 33 to 99 days at the onset of treatment.

The group of 66 cows (the Synchronized Group) was treated with progesterone following Grosskopf (1974). This consisted of ten 48-hourly intramuscular

injections of 50 mg progesterone in 3 ml propylene glycol each, given in two courses of four and six injections with a rest period of eight days between the two courses. The synchronized cows were observed for signs of oestrus over a period of 29 days beginning on the morning of the third day after the last progesterone injection. Only those cows found to be in oestrus during the first five days (synchronized oestrous period) and the last eight days (second oestrous period) of this period were inseminated. After this period of observation the cows were run with a bull for another 34 days until the end of the breeding season.

The other 32 cows served as the Control Group. They were observed for signs of oestrus as from the day of the first progesterone injection in the synchronized group until the last day of the second oestrous period after treatment in the experimental group. The observation period covered 57 days and thereafter they were also run with a bull for a further 34 days. Both groups were kept under the same conditions throughout and were inseminated by the same inseminator with frozen semen from the same Bonsmara bull.

### **Results and discussion**

#### *Distribution of oestrus*

The distribution and occurrence of visible oestrus in the two groups as well as the conception to insemina-

tions are shown in Fig. 1. The most striking difference is that the heat periods are grouped in the Synchronized Group and spread over 45 days in the Control Group. The first two cows in the Control Group came on heat

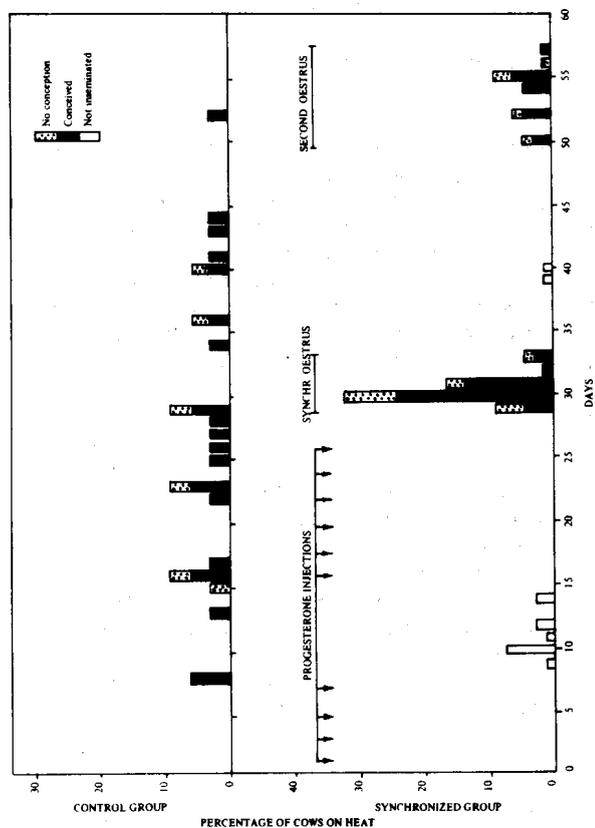


Fig. 1 Incidence of heat and conceptions in the synchronized and control groups.

on the 8th day of the experiment and were both inseminated successfully. Of the synchronized cows 11 exhibited signs of oestrus during the rest period between the two courses of progesterone but were not inseminated. The synchronized oestrous period was spread over five days from day no 29 to day 33. Forty-two cows (64%) responded during this period of which 31 (74%) conceived to insemination. About three weeks later 18 of the synchronized cows were again in oestrus, this time over a period of 8 days. Of these, 6 were from the 11 that did not conceive during the synchronized oestrus and 12 were observed for the first time. Thus a total of 54 (82%) of synchronized cows showed oestrus during the observation period. During the period of observation 24 (75%) of the control cows showed visible signs of oestrus. Of these 20 conceived to first insemination.

The small difference in the percentage of cows that exhibited oestrus between the two groups during the observation period is not significant. It is disturbing, however, that so many cows in the synchronized group were only observed to be on heat for the first time during the second synchronized oestrous period. This indicates either inadequate observations during the synchronized oestrous period or probably a de-

gree of silent heat. On the other hand, by the end of the synchronized oestrous period only 63% of Control cows had been on heat. cf. 64% in the Synchronized Group. Thus it appears that many of the cows might not have been ready to cycle at that time. Four of the synchronized cows that were in oestrus during the rest period between the two courses of progesterone did not show any further signs of heat during the remaining period of observation. However, three of them conceived soon afterwards to natural service. The time interval after parturition had an effect on the occurrence of oestrus. Only 5 out of 12 cows with calves younger than 45 days at the onset of the experiment showed signs of heat during the period of observation.

#### Conception rate

The cumulative number of conceptions in the two groups during the different stages of the experiment as well as the efficiency of the inseminations are compared in Table 1. From this table it is apparent that the pregnancy rate in the two groups remained remarkably similar as the breeding season progressed.

Table 1

*A comparison of the results of inseminations in the synchronized and control herds*

|  | Controls |    | Synchronized |    |
|--|----------|----|--------------|----|
|  | n        | %  | n            | %  |
| Number of cows                                   | 32       |    | 66           |    |
| <b>Cumulative conceptions:</b>                   |          |    |              |    |
| Treatment period                                 | 13       | 41 | —            | —  |
| To end synchr. oestrus                           | 15       | 47 | 31           | 47 |
| To end 2nd oestrus                               | 22       | 69 | 44           | 67 |
| To end of season                                 | 28       | 88 | 57           | 86 |
| <b>Conception rate to A.I.:</b>                  |          |    |              |    |
| Synchron. oestrus (1st insemination in controls) | 20       | 80 | 31           | 74 |
| 2nd oestrus (2nd insemination in controls)       | 2        | 50 | 13           | 72 |
| Percentage of calves from A.I.                   | 22       | 79 | 44           | 77 |
| Number of inseminations per conception           | 1,27     | —  | 1,36         | —  |

#### Distribution of calving dates

One of the attractions of synchronization of oestrus is synchronization of calving. Due to the fact that duration of pregnancy varies from one cow to another and that all cows do not conceive to a single insemination, this ideal appears to be unattainable with this

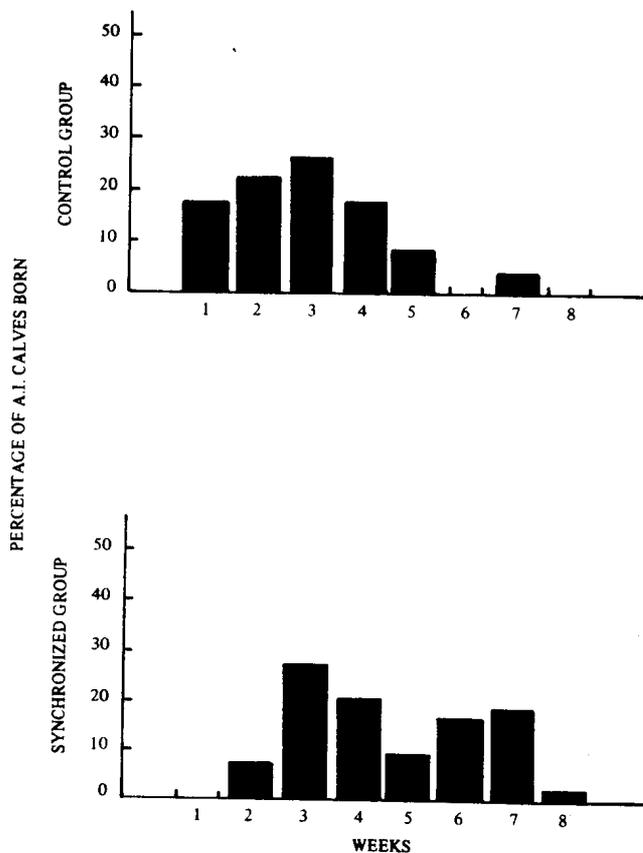


Fig. 2 The distribution of the birth of calves derived from A.I. in the synchronized and control groups.

technique. In Fig. 2 the distribution of births derived from A.I. is illustrated. Except for a tendency towards two peaks, the calving dates of the Synchronized Group showed the same spread as those of the Control Group. The duration of the pregnancies derived from A.I. in the two groups were  $285,0 \pm 4,7$  d (range 272 to 196 d) for

the Synchronized Group cf.  $283,9 \pm 4,1$  d (range 265 to 294 d) in the Control Group. The average intercalving period of the synchronized cows that recalved was 389,9 days and of the untreated cows 384 days. Eleven of the synchronized cows and 7 of the control cows calved earlier than the previous year.

### Conclusions

The oestrous cycles of lactating beef cows were successfully synchronized by an interrupted course of progesterone injections. Except for the initial postponement of the cycles during the period of treatment, the cumulative number of cows that exhibited oestrus to various stages in the breeding season was very similar to that of control cows. It therefore appears that only those cows that would have exhibited oestrus in any case at that stage will respond to the treatment.

The percentage of the treated cows that conceived to insemination during the various stages was remarkably similar to that of the untreated controls. Even at the end of the breeding season, after a period of natural service, the pregnancy rate in the two groups were still similar.

The calving dates of the synchronized cows were no more synchronized than those of the control cows. Due to the normal variation in the duration of pregnancy it is unlikely that "synchronized calving" will ever be achieved by ovulation control alone. It is concluded that the only value of synchronization of the oestrus cycle of beef cows under ranching conditions is to group the heat periods so as to alleviate the burden of continuous oestrus observations over an extended breeding season.

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