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J.E. Larson

G.C. Lamb

Jeffrey S. Stevenson

See next page for additional authors

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Abstract

Our objectives were to determine whether a fixed-time artificial insemination (TAI) protocol could yield pregnancy rates similar to a protocol requiring detection of estrus and whether inclusion of a CIDR (a vaginal insert containing progesterone) in protocols using gonadotropin-releasing hormone (GnRH) and prostaglandin F2α(PGF) would enhance fertility. Postpartum suckled beef cows (n = 2,630) from 14 locations were assigned randomly to each of five estrus-synchronization protocols using PGF with GnRH and(or) a CIDR. Protocols were Control, CO-Synch, COSynch+ CIDR, Hybrid-Synch, and Hybrid-Synch+CIDR. The percentage of cows cycling at the initiation of estrus synchronization was 66.8%, the percentage of cycling cows ranging from 38 to 90% among locations. Overall pregnancy among locations ranged from 39% to 67%. Pregnancy rates were greatest for the Hybrid-Synch+CIDR (57.9%) treatment, although not significantly different from the CO-Synch+CIDR (53.6%) and Hybrid-Synch (53.0%) treatments, but greater than the Control (52.3%) and CO-Synch (43.4%), which yielded the poorest pregnancy rates. Overall, the Hybrid-Synch+CIDR protocol (AI after detected estrus for 3 days, and then a clean-up TAI) achieved the greatest pregnancy rates, but CO-Synch+CIDR is a reliable, fixed-time AI protocol that gives producers the option to eliminate

Keywords

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Authors

J.E. Larson, G.C. Lamb, Jeffrey S. Stevenson, T.W. Marston, Sandra K. Johnson, M.L. Day, T.W. Geary, D.J. Kesler, J.M. DeJarnette, and F.N. Schrick

ESTRUS SYNCHRONIZATION OF SUCKLED BEEF COWS BY USING GnRH, PROSTAGLANDIN $F_{2\alpha}$ (PGF), AND PROGESTERONE (CIDR): A MULTI-LOCATION STUDY[1]

J. E. Larson[2], G. C. Lamb[2], J. S. Stevenson, T. W. Marston, S. K. Johnson, M. L. Day[3], T. W. Geary[4], D. J. Kesler[5], J. M. DeJarnette[6], F. N. Schrick[7], and J. D. Areseneau[8]

Summary

Our objectives were to determine whether a fixed-time artificial insemination (TAI) protocol could yield pregnancy rates similar to a protocol requiring detection of estrus and whether inclusion of a CIDR (a vaginal insert containing progesterone) in protocols using gonadotropin-releasing hormone (GnRH) and prostaglandin $F_{2\alpha}$ (PGF) would enhance fertility. Postpartum suckled beef cows (n = 2,630) from 14 locations were assigned randomly to each of five estrus-synchronization protocols using PGF with GnRH and(or) a CIDR. Protocols were Control, CO-Synch, CO-Synch+CIDR, Hybrid-Synch, and Hybrid-Synch+CIDR. The percentage of cows cycling at the initiation of estrus synchronization was 66.8%, the percentage of cycling cows ranging from 38 to 90% among locations. Overall pregnancy among locations ranged from 39% to 67%. Pregnancy rates were greatest for the Hybrid-Synch+CIDR (57.9%) treatment, although not significantly different from the CO-Synch+CIDR (53.6%) and Hybrid-Synch (53.0%) treatments, but greater than the Control (52.3%) and CO-Synch (43.4%), which yielded the poorest pregnancy rates. Overall, the Hybrid-Synch+CIDR protocol (AI after detected estrus for 3 days, and then a clean-up TAI) achieved the greatest pregnancy rates, but CO-Synch+CIDR is a reliable, fixed-time AI protocol that gives producers the option to eliminate detection of estrus.

Introduction

Synchronization of estrus shortens the calving season, increases calf uniformity, and enhances the possibilities for using artificial insemination (AI). The EAZI-BREED CIDR® (CIDR; Pharmacia Animal Health, Kalamazoo, MI) was recently approved by the U.S. Food and Drug Administration for synchronizing estrus in beef cows. The CIDR is a vagi-

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[2]University of Minnesota, Grand Rapids.
[3]Ohio State University, Columbus.
[4]ARS-USDA, Miles City, Montana.
[5]University of Illinois, Champaign.
[6]Select Sires, Inc., Plain City, Ohio.
[7]University of Tennessee, Knoxville.
[8]Purdue University, West Lafayette, Indiana.

nal insert that contains 1.38 g of progesterone, which is gradually released over a period of days, and it can be used effectively with prostaglandin $F_{2\alpha}$ (PGF) with or without gonadotropin-releasing hormone (GnRH) to synchronize estrus or ovulation in beef cows. To enhance the use of estrus synchronization of suckled beef cows by beef producers, systems must reduce time and labor, be user friendly, and obtain satisfactory fertility. The objectives of this study were to determine whether: 1) a TAI protocol could yield pregnancy rates similar to a protocol requiring detection of estrus; and 2) inclusion of a CIDR to GnRH and PGF-based protocols would enhance fertility.

Materials and Methods

Estrus in 2,630 suckled beef cows from 14 locations was synchronized, and artificial insemination occurred after five treatments (Figure 1): 1) cows received a CIDR insert for 7 days, with 25 mg of PGF on the day of CIDR removal, followed by detection of estrus and AI for 84 hours, with any cow not detected in estrus by 84 hours receiving 100 μg of GnRH and a clean-up TAI at 84 hours (**Control**; n = 511); 2) cows received 100 μg of GnRH, followed in 7 days with 25 mg of PGF, followed in 60 hours by a second injection of GnRH and one TAI (**CO-Synch**; n = 551); 3) CO-Synch plus a CIDR during the 7 days between the first injection of GnRH and administration of PGF (**CO-Synch+CIDR**; n = 547); 4) cows received 100 μg of GnRH, followed in 7 days with 25 mg of PGF, followed by detection of estrus and AI for 84 hours, with any cow not detected in estrus by 84 hours receiving 100 μg of GnRH and a clean-up TAI at 84 hours (**Hybrid-Synch**; n = 513); and 5) Hybrid-Synch plus a CIDR during the 7 days between the first injection of GnRH and administration of PGF (**Hybrid-Synch+CIDR**; n = 508).

Pregnancy was diagnosed by transrectal ultrasonography between 30 and 35 days, and again between 80 and 100 days after AI. Clean-up bulls were not introduced until a minimum of 10 days after treatment inseminations.

Blood samples were collected on days –17 and –7 relative to the injection of PGF. Blood serum was analyzed for progesterone concentration to determine cycling status. Body condition scores were assessed on day –17. The statistical model to evaluate pregnancy rates included treatment, location, cycling status, parity, and body condition scores, with days postpartum as a regression variable.

Results and Discussion

Percentage of cows cycling at the initiation of treatments was 66.8% (1,534 of 2,296 cows). Percentages of cycling cows ranged from 38 to 90% among locations. In addition, overall pregnancy rates at days 30 to 35 ranged from 39% to 67% among locations (Figure 2).

The greatest pregnancy rates were achieved by using the Hybrid-Synch+CIDR (57.9%) treatment, although not significantly different from the CO-Synch+CIDR (53.6%) and Hybrid-Synch (53.0%) treatments, but greater than the Control (52.3%) and CO-Synch (43.4%), which yielded the poorest pregnancy rate (Figure 3). Perhaps the lesser pregnancy rate associated with CO-Synch was a result of delaying the TAI to 60 hours compared with previous reports in which timed AI was at 48 hours, and that indicate pregnancy rates between 47 and 52%.

For the protocols in which estrus was detected (Control, Hybrid-Synch, and Hybrid-Synch+CIDR), pregnancy rates for cows inseminated after detected in estrus were 37.1, 40.7, and 44.8%, respectively. Additional cows that conceived after the clean-up TAI at 84 hours enhanced pregnancy rates by 15.2, 12.3, and 13.1 percentage points for Control, Hybrid-Synch, and Hybrid-Synch+CIDR treatments, respectively. These results indicate

the TAI protocol alone would yield greater pregnancy rates than protocols involving a short period of detected estrus without the clean-up TAI.

In addition, the time from PGF injection to detection of estrus, and to AI for those cows exhibiting estrus, was similar among Control (52.6 and 64.0 hours, respectively), Hybrid-Synch (51.4 and 63.6 hours, respectively), and Hybrid-Synch+CIDR (53.5 and 65.2 hours, respectively).

In summary, producers have several good options for synchronization of estrus and AI in suckled cows; the options differ in treatment costs and labor requirements. For a strict fixed-time AI protocol, the CO-Synch+CIDR protocol yielded pregnancy rates greater than 50% at 9 of 14 locations. The treatment that most consistently yielded the greatest pregnancy rates was the Hybrid-Synch+CIDR treatment, with pregnancy rates greater than 50% at 10 of 14 locations.

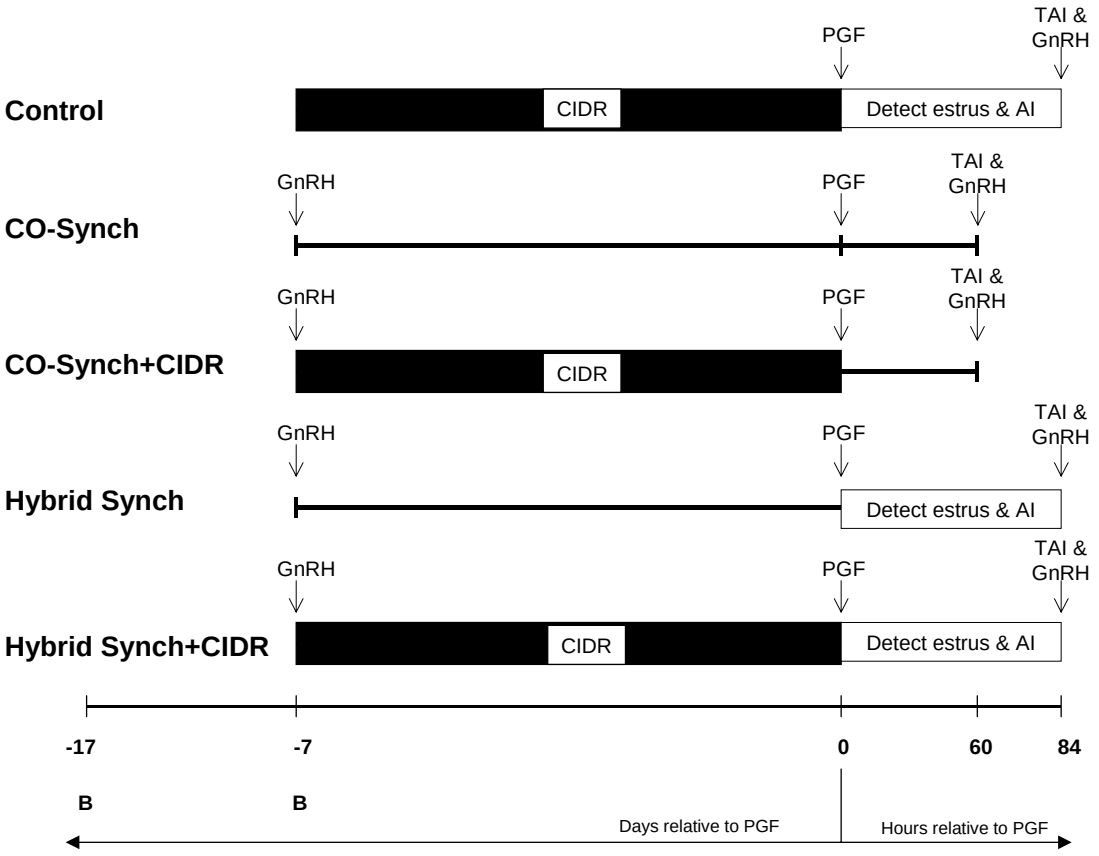

Figure 1. Schematic of Experimental Protocols for Suckled Beef Cows Treated with GnRH, PGF, and a CIDR.

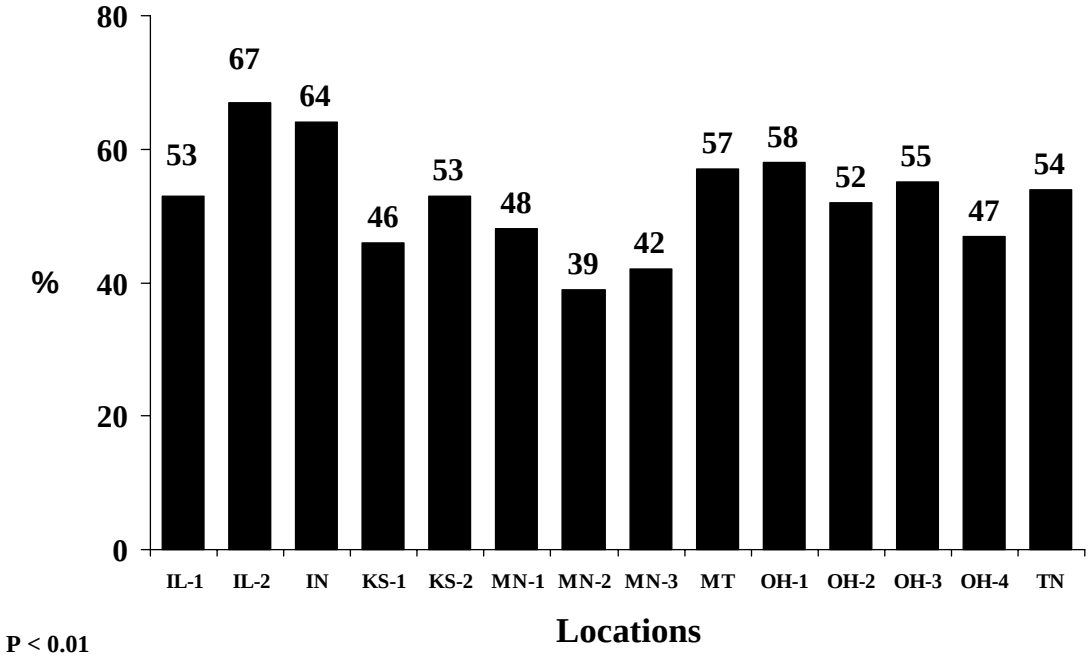

Figure 2. Distribution in Overall Pregnancy Rates Among Locations for Suckled Beef Cows Treated with GnRH, PGF, and a CIDR.

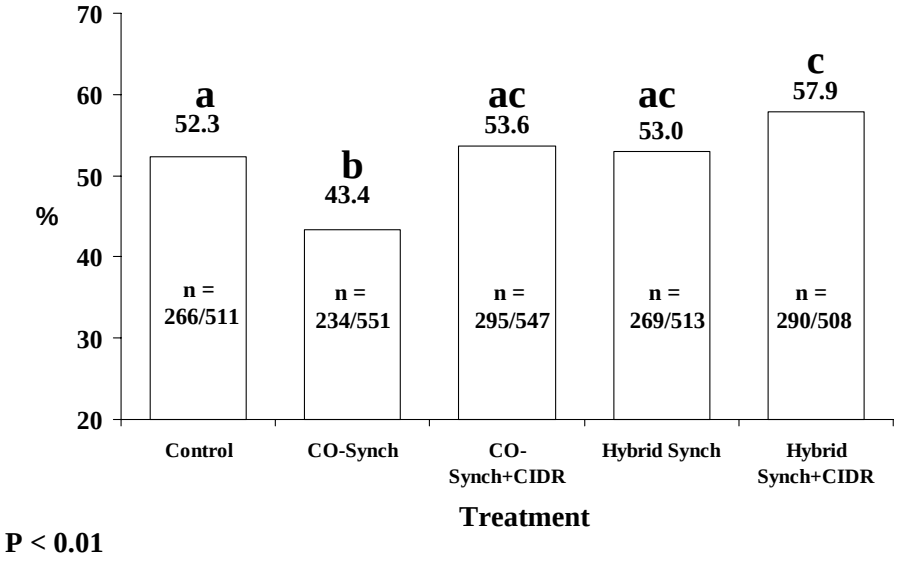

Figure 3. Pregnancy Rates for Suckled Beef Cows Treated with GnRH, PGF, and a CIDR.