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Abstract

Injecting 100 mcg of GnRH into cycling heifers at artificial insemination following estrus synchronization with either prostaglandin or Syncro-Mate-B® did not improve first service conception rate. However, GnRH improved first service conception in Syncro-Mate-B®-treated heifers that did not exhibit estrus prior to breeding and were bred by appointment.

Keywords

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The Effect of GnRH on Pregnancy Rates in Estrus-Synchronized Beef Heifers

Mary Ferguson and Larry Corah

Summary

Injecting 100 mcg of GnRH into cycling heifers at artificial insemination following estrus synchronization with either prostaglandin or Syncro-Mate-B® did not improve first service conception rate. However, GnRH improved first service conception in Syncro-Mate-B®-treated heifers that did not exhibit estrus prior to breeding and were bred by appointment.

Introduction

Use of artificial insemination in beef cattle is still limited, partially because of low first service conception rates. Injecting gonadotropin-releasing hormone (GnRH) or related gonadotropins at artificial insemination has had varying effects on conception rate. Research at Kansas State University using GnRH on lactating Holstein cows did not improve first service conception rate, but conception rates on second and third services were improved by nearly 21%.

This study was designed to determine the effect of GnRH on conception rates in yearling beef heifers, estrus synchronized with Syncro-Mate-B®[1] (SMB) or prostaglandin[2] (PGF).

Experimental Procedures

Spring trials with Syncro-Mate-B®

Three field trials were conducted in 1984 on 169 spring-born, yearling beef heifers. All received the SMB treatment (6 mg norgestomet implanted subcutaneously in the ear for 9 days and an intramuscular injection of 5 mg estradiol valerate and 3 mg norgestomet on the day of implant insertion).

The heifers were observed for estrus beginning 24 hr after implant removal. Those showing heat 24 to 36 hr after implant removal were artifically inseminated 12 hr after estrus was first detected. Those that did not show heat by 36 hr were inseminated 48 hr after implant removal. All heifers were allotted at breeding to either an untreated control group or a treated group that received 100 mcg of GnRH (2 ml Cystorelin®[1]) subcutaneously at insemination. Calving dates were used to determine conception rate.

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[1] CEVA Laboratories, Overland Park, Kansas.

[2] Lutalyse is a Prostaglandin developed and marketed by the Upjohn Co., Kalamazoo, Michigan.

Fall trial with Synero-Mate-B®

Two additional field trials with SMB and GnRH were conducted on 268 fall-born yearling beef heifers. Procedures were the same as in the spring trials. At first service, all heifers were inseminated by the same A.I. sire 48 hr after implant removal.

Trial with Prostaglandin

At another commercial ranch in Southwest Kansas, 184 fall-born yearling Angus heifers were observed 5 days for estrus. Heifers showing estrus were artificially inseminated 12 hr after the onset of estrus. On day 6, 25 mg PGF (5 ml Lutalyse) was given intramuscularly to heifers that had not shown estrus. Heifers that exhibited estrus by 12 days after PGF injection were inseminated 12 hr after the onset of estrus. Those that did not exhibit estrus after PFG were given a second injection on day 12, and were inseminated by estrus. All heifers were allotted to either an untreated control group or a GnRH-treated group at insemination. Over a 65-day breeding season, heifers that returned to estrus were reinseminated and about 70% of the treated heifers received GnRH again. Pregnancy was determined by rectal palpation 40 days after the last insemination.

Results and Discussion

Trials with SMB

Injecting GnRH at breeding following synchronization with SMB did not significiantly affect first or second service conception rates (Table 13.1). We cannot explain the extremely low first service conception rate, except for the fact that a high percentage of the heifers were not cycling.

Those heifers not observed in estrus before insemination had higher conception rates if injected with GnRH at first service (Table 13.2). GnRH may have induced follicle rupture, which would correlate time of insemination and ovulation.

Table 13.1. Effect of GnRH on First and Second Service Conception Rates of SMB-Synchronized Heifers

Item	GnRH	Control
First service conception rate, %	20.71	17.79
No. heifers	41/198	37/208
Second service conception rate, %	28.57	33.33
No. heifers	4/14	7/21

Table 13.2. Effect of GnRH on First Service Conception Rates in SMB-Synchronized Heifers Bred by Appointment or by Estrus

Item	GnRH			Control		
	Bred by Estrus	Bred by Appointment	Total	Bred by Estrus	Bred by Appointment	Total
Estrus observed						
First service conception rate, %	22.4	25.9	23.2	21.6	28.2	23.5
No. heifers	19/85	7/27	26/112	21/97	11/39	32/136
No estrus observed						
First service conception rate, %		17.4[a]	17.4[a]		6.9[b]	6.9[b]
No. heifers		15/86	15/86		5/72	5/72
Total, %		19.5			14.4	

[a,b]Values on the same line with different superscripts differ (P<.05).

Trial with PGF

In this trial, all heifers were bred approximately 12 hr after observed estrus. Injecting GnRH at breeding had no significant effect on first service conception rate. GnRH treatment of the same heifers at the second service decreased (P<.10) conception rate (Table 13.3).

Table 13.3. Effect of GnRH on First and Second Service Conception Rates Following PGF Synchronization

Item	GnRH	Control
First service conception rate, %	47.7	51.0
No. heifers	41/86	50/98
Second service conception rate, %	45.2[a]	65.4[b]
No. heifers	14/31	34/52

[a,b]Values on the same line with different superscripts differ (P<.10).