Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 589

1995

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D.P. Hoffman

C.L. Krehbiel

R.M. McKee

*See next page for additional authors*

# Pregnancy rates in virgin heifers and suckled beef cows after synchronized ovulation using PGF2", norgestomet, and GnRH


## Abstract

One disadvantage of most estrous synchronization programs is their inability to induce cycling in prepubertal heifers and anestrous suckled beef cows. Suckled cows and virgin heifers were treated with PG F2", norgestomet, and GnRH to induce ovarian cyclicity in prepubertal heifers and anestrous suckled cows as well as to synchronize estrus in cycling females. The treatment consisted of two injections of PGF2" (day -14 and 0) plus 100 Î¼g of GnRH and a 6 mg norgestomet implant on day -7. The implants were removed 24 h after the second injection of PGF2" (day 0). An injection of 100 Î¼g of GnRH was given 30 hours after implant removal. The treatment group was inseminated at estrus or 18 hours after the second injection of GnRH. Pregnancy rate in the treated female s was higher than in the controls that had received PGF injections 14 days 2" apart and were bred at estrus (65.1 vs 48.1%). The treatment also successfully induced a fertile ovulation in previously prepubertal heifers and anestrous cows (treatment vs. control; 67.7 vs 20.0%). We conclude that treating beef cattle with PGF2", norgestomet, and GnRH induced ovarian cyclicity and increased pregnancy rates in prepubertal heifers, anestrus cows, and cycling females.



## Keywords

Cattlemen's Day, 1995; Kansas Agricultural Experiment Station contribution; no. 95-357-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 727; Beef; Prepubertal status; Anestrus; Heifer; Cow; Estrous synchronization





## Authors

D.P. Hoffman, C.L. Krehbiel, R.M. McKee, Jeffrey S. Stevenson, and David A. Nichols

# PREGNANCY RATES IN VIRGIN HEIFERS AND SUCKLED BEEF COWS AFTER SYNCHRONIZED OVULATION USING $PGF_{2\alpha}$, NORGESTOMET, AND GnRH

*D. P. Hoffman, J. S. Stevenson, C. L. Krehbiel, D. A. Nichols, and R. M. McKee*


## Summary

One disadvantage of most estrous synchronization programs is their inability to induce cycling in prepubertal heifers and anestrous suckled beef cows. Suckled cows and virgin heifers were treated with $PGF_{2\alpha}$, norgestomet, and GnRH to induce ovarian cyclicity in prepubertal heifers and anestrous suckled cows as well as to synchronize estrus in cycling females. The treatment consisted of two injections of $PGF_{2\alpha}$ (day –14 and 0) plus 100 µg of GnRH and a 6 mg norgestomet implant on day –7. The implants were removed 24 h after the second injection of $PGF_{2\alpha}$ (day 0). An injection of 100 µg of GnRH was given 30 hours after implant removal. The treatment group was inseminated at estrus or 18 hours after the second injection of GnRH. Pregnancy rate in the treated females was higher than in the controls that had received $PGF_{2\alpha}$ injections 14 days apart and were bred at estrus (65.1 vs 48.1%). The treatment also successfully induced a fertile ovulation in previously prepubertal heifers and anestrous cows (treatment vs. control; 67.7 vs 20.0%). We conclude that treating beef cattle with $PGF_{2\alpha}$, norgestomet, and GnRH induced ovarian cyclicity and increased pregnancy rates in prepubertal heifers, anestrus cows, and cycling females.


(Key Words: Prepubertal Status, Anestrus, Heifer, Cow, Estrous Synchronization.)

## Introduction

Estrous synchronization improves reproductive efficiency by reducing the length of the breeding and calving season and increasing calf weaning weights, because cows calve earlier. However, most estrous synchronization programs do not induce cycling in prepubertal heifers and anestrous suckled beef cows. Treatments that involve single or multiple injections of gonadotropin-releasing hormone (GnRH) given at 10- to 12-day intervals and(or) implants of norgestomet have been used to "jump-start" these acyclic females. The effect of GnRH is to induce LH and FSH release and ovulation of follicles that are of preovulatory size and function. The effect of the norgestomet is to prime the hypothalamic-pituitary axis for the release of endogenous GnRH, LH, and FSH necessary for follicular growth. In both prepubertal heifers and anestrous suckled cows, the norgestomet implant prevents the short luteal phase that follows the first pubertal or postpartum ovulation. That short luteal phase prevents the continuation of pregnancy, even if fertilization occurs.

Therefore, our objective was to determine the effect of a treatment consisting of $PGF_{2\alpha}$, norgestomet, and GnRH on inducing ovarian cyclicity in prepubertal heifers and suckled cows, as well to synchronize estrus in cycling females before one fixed-time insemination.

## Experimental Procedures

Purebred Angus, Hereford, and Simmental heifers and suckled cows were assigned to two treatments: 1) two injections of $PGF_{2\alpha}$ 14 days apart (control); or 2) two injections of $PGF_{2\alpha}$ (days 0 and 14) plus 100 µg of GnRH and a 6 mg norgestomet implanted on day –7 (Figure 1). The implants were removed 24 h after the second injection of $PGF_{2\alpha}$ (day 0). A second injection of 100 µg of GnRH was given 30 h after implant removal. Three blood samples were collected (–21, –14, and –7 days) before the second $PGF_{2\alpha}$ injection to determine cycling status. Control females were inseminated 12 to 16 h (AM-PM rule) after first detected estrus until 80 h after the second $PGF_{2\alpha}$ injection, when all remaining females were inseminated. The females in the treatment group were inseminated either at estrus or at 18 h after the

second injection of GnRH (48 h after implant removal or 72 h after the second $PGF_{2\alpha}$ injection). Pregnancy status was determined at day 34 to 35 postservice by intrarectal ultrasonography.

## Results and Discussion

Pregnancy rate was greater (P<.05) in the treated females than in the controls (65.1 vs 48.1%). No differences in pregnancy rates were detected among breeds or parity groups (heifers, primiparous, and multiparous cows). An interaction (P<.01) occurred between treatment and insemination type. Control and treated females inseminated at estrus had similar pregnancy rates (61.5 vs 62.8%), whereas control and treated females inseminated at a fixed time were markedly different (7.7 vs 66.7%, respectively). An interaction also occurred between treatment and cycling status (P<.05). The treatment successfully induced a fertile ovulation in previously prepubertal heifers and anestrous cows (Table 1). Furthermore, the treatment numerically increased pregnancy rates in all cycling females in each of the parity groups. We conclude that treating beef cattle with $PGF_{2\alpha}$, norgestomet, and GnRH induced ovarian cyclicity and increased pregnancy rates in prepubertal heifers, anestrus cows, and cycling females.

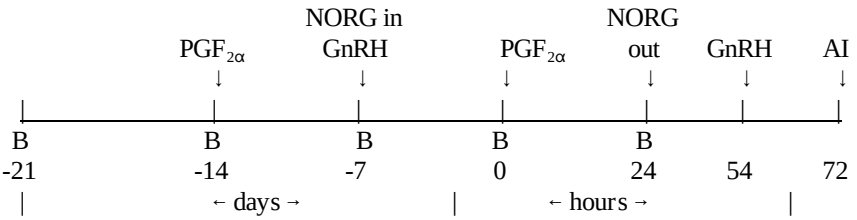


**Figure 1. Treatment Protocol and Blood Sampling (B)**

**Table 1. Pregnancy Rate: Interactions of Treatment and Cycling Status**

| | Treatments [1] | | | |
|---|---|---|---|---|
| | Control-$PGF_{2\alpha}$ | | $PGF_{2\alpha}$/GnRH/NORG/GnRH | |
| Cycling status [2] | No. | % Pregnant [3] | No. | % Pregnant [3] |
| Noncycling | 25 | 20.0 | 31 | 67.7 |
| Heifers | 4 | 0.0 | 5 | 100.0 |
| Primiparous | 4 | 0.0 | 8 | 37.5 |
| Multiparous | 17 | 29.4 | 18 | 72.2 |
| Cycling | 79 | 57.0 | 75 | 64.0 |
| Heifers | 32 | 56.2 | 32 | 59.4 |
| Primiparous | 17 | 58.8 | 14 | 64.3 |
| Multiparous | 30 | 56.7 | 29 | 69.0 |

[1]Cows in the control-$PGF_{2\alpha}$ treatment received two injections of $PGF_{2\alpha}$ 14 d apart. Cows in the $PGF_{2\alpha}$/GnRH/NORG/GnRH treatment received two $PGF_{2\alpha}$ injections as controls plus 100 µg of GnRH 7 d before the second injection of $PGF_{2\alpha}$ when 6 mg of norgestomet was implanted. Implants were removed 24 h after the second injection of $PGF_{2\alpha}$. An injection of 100 µg of GnRH was administered 30 h after implant removal. [2]When concentration of progesterone in serum on days -21, -14, and/or –7 (second injection of $PGF_{2\alpha}$) exceeded 1 ng/mL, estrous cycles were assumed to have been established; otherwise, heifers were defined to be prepubertal and cows to be anestrous. [3]Based on ultrasonically determined presence of uterine fluid and embryo on day 34 or 35 postservice.