SUPPLEMENTAL PROGESTIN INCREASES PREGNANCY RATES IN SUCKLED BEEF COWS[1]

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Summary

In two experiments, combining a source of progestin with the ovulation synchronization protocol using gonadotropin-releasing hormone plus prostaglandin $F_{2\alpha}$ (GnRH + $PGF_{2\alpha}$) tended to increase or statistically increase pregnancy rates in suckled cows compared to GnRH + $PGF_{2\alpha}$ alone. These improvements were accomplished without any detected estrus when cows were inseminated and received a second injection of GnRH at 48 hr after $PGF_{2\alpha}$.

(Key Words: Cows, AI, Estrus-Ovulation Synchronization, GnRH, $PGF_{2\alpha}$,Progestin.)

Introduction

Recent studies have identified the effectiveness of using GnRH + $PGF_{2\alpha}$ to synchronize estrus and ovulation in beef cattle (1998 Cattlemen's Day, pp 34-36). This protocol (known as Select Synch) requires an injection of GnRH 7 days before $PGF_{2\alpha}$ is given on the first day of the breeding season. Cows then are observed for estrus and inseminated. This protocol requires three separate trips through the working chute (two for hormone injections and one for AI). In other studies, pregnancy rates (number of pregnant cows/number of cows treated) have exceeded 50%.

The Select Synch protocol was refined further to allow for one fixed-time breeding of beef cows with only three trips through the working chute. Artificial insemination at 48 hr after $PGF_{2\alpha}$ was combined with a second injection of GnRH to induce ovulation; thus, it is referred to as Cosynch. Cosynch studies conducted in Colorado have consistently produced good pregnancy rates (approximately 50%), whereas our results in Kansas field trials were not quite as good (1999 Cattlemen's Day, pg. 61-64). We believe part of the difference is related to the better body condition of their cows. In addition, about 10% of the cows treated with GnRH + $PGF_{2\alpha}$ are observed in heat 1 or 2 days before the $PGF_{2\alpha}$ is administered or 6 to 7 days after the first GnRH injection. To prevent those cows from showing heat prematurely in our studies, we applied either an intravaginal progesterone insert or an implant containing a synthetic progestin (norgestomet; Syncro-Mate-B ear implants) during the 7-day interim between injections.

Our objective was to determine if adding progestin to the Cosynch protocol would enhance pregnancy rates.

Experimental Procedures

In 1998, purebred Simmental, Angus, and Hereford cows were assigned randomly to each of two treatments (Figure 1): 1) cows received (i.m.) 100 µg of GnRH (Fertagyl®; Intervet Inc. Millsboro, DE) followed in 7 days with 25 mg of $PGF_{2\alpha}$ (Lutalyse®; Pharmacia & Upjohn, Kalamazoo, MI), followed by a second injection of Fertagyl and one fixed time insemination (Cosynch) or 2) Cosynch plus one intravaginal progesterone insert (CIDR-B, InterAg, Hamilton, NZ) containing 1.9 g of progesterone during the 7 days between the first injection of Fertagyl and Lutalyse (Cosynch + CIDR).

[1]We acknowledge the assistance of student workers at the KSU Purebred Beef Unit.

Blood samples were collected 10 days before the first Fertagyl injection and at the time of each hormonal injection for progesterone assay. Pregnancy was diagnosed by trans-rectal ultrasound 35 days after the fixed-time insemination.

In 1999, Purebred Simmental, Angus, and Hereford cows were assigned randomly to each of two treatments (Figure 1): 1) cows received (i.m.) 100 µg of GnRH (Cystorelin; Merial Limited, Iselin, NJ), followed in 7 days with 25 mg of $PGF_{2\alpha}$ (Lutalyse), followed in 48 h by a second injection of Cystorelin and one fixed time insemination (Cosynch) or 2) Cosynch plus one 6-mg implant of norgestomet (Syncro-Mate-B ear implants only, Merial, Iselin, NJ) in place during the 7 days between the first injection of Cystorelin and Lutalyse (Cosynch + NORG). Blood samples for progesterone assay were collected 10 days before the first Cystorelin injection and prior to each hormonal injection. Pregnancy was diagnosed by transrectal ultrasound 35 days after the fixed-time insemination.

During 1998, blood serum samples were collected at least 1 hr after CIDR removal to allow progesterone released by the CIDR insert to clear from blood. Samples were assayed for progesterone to determine if cows were cycling or anestrus at the beginning of the breeding season.

Results and Discussion

Results of both experiments are summarized in Table 1. Based on serum progesterone levels, 78% of the cows in 1998 had ovulated at least once prior to the onset of treatments. Of those cows that were still anestrus on day -7, more ($P<0.05$) Cosynch than Cosynch + CIDR cows had high progesterone (≥1 ng/mL) on day 0 (CIDR removal and $PGF_{2\alpha}$ injection). More than 94% of the cows in both treatments had low progesterone prior to the timed insemination. Pregnancy rates tended ($P=0.09$) to be greater in all three breeds of cows receiving the CIDR inserts.

Based on changes in blood progesterone, about 60% of the cows in 1999 had ovulated at least once prior to the onset of treatments. As in 1998, of those cows that were still anestrus on day -7, more ($P<0.05$) Cosynch than Cosynch + NORG cows had high progesterone (≥1 ng/mL) on day 0 (norgestomet implant removal and $PGF_{2\alpha}$ injection). More than 94% of the cows in both treatments had low progesterone prior to the timed insemination. Pregnancy rates were increased ($P<0.01$) by the norgestomet implant even though cycling rates were less than those observed in 1998. Again, pregnancy rates were consistently better in all three breeds of cows.

Our results during 2 years indicate the need for progestin as part of a GnRH + $PGF_{2\alpha}$ ovulation synchronization protocol for suckled cows. Progestin combined with GnRH increased the proportion of cows detected in estrus in earlier experiments and usually increased pregnancy rates whether cows were inseminated after detected estrus or by appointment at 48 to 54 hr after $PGF_{2\alpha}$. In those studies, a second GnRH injection was administered at the time of the appointment insemination.

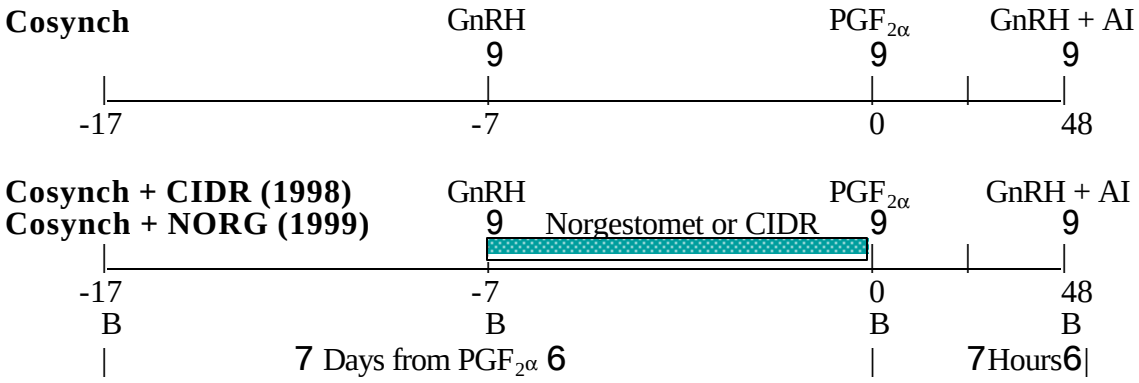

Figure 1. Protocols for Cosynch and Cosynch + NORG (1998) or Cosynch +CIDR (1999; B = blood collection for progesterone analyses; NORG = norgestomet; CIDR = progesterone-impregnated intravaginal insert).

Table 1. Comparison of Cosynch vs. Cosynch + Norgestomet or Cosynch + CIDR in Suckled Beef Cows

	Treatments			
	1998		1999	
Item	Cosynch	Cosynch + CIDR	Cosynch	Cosynch + NORG
No. of cows	92	95	91	92
Cycling by day -7, %	77.0	78.9	60.4	58.7
High progesterone on day 0, %	75.0	59.0[a]	73.6	47.8[a]
Low progesterone at +48 hr, %	94.6	98.9	98.9	94.6
Body condition score on day 0	-	-	4.8	4.6
Average days postpartum on day 0 (range)	71 (26-108)	70 (29-108)	76 (37-103)	78 (37-106)
Pregnancy rates, %	51.1	66.3[a]	30.7	51.1[b]
Breed				
Angus	58.8 (51)	62.2 (53)	37.0 (54)	56.6 (53)
Hereford	30.4 (23)	70.8 (24)	18.7 (16)	31.2 (16)
Simmental	55.6 (18)	72.2 (18)	23.8 (21)	52.1 (23)

[a]Different (P=0.05) from Cosynch within year.

[b]Different (P<0.09) from Cosynch within year.