

OBSERVATIONS OF INDUCED OESTRUS AND OVULATION IN BEEF HEIFERS IN CENTRAL QUEENSLAND

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I. INTRODUCTION

Little is known of length of oestrous cycles and time of ovulation in relation to oestrus in beef cattle in northern Australia (Donaldson 1962). This paper presents the results of observations on a group of heifers after treatment with progesterone to synchronize ovarian cycles.

II. METHODS

The ovaries of 150 Hereford and Shorthorn x Santa-Gertrudis heifers, about two years old, were examined *per rectum* on February 23, 1963. Corpora lutea were enucleated from about 25 %; 50% had follicles only, or corpora lutea that could not be removed, and 25% had neither corpora lutea nor follicles. The heifers were in store or forward store condition and were run in a 50-acre paddock near the yards. Seventy of the heifers were allotted to two groups. Group A comprised 15 heifers of each breed type from which corpora lutea were removed, and Group B comprised 20 heifers of each breed type which had follicles only, corpora lutea that could not be removed, or neither corpora lutea nor follicles.

A dose of 40 mg of progesterone plus 20 μ g of stilboestrol in peanut oil was administered intramuscularly to animals in Group A daily from February 23 to February 26, inclusive. Group B was given the same hormone treatments on February 23, 25, 27, and March 1. The treatments were selected on the basis of previous experience.

Commencing on March 1, the cattle were observed at intervals of 3-4 hr from 6 a.m. to 10 p.m. A heifer was considered to be in oestrus when she allowed another heifer to mount. The heifers exhibiting oestrus were examined *per rectum* approximately 24 hr after onset and again 12 hr later to determine if ovulation had occurred. On March 6, the heifers that had not shown oestrus were examined *per rectum*.

Coat scores (Turner and Schleger 1960) were determined for each heifer.

III. RESULTS

(a) Occurrence of oestrus

The numbers of heifers exhibiting oestrus during the first six days after their final injection are shown in Table 1. Chi-square analysis indicates a significant

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TABLE 1

Numbers of heifers in oestrus in the first 6 days after cessation of progesterone treatment; and the mean intervals between the final injection and onset of oestrus and coat scores.

	Hereford		Hereford x Santa Gertrudis	
	Group A	Group B	Group A	Group B
Number of heifers	15	20	15	20
Number in oestrus	9	5	10	4
Mean time to onset of oestrus (hr) \pm SE	113 \pm 3	114 \pm 13	96 \pm 2	84 \pm 7
Coat score \pm SE (all heifers)	8.7 \pm 0.42	10.4 \pm 0.42	7.5 \pm 0.32	8.0 \pm 0.37

difference ($P < 0.01$) in incidence of oestrus between Groups A and B, but no breed difference or interaction between breed and ovarian state.

Of the 11 heifers in Group A that did not exhibit oestrus in the first six days after treatment, one came into oestrus on the seventh day, four had ovarian follicles, two had neither corpora lutea nor follicles though the ovaries were of "normal" size and consistency (i.e. 1-3 cm in diameter and firm consistency), and the remaining four had small, hard ovaries.

Of the 31 heifers in Group B not exhibiting oestrus, six had corpora lutea, two had follicles, seven had neither corpora lutea nor follicles but the ovaries appeared "normal", and the remaining sixteen had small and hard ovaries.

(b) Period to onset of oestrus

Shorthorn x Santa-Gertrudis heifers came into oestrus approximately 24 hr before Hereford heifers ($P < 0.05$), but there was no significant average difference between Groups A and B. Oestrus was poorly synchronized in Group B heifers compared with Group A heifers (Table 1).

(c) Duration of oestrus

Few animals were in oestrus for longer than 12 hr, and the majority were in oestrus for approximately 9 hr.

(d) Time of ovulation

All animals showing oestrus, except one, had ovulated within 24 hr of onset of oestrus; the exception had ovulated within 36 hr.

(e) Coat score

The Hereford heifers in Group B had a higher coat score ($P < 0.05$) than those in Group A. The average difference between breeds was not significant.

IV. DISCUSSION

The presence of small, hard ovaries suggests that a number of heifers were experiencing anoestrus. Possibly 4 of 30 heifers from which corpora lutea were removed went into anoestrus as judged by palpation of the ovaries on March 6. Approximately two fifths of the heifers in Group B also showed no indication of ovarian activity after treatment. Anoestrus in the late-summer and autumn period could be expected on the basis of studies of seasonality on effects of progesterone in heifers (Lamond 1964). On the other hand, rectal palpation cannot be considered to give an accurate picture, nor is it known with any certainty that small, hard ovaries in heifers are not functional.

These field observations raise three important points.

Firstly, February-March is considered by farm managers an optimal time to join heifers in central Queensland, but it appears that a number of two-year old heifers may experience anoestrus at that time. Bulls were absent from the heifers used in this study, and the possibility that introduction of bulls may act as an external stimulus to reproduction in beef heifers run under extensive conditions should be considered.

Secondly, these results taken in conjunction with those of Rollinson (1963) suggest that oestrus in cattle is shorter in the tropics than in temperate zones. However, we do not know of any experiments that have critically examined this conclusion.

Thirdly, there was no evidence of delayed ovulation in heifers that were in oestrus, as has been observed by Van Rensburg and De Vos (1962).

The importance of the difference in coat score is not understood.

V. ACKNOWLEDGMENTS

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