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EFFECTS OF ADMINISTERING PROGESTERONE OR PROGESTERONE AND GnRH BEFORE
PUBERTY ON AGE AT PUBERTY AND REPRODUCTIVE RESPONSE IN
CROSSBRED BEEF HEIFERS

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Summary

One hundred six crossbred heifers were utilized to determine prepubertal treatment of progesterone or progesterone plus Gonadotropin Releasing Hormone (GnRH) on age at puberty, conception to a synchronized estrus and conception during the breeding season. Days to puberty were 369.5 ± 6.2 , 363.1 ± 9.9 and 360.4 ± 7.8 for control, progesterone primed and progesterone plus Gonadotropin Releasing Hormone (GnRH), respectively. There was no difference ($P > .05$) in age of puberty, number cycling before synchronization or conception rate during a 35-day breeding season. The percentage of heifers conceiving to synchronized estrus was lower ($P < .10$) for control compared to progesterone or progesterone plus GnRH treated heifers. Injecting GnRH at breeding had little ($P > .05$) effect on increasing conception rates to the synchronized estrus or during the breeding season.

(Key Words: Beef Heifers, Puberty, GnRH, Progesterone, Fertility.)

Introduction

Decreasing the time to puberty in beef heifers should result in increased conception rate early in the breeding season, since the heifer would be cycling for a longer period of time prior to breeding. Also, older and larger calves would result at weaning, and a longer period of time would be available for the heifer to begin cycling before the second breeding season. Some research has been conducted administering reproductive hormones to heifers before puberty, resulting in varying results on decreasing time to puberty. A management procedure to decrease time to puberty resulting in increased reproductive efficiency in first calf beef heifers would be economically important to the cow-calf producer. The purpose of this study was to evaluate several hormones administered before puberty and their effects on age at puberty and subsequent reproductive performance in crossbred beef heifers.

Materials and Methods

One hundred six crossbred beef heifers were randomly allotted to one of three groups. One group was the control and did not receive hormone therapy. A second group was progesterone primed before puberty (9 days Synchro-Mate B). The third group was progesterone primed and injected with Gonadotropin Releasing Hormone (GnRH) at SMB removal. Each of the treatment groups were divided and one-half of each group given GnRH injections at trial initiation. Blood was collected via jugular venipuncture weekly from October until all heifers were synchronized for breeding in May. Blood samples were centrifuged and the serum harvested and analyzed by radioimmunoassay for progesterone levels to determine when cycling was initiated. On May 9 all heifers were synchronized with Synchro-Mate B and inseminated 48 hours after implant removal. At breeding each of the three prepubertal groups were divided and one-half of each group injected with GnRH and the other one-half control. One week after AI, the heifers were exposed to bulls for 28 days. Eighty-one days after AI the heifers were rectally palpated and conception date estimated.

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Results and Discussion

There was no difference ($P>.05$) in age to puberty between the three prepubertal treatment groups (Table 1). Also, no difference ($P>.05$) existed between the three prepubertal groups in the number of heifers cycling before estrous synchronization. Collectively, 54 of the 106 heifers were cycling before synchronization. After synchronization and breeding, all heifers but one that did not conceive started cycling. This may be due to the progesterone implant and estradiol injection associated with SMB synchronization.

TABLE 1. EFFECTS OF PROGESTERONE PRIMING AND PROGESTERONE PRIMING + GNRH ON REPRODUCTIVE DEVELOPMENT IN CROSSBRED BEEF HEIFERS

	Control	Progesterone	Progesterone + GnRH
Number of heifers	34	36	36
Days to puberty	369.5 ± 6.2	363.1 ± 9.9	360.4 ± 7.8
Cycling before synchronization ^a	17 (50.0)	17 (47.2)	20 (55.6)

^a Values in parenthesis are percentages.

Conception rates to the synchronized estrus and for the breeding season are presented in Table 2. The lowest conception rate to synchronized estrus was in the control heifers ($P<.10$). Both control treatment groups prepubertal had lower conception rates than progesterone primed or progesterone primed plus GnRH groups. There was no difference ($P>.05$) in conception rate for the breeding season for the prepubertal treatments or the GnRH injection at breeding. Average conception rates from the prepubertal treatments to synchronized estrus were 47.1, 61.1 and 69.4% for control, progesterone primed and progesterone primed plus GnRH, respectively, and for the breeding season 82.4, 91.7 and 80.6% for control, progesterone primed and progesterone primed plus GnRH, respectively.

Progesterone priming or progesterone priming plus GnRH had little effect on age to puberty or reproductive performance in beef heifers. Also, little advantage existed by injecting heifers with GnRH at the time of insemination.

TABLE 2. CONCEPTION RATE TO SYNCHRONIZED AI AND BREEDING PERIOD FOR BEEF HEIFERS TREATED WITH PROGESTERONE AND GNRH BEFORE PUBERTY AND GNRH AT BREEDING

Prepuberty	Breeding	No. of heifers	Conception rate to synchronized estrus ^a	Conception rate for breeding season ^a
Control	Control	18	8 (44.4) ^b	14 (77.8)
Progesterone	Control	17	10 (58.8) ^c	15 (88.2)
Progesterone + GnRH	Control	19	14 (73.7) ^c	15 (79.0)
Control	GnRH	16	8 (50.0) ^b	14 (87.5)
Progesterone	GnRH	17	11 (64.7) ^c	14 (82.4)
Progesterone + GnRH	GnRH	19	12 (63.2) ^c	18 (94.7)

^a Values in parenthesis are percentages.

^{b,c} Values in columns with unlike superscripts differ ($P<.10$).