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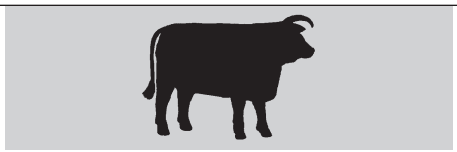

Cloprostenol sodium and dinoprost tromethamine result in similar artificial insemination pregnancy rates in *Bos taurus*, *Bos indicus*, and *Bos indicus* × *Bos taurus* cattle synchronized with a Select Synch and CIDR plus timed–artificial insemination protocol

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ABSTRACT

Two experiments were conducted to evaluate breed [Angus (AN), Brahman (BR), and varying percentages of BR × AN breeding] and prostaglandin $F_{2\alpha}$ (PGF) type [dinoprost tromethamine (dinoprost) vs. cloprostenol sodium (cloprostenol)] in suckled cows (Exp. 1; n = 504) and 2-yr-old virgin heifers (Exp. 2; n = 309) synchronized with a Select Synch + controlled intravaginal drug-releasing insert and timed-AI protocol (SSCT). On d −7, cows and heifers received gonadotropin-releasing hormone and controlled intravaginal drug-releasing inserts. At controlled intravaginal drug-releasing insert removal (d 0), cows were stratified by BCS, days postpartum, parity, and breed; heifers were stratified by BCS and breed. In both experiments cattle were randomly allotted to receive either dinoprost (25 mg) or cloprostenol (500 μg). Estrus was detected 3 times per day for 72 h after PGF, and AI was conducted by the am/pm rule. At 72 h after PGF, nonresponders were timed artificially inseminated and received gonadotropin-releasing hormone. The AI pregnancy rates were similar ($P > 0.05$) between PGF treatments in Exp. 1 (51%) and Exp. 2 (46%). In Exp. 1, AN (52%), 1/4 to 3/8 BR (42%), and 1/2 BR (59%) cows had similar AI pregnancy rates, whereas 1/2 BR (59%) had a greater ($P < 0.05$) AI pregnancy rates compared with cows with ≥3/4 BR (41%). In Exp. 2, heifer breed had no effect on AI pregnancy rates. In conclusion, dinoprost and cloprostenol in a SSCT protocol yielded similar AI pregnancy rates in cows and 2-yr-old virgin heifers across all breed types; however, AI pregnancy rates were influenced by breed type in cows but not 2-yr-old virgin heifers.

Key words: artificial insemination,

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Brahman, cattle, estrous synchronization

INTRODUCTION

The gonadotropin-releasing hormone (**GnRH**) + prostaglandin $F_{2\alpha}$ (**PGF**) protocol (Thatcher et al., 1989; Pursley et al., 1995) also known as the Select Synch protocol is an effective synchronization protocol in *Bos taurus* beef cattle (Geary et al., 2000; Dejarnette et al., 2001). However, AI pregnancy rates to this protocol are unacceptable in *Bos indicus* × *Bos taurus* cattle because of a limited estrous response after PGF (Lemaster et al., 2001). The AI pregnancy rates of the Select Synch protocol can be improved by adding a timed-AI + GnRH for cows not exhibiting estrus after PGF (Lemaster et al., 2001). Addition of a controlled intravaginal drug-releasing insert (**CIDR**; Lucy et al., 2001; Larson et al., 2006) to a GnRH + PGF protocol induces estrus in some anestrous cows, which can improve AI pregnancy rates. In *Bos indicus* × *Bos taurus* cows, there are studies evaluating modified Co-Synch + CIDR protocols (Saldarriaga et al., 2007; Zuluaga et al., 2010; Esterman et al., 2016) but limited studies evaluating the Select Synch and CIDR + timed-AI protocol (**SSCT**; Esterman et al., 2016).

There are 2 types of PGF: one is chemically similar to the uterine-derived PGF called dinoprost tromethamine (dinoprost) and the other is the agonist cloprostenol sodium (cloprostenol). The half-life of cloprostenol in the blood stream is approximately 3 h compared with minutes for dinoprost (EMEA, 2004a,b). Cloprostenol and dinoprost appear to have equal effectiveness to synchronize *Bos taurus* cattle (Young and Anderson, 1986; Salverson et al., 2002), but there is limited research in *Bos indicus* and *Bos indicus* × *Bos taurus* cattle. Hiers et al. (2003) reported a 5% numerically greater fixed timed-AI pregnancy rate in *Bos indicus* × *Bos taurus* cows receiving cloprostenol compared with dinoprost in a Select Synch protocol concurrent with melengestrol acetate. There are no definitive reports in suckled cows and heifers of *Bos indicus* and *Bos indicus* × *Bos taurus* evaluating cloprostenol and dinoprost in a SSCT protocol.

Therefore, 2 experiments were conducted to evaluate the effectiveness of cloprostenol compared with dinoprost in a SSCT protocol in suckled cows (Exp. 1) and 2-yr-old virgin heifers (Exp. 2) of Angus, Brahman, and varying percentages of Brahman × Angus breeding.

MATERIALS AND METHODS

All experimental procedures were conducted in accordance with acceptable practices as outlined by the *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching* (FASS, 2010), and animals were handled in accordance with The University of Florida Institutional Animal Care and Use Committee protocol number E821.

Animals, Methods, and Statistical Analysis, Exp. 1

Experiment 1 was conducted over a 3-yr period during the months of February to March at the University of Florida Beef Unit in north central Florida. Three-year-old suckled primiparous (n = 162) and multiparous (n = 342) postpartum cows of varying percentages of Brahman (*Bos indicus*) and Angus (*Bos taurus*) breeding were used, and a physical description of the cows is presented in Table 1. The 6 breed types (Table 2) represented included Angus, Brahman, and different percentages of Brahman × Angus breeding with approximately 3/4 Angus 1/4 Brahman, 5/8 Angus 3/8 Brahman (Brangus), 1/2 Angus 1/2 Brahman, and 3/4 Brahman 1/4 Angus.

On d −7, all cows were administered a CIDR (1.38 g of progesterone CIDR, Zoetis, Florham Park, NJ) and GnRH (100 μg i.m.; Fertagyl, Merck Animal Health, Summit, NJ), and BCS (1 = emaciated, 9 = obese; Wagner et al., 1988) were recorded. On d 0, CIDR were removed and cows were stratified by BCS, days postpartum (**DPP**), and parity and randomly allotted to receive either cloprostenol

Table 1. Physical description of cows in Exp. 1 by year and parity with means and ranges for days postpartum, age, BW, and BCS[1]

Year by parity	n	Mean days postpartum at CIDR[2] insertion (range)	Mean age, yr (range)	Mean BW, kg (range)	Mean BCS (range)
Yr 1					
Primiparous	46	74 (39–95)	3.0	500 (408–626)	5.1 (4.0–6.0)
Multiparous	111	66 (37–97)	6.2 (4–14)	561 (395–707)	5.1 (4.0–6.0)
Yr 2					
Primiparous	64	74 (31–103)	3.0	519 (381–651)	5.2 (4.0–6.5)
Multiparous	114	63 (32–84)	6.1 (4–15)	567 (395–735)	5.1 (3.5–6.5)
Yr 3					
Primiparous	52	72 (29–99)	3.0	519 (381–650)	5.0 (4.0–6.5)
Multiparous	117	56 (29–77)	6.1 (4–16)	562 (416–723)	5.3 (3.5–6.5)

[1]BCS scale 1 to 9 (1 = emaciated and 9 = obese; Wagner et al., 1988).

[2]CIDR = controlled intravaginal drug-releasing insert.