# Effects of Day of Cycle at Initiation of a Select Synch/CIDR + Timed-artificial Insemination Protocol in Suckled Angus and Brangus Cows

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In anestrous cows, synchronized pregnancy rates were similar for Angus and Brangus cows, as well as for cows that ovulated to GnRH on d 0 and cows that failed to ovulate to GnRH on d 0. In estrous cycling cows, day of the estrous cycle at initiation of the Select Synch/CIDR + timed-artificial insemination protocol affected ovulation rate and ovulatory follicle sizes on d 0, estrous response, conception rate, timed-AI pregnancy rate, and synchronized pregnancy rate. Synchronized pregnancy rates were similar for both anestrous and estrous cycling cows, regardless of whether they ovulated to GnRH on d 0 or failed to ovulate to GnRH on d 0 of the synchronization protocol.

**Summary**

*Postpartum Angus (n=37) and Brangus (n=37) cows were used to evaluate cycling status and day of estrous cycle (DOC) effects at initiation of a Select Synch/CIDR + timed artificial insemination (AI) protocol on ovulation rate, follicle development, and pregnancy rates. The experiment was conducted in two phases (phase 1=anestrous, phase 2=estrous cycling). Anestrous cows were selected to have either ovulated to GnRH on d 0 (n=6 Angus, n=6 Brangus) or not ovulated to GnRH on d 0 (n=6 Angus, n=6 Brangus). Estrous cycling cows were pre-synchronized to be d 2, 6, 10, 14, and 18 DOC on d 0 of synchronization (Angus=5; Brangus=5 per DOC group). In phase 1, anestrous cows had similar (P>0.05) ovulatory follicle sizes for Angus (12.7 ± 0.7 mm) and Brangus (13.7 ± 0.7 mm). Total ovulation rate following $PGF_{2\alpha}$ was similar (P>0.05) for Angus (83.3%) and Brangus (91.7%), as well as for cows that ovulated to GnRH (91.7%) and failed to ovulate to GnRH (83.8%). Estrous response (ER) tended (P=0.17) to be greater for Brangus (41.7%) compared to Angus (16.7%). Cows that ovulated to GnRH also tended (P=0.17) to have a greater ER compared to cows that failed to ovulated to GnRH (16.7%). Conception rate (CR) was similar (P>0.05) for Angus (50.0%) and Brangus (40.0%) cows, but cows that ovulated to GnRH (60.0%) tended (P=0.09) to have a greater CR compared to cows that failed to ovulate to GnRH (0.0%). Timed-AI pregnancy rate (TAIPR) was similar (P>0.05) for Angus (30.0%) and Brangus (42.9%), but TAIPR tended (P=0.11) to be greater for cows that failed to ovulate to GnRH (50.0%) compared to cows that ovulated to GnRH (14.3%). Synchronized pregnancy rates were similar (P>0.05) for both Angus (33.3%) and Brangus (41.7%), as well as for cows that ovulated to GnRH (33.3%) and failed to ovulate to GnRH (41.7%). In phase 2, breed had no effect (P>0.05) on ovulation rate to GnRH (Angus=56%; Brangus=52%) and ovulatory follicle size on d 0 (Angus=13.9 ± 1.8 mm; Brangus=14.1 ± 2.4 mm). Day of cycle affected (P<0.05) ovulation rate to GnRH and ovulatory follicle size. Estrous response was greater (P<0.05) for Brangus (48%) compared to Angus (28%), but CR, TAIPR, and SPR were similar (P>0.05) for Angus and Brangus. However, DOC affected (P<0.05) ER, CR, TAIPR, and*

*SPR for DOC groups.*

## Introduction

Inclusion of GnRH at the start of a synchronization protocol causes ovulation of follicles greater than 10 mm in diameter. By ovulating the largest follicle present, the cow will begin a new wave of follicle growth. With a new wave of follicle growth, follicle development can be better synchronized within a group of cows. By synchronizing both follicle development and luteal lifespan (using $PGF_{2\alpha}$), a more synchronous estrus can be achieved following $PGF_{2\alpha}$ administration.

Due to differences in a cow's length of estrous cycle and number of follicular waves, predicting when GnRH will be most effective can be a challenge. GnRH is effective once a dominant follicle reaches 10 mm in diameter and continues until the follicle either ovulates on its own or becomes atretic and regresses in preparation for the next follicular wave. Across all stages of the estrous cycle, it is estimated that 60 to 70% of *Bos taurus* cows will ovulate to GnRH. Cattle of *Bos indicus* breeding are known to frequently have a greater number of follicular waves and more variability to their length of estrous cycle. With greater numbers of follicular waves, the windows of opportunity for GnRH to be effective are shortened. However, recent research from our lab would suggest that ovulation rates in cattle of *Bos indicus* breeding are at or slightly below that of *Bos taurus* cattle.

Therefore, the objectives of this experiment were to: 1) evaluate follicle development following ovulation or no ovulation to GnRH in anestrous Angus and Brangus cows, 2) evaluate luteolysis, estrous characteristics, and pregnancy rates following ovulation or no ovulation to GnRH in anestrous Angus and Brangus cows, 3) determine ovulation rates to GnRH in cycling Angus and Brangus cows known to be on d 2, 6, 10, 14, & 18 of their estrous cycles, and 4) evaluate luteolysis, estrous characteristics, and pregnancy rates following the Select Synch/CIDR + timed-AI protocol in cycling Angus and Brangus cows known to be on d 2, 6, 10, 14, & 18 of their estrous cycles.

## Materials & Methods

The experiment was conducted from March to June of 2007 at the University of Florida, Department of Animal Sciences, Santa Fe Beef Research Unit in two phases (phase 1=anestrous, phase 2=estrous cycling). Postpartum lactating Angus (n=37) and Brangus (n=37) cows were utilized. For the first phase of the experiment, on d -12 and -2 blood samples were collected for the evaluation of progesterone concentrations to determine estrous cycling status. A cow was deemed to have estrous cycles (cycling) if either sample had progesterone concentrations ≥ 1 ng/mL, and anestrous (noncycling) if progesterone concentrations were < 1 ng/mL at both samples. Only cows determined to be anestrous were utilized for the first phase of the experiment. Day 0 was designated as the start of the synchronization protocol. At the start of phase 1 synchronization, Angus and Brangus cows, respectively, were 2 yr of age, body weight 1,038 ± 31 lb and 1,025 ± 31 lb, body condition score (1=emaciated, 9=obese) 5.0 ± 0.1 and 5.2 ± 0.1, and 72.0 ± 4.6 d and 61.5 ± 4.6 d. For phase 2, Angus and Brangus cows, respectively, were 5.3 ± 2.4 y and 3.6 ± 1.1 y of age, body weight 1,192 ± 95 lb and 1,188 ± 139 lb, body condition score 5.3 ± 0.4 and 5.4 ± 0.5, and d postpartum 59.2 ± 2.4 d and 54.7 ± 11.1 d.

In phase 1 (anestrous cows), on d 0 of the experiment, all cows received GnRH (100 µg; i.m., Cystorelin®, Merial) and a new CIDR (1.38 g; Eazi-Breed™ CIDR®, Pfizer Animal Health). On d 2, ovulation status to GnRH was evaluated and cows that ovulated to GnRH (n=6) and cows that failed to ovulate to GnRH (n=6) within each breed group were selected to continue on the experiment. On d 7, the CIDR was removed and cows received $PGF_{2\alpha}$ (25 mg, i.m., Lutalyse®, Pfizer Animal Health).

In phase 2 (estrous cycling cows), cows were pre-synchronized using a 7 d CIDR with $PGF_{2\alpha}$ on d 7 to be on either d 2, 6, 10, 14, or 18 of their estrous cycle (DOC) at the start of synchronization. Following $PGF_{2\alpha}$ in the pre-synchronization, estrous was detected visually with the aid of estrous detection patches (Estrotect™, Rockway, Inc.) and the day each cow displayed estrus was determined to be d 0

of that cow's estrous cycle. Pre-synchronization groups were staggered over several weeks prior to the synchronization in order for all cows to began the synchronization on the same day. On d 0 of synchronization, all cows received GnRH and a new CIDR. On d 7, the CIDR was removed and cows received $PGF_{2\alpha}$.

Following $PGF_{2\alpha}$ in both phases, estrus was monitored using electronic heat detection monitors (HeatWatch®, DDx) for 3 d. Cows were inseminated by a single AI technician 8 to 12 h after declared in estrus by the HeatWatch® system. Cows were inseminated using frozen-thawed semen from multiple sires.

The GENMOD procedure of SAS (SAS Inst. Inc.) was used for the statistical analysis of categorical data. The effect of breed, DOC, and their interaction were evaluated for ovulation rate to GnRH, estrous response, conception rate, timed-AI pregnancy rate, and synchronized pregnancy rate, while cow age, DPP, BCS, and interval from $PGF_{2\alpha}$ to the onset of estrus were included as covariates. The effect of ovulation or no ovulation to GnRH, breed, and interaction were evaluated for estrous response, conception rate, timed-AI pregnancy rate, and synchronized pregnancy rate, while cow age, DPP, BCS, and interval from $PGF_{2\alpha}$ to the onset of estrus were included as covariates. When covariates were significant ($P < 0.05$) they were treated as independent variables. The effect of breed, DOC, and the interaction on follicle diameters were analyzed using GLM procedure of SAS.

**Results**

In phase 1 (anestrous cows), ovulatory follicle size in response to GnRH on d 0 for cows that ovulated was 13.2 ± 0.5 mm. Ovulatory follicle size was similar ($P$>0.05) for Angus (12.7 ± 0.7 mm) and Brangus (13.7 ± 0.7 mm) cows.

Luteal regression was 100% for both Angus and Brangus and cows, as well as 100% for cows that ovulated to GnRH on d 0. Estrous response tended ($P$=0.17) to be greater for Brangus compared to Angus (Table 1). Estrous response also tended ($P$=0.17) to be greater for cows that ovulated to GnRH on d 0 compared to cows that did not ovulate to GnRH on d 0. Interval from $PGF_{2\alpha}$ to the onset of estrus was similar ($P$>0.05) for Angus and Brangus cows. However, cows that ovulated to GnRH on d 0 had a greater ($P$<0.05) interval from $PGF_{2\alpha}$ to the onset of estrus compared to cows that did not ovulate to GnRH on d 0. Duration of estrus tended ($P$=0.06) to be longer for Angus cows compared to Brangus cows, but duration of estrus was similar ($P$>0.05) whether cows ovulated or did not ovulate to GnRH on d 0. The number of mounts received during estrus was similar ($P$>0.05) for Angus and Brangus cows. Cows that ovulated to GnRH on d 0 tended ($P$=0.13) to receive more mounts (34.2) compared to cows that did not ovulate to GnRH (21.5).

Conception rate was similar ($P$>0.05) for Angus and Brangus cows (Table 2). Cows that ovulated to GnRH on d 0 tended ($P$=0.09) to have a greater conception rate (60.0%; 3/5) compared to cows that did not ovulate to GnRH on d 0 (0%; 2/2). Timed-AI pregnancy rate was similar ($P$>0.05) for Angus and Brangus cows (Table 2), but cows that ovulated to GnRH on d 0 tended ($P$=0.11) to have a lower timed-AI pregnancy rate compared to cows that did not ovulate to GnRH on d 0 (14.3%; 1/7 and 50.0%; 5/5, respectively). Synchronized pregnancy rate was similar ($P$>0.05) for Angus and Brangus cows, as well as for cows that ovulated or failed to ovulate to GnRH on d 0 (Table 2).

In phase 2 (estrous cycling), ovulation rate to GnRH on d 0 was similar ($P$>0.05) between Angus and Brangus cows (Table 3). Day of the estrous cycle effected ($P$<0.05) ovulation rate to GnRH. No cows (0/10) that were on d 2 of their estrous cycle at the start of synchronization ovulated to GnRH on d 0. Cows on d 6, 10, 14, & 18 of their estrous cycles had ovulation rates to GnRH of 100, 30, 70 and 70%, respectively. Size of the follicle ovulated to GnRH on d 0 was similar ($P$>0.05) for Angus (13.9 mm) and Brangus (14.1 mm) cows. However, cows on DOC 6 and 14 ovulated smaller ($P$<0.05) follicles to GnRH compared to cows on DOC 10 or 18.

Luteal regression following $PGF_{2\alpha}$ was similar ($P$>0.05) for both Angus (92.0%; 23/25) and Brangus (92.0%; 23/25) cows. Luteolysis was 100% for cows DOC 10, 14, and 18, but was lower ($P$<0.05) for cows DOC 2 and 6 (both 80%). Ovulation rate following $PGF_{2\alpha}$ was similar ($P$>0.05) for Angus (88.0%; 22/25) and Brangus (92.0%; 23/25). Ovulation rate following $PGF_{2\alpha}$ tended ($P$=0.12) to be different between DOC groups with ovulation rates of 70.0, 90.0, 90.0, 100.0, and 100.0% for cows DOC 2, 6, 10, 14, and 18, respectively. Ovulatory follicle size following $PGF_{2\alpha}$ was similar ($P$>0.05) for Angus (15.0 ± 0.6 mm) and Brangus (15.3 ± 0.6 mm) cows. However, DOC tended ($P$=0.06) to effect ovulatory follicle size following $PGF_{2\alpha}$. Ovulatory follicle size following $PGF_{2\alpha}$ was similar ($P$>0.05) for DOC 2 (13.6 ± 0.9 mm), 6 (14.1 ± 0.8 mm), 10 (15.0 ± 0.8 mm), and 14 (15.4 ± 0.8 mm). Ovulatory follicle size was greater ($P$<0.05) for DOC 18 (16.9 ± 0.8 mm) compared to DOC 2 and 4, but was similar ($P$>0.05) to DOC 10 and 14.

Estrous response was greater ($P$<0.05) for cows that ovulated to GnRH on d 0 (48.7%; 19/39) compared to cows that failed to ovulate to GnRH on d 0 (20.0%; 7/35). Estrous response was greater ($P$=0.05) for Brangus compared to Angus cows (Table 4). Estrous response was different ($P$<0.05) for DOC groups. Interval from $PGF_{2\alpha}$ to the onset of estrus was similar ($P$>0.05) for Angus and Brangus cows, but tended ($P$=0.11) to be different for DOC groups. Duration of estrus tended ($P$=0.12) to be greater for Brangus cows (11 h 15 m) compared to Angus cows (8 h 46 m). Duration of estrus was similar ($P$>0.05) for DOC groups. Brangus cows received a greater ($P$<0.05) number of mounts during estrus (53.9) compared to Angus cows (20.3). Number of mounts received during estrus was similar ($P$>0.05) for DOC groups.

Cows that ovulated to GnRH on d 0 (47.4%; 9/19) had similar ($P$>0.05) conception rates compared to cows that failed to ovulate to GnRH on d 0 (57.1%; 4/7). Conception rates were similar ($P$>0.05) for Angus compared to Brangus cows (Table 5). Conception rate was effected ($P$<0.05) by DOC. Timed-AI pregnancy rates were similar ($P$>0.05) for Angus and Brangus cows. Timed-AI pregnancy rate was effected ($P$<0.05) by DOC. Cows that failed to ovulate to GnRH on d 0 (42.9%; 12/28) tended ($P$=0.09) to have a greater timed-AI pregnancy rate compared to cows that ovulated to GnRH on d 0 (20.0; 4/20). Synchronized pregnancy rate was similar ($P$>0.05) for Angus and Brangus cows. Cows 2, 6, and 18 DOC had similar ($P$>0.05) synchronized pregnancy rates, but were lower ($P$<0.05) compared to cows 10 and 14 DOC. However, cows 10, 14, and 18 DOC were similar ($P$>0.05) to each other. Synchronized pregnancy rates were similar ($P$>0.05) for cows that ovulated to GnRH on d 0 (33.3%; 13/39) and cows that failed to ovulate to GnRH on d 0 (45.7%; 16/35).

In conclusion, DOC when a Select Synch/CIDR + timed-AI synchronization protocol is initiated affected ovulation rates to GnRH and ovulatory follicle size to GnRH on d 0. Cows that ovulated to GnRH on d 0 and cows that failed to ovulate to GnRH on d 0 had similar synchronized pregnancy rates. Estrous response, conception rate, timed-AI pregnancy rate, and synchronized pregnancy rate were influenced by DOC.

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**Table 1.** Effect of breed and ovulation status to GnRH on d 0 (OVGnRH) on estrous characteristics following $PGF_{2\alpha}$ in anestrous Angus and Brangus cows synchronized with a Select Synch + CIDR and timed-AI synchronization protocol.[a]

| Variable | n | Estrous response, %[b] | Interval from $PGF_{2\alpha}$ to onset of estrus (hr, min)[c] | Duration of estrus (hr, min)[d] | Total mounts during estrus[e] |
|---|---|---|---|---|---|
| Angus | 12 | 16.7 (12) | 49 h 5 m ± 3 h 44 m | 16 h 20 m ± 3 h 53 m | 32 ± 7.6 |
| Brangus | 12 | 41.7 (12) | 49 h 6 m ± 2 h 21 m | 5 h 21 m ± 2 h 27 m | 30 ± 4.8 |
| OV to GnRH | 12 | 41.7 (12) | 51 h 16 m ± 1 h 30 m | 6 h 8 m ± 3 h 1 m | 34.2 ± 3.8 |
| No OV to GnRH | 12 | 16.7 (12) | 43 h 40 m ± 2 h 22 m | 14 h 20 m ± 4 h 46 m | 21.5 ± 6.0 |
| P values | | | | | |
| Breed | | P = 0.17 | P > 0.05 | P = 0.06 | P > 0.05 |
| OVGnRH | | P = 0.17 | P = 0.04 | P > 0.05 | P = 0.13 |
| Breed × OVGnRH | | P > 0.05 | P > 0.05 | P = 0.04 | P > 0.05 |

[a] All cows received GnRH at initiation of the 7 d CIDR treatment, with $PGF_{2\alpha}$ administered at the time of CIDR removal. Estrus was detected for 3 d, and cows that exhibited estrus were AI approximately 8 to 12 h later. Cows which had not displayed estrus were timed-AI at 76 to 80 h and given GnRH.

[b] Percentage of cows displaying estrus 3 d after $PGF_{2\alpha}$ of the total treated.

[c] Time from $PGF_{2\alpha}$ administration to the first mount of estrus, as determined by HeatWatch®.

[d] Time from the first mount of estrus to the last mount of estrus, as determined by HeatWatch®.

[e] Total mounting events which occurred during estrus, as determined by HeatWatch®.

**Table 2**. Effect of breed and ovulation status to GnRH on d 0 (OVGnRH) on estrous response, conception, timed-AI pregnancy, and synchronized pregnancy rates following $PGF_{2\alpha}$ in anestrous Angus and Brangus cows synchronized with a Select Synch + CIDR and timed-AI synchronization protocol.[a]

| Variable | n | Estrous response, %[b] | Conception rate, %[c] | Timed-AI pregnancy rate, %[d] | Synchronized pregnancy rate, %[e] |
|---|---|---|---|---|---|
| Angus | 12 | 16.7 (12) | 50.0 (12) | 30.0 (10) | 33.3 (12) |
| OV to GnRH | 6 | 16.7 (6) | 100.0 (1) | 0.0 (5) | 16.7 (6) |
| No OV to GnRH | 6 | 16.7 (6) | 0.0 (1) | 60.0 (5) | 50.0 (6) |
| Brangus | 12 | 41.7 (12) | 40.0 (5) | 42.9 (7) | 41.7 (12) |
| OV to GnRH | 6 | 66.7 (6) | 50.0 (4) | 50.0 (2) | 50.0 (6) |
| No OV to GnRH | 6 | 16.7 (6) | 0.0 (1) | 40.0 (5) | 33.3 (6) |
| P values | | | | | |
| Breed | | P = 0.17 | P > 0.05 | P > 0.05 | P > 0.05 |
| OVGnRH | | P = 0.17 | P = 0.09 | P = 0.11 | P > 0.05 |
| Breed × OVGnRH | | P > 0.05 | P > 0.05 | P = 0.06 | P = 0.19 |

[a] All cows received GnRH at initiation of the 7 d CIDR treatment, with $PGF_{2\alpha}$ administered at the time of CIDR removal. Estrus was detected for 3 d, and cows that exhibited estrus were AI approximately 8 to 12 h later. Cows which had not displayed estrus were timed-AI at 76 to 80 h and given GnRH.

[b] Percentage of cows displaying estrus 3 d after $PGF_{2\alpha}$ of total treated.

[c] Percentage of cows pregnant to AI of the total that exhibited estrus and were AI.

[d] Percentage of cows pregnant to timed-AI of the total that were timed-AI.

[e] Percentage of cows pregnant during the synchronized breeding of the total treated.

**Table 3.** Effect of breed and day of estrous cycle on ovulation rates to GnRH and ovulatory follicle size (LS mean ± SE) in estrous cycling Angus and Brangus cows synchronized with a Select Synch + CIDR and timed-AI synchronization protocol.[a]

| Variable | n | Follicles ovulating to GnRH, %[b] | Ovulatory follicle size, mm, (range)[c] |
|---|---|---|---|
| Angus | 25 | 56.0 (25) | 13.9 ± 0.6 (11 to 17) |
| Brangus | 25 | 52.0 (25) | 14.1 ± 0.6 (10 to 18) |
| d 2 | 10 | 0.0 (10) | . |
| d 6 | 10 | 100.0 (10) | 13.2 ± 0.6 (11 to 17)[d] |
| d 10 | 10 | 30.0 (10) | 15.7 ± 1.0 (14 to 17)[e] |
| d 14 | 10 | 70.0 (10) | 12.7 ± 0.7 (10 to 14)[d] |
| d 18 | 10 | 70.0 (10) | 15.6 ± 0.7 (14 to 18)[e] |
| P values | | | |
| Breed | | P > 0.05 | P > 0.05 |
| DOC | | P < 0.05 | P < 0.05 |

[a] All cows received GnRH at initiation of the 7 d CIDR treatment, with $PGF_{2\alpha}$ administered at the time of CIDR removal. Estrus was detected for 3 d, and cows that exhibited estrus were AI approximately 8 to 12 h later. Cows which had not displayed estrus were timed-AI at 76 to 80 h and given GnRH.

[b] Percentage of cows that ovulated to GnRH on d 11 divided by the total treated.

[c] Size of the largest follicle on d 0 that ovulated by 48 h later.

[d,e] Means without a common superscript within a column differ (P<0.05).

**Table 4.** Effect of breed and day of estrous cycle on estrous characteristics as determined by HeatWatch® of estrous cycling Angus and Brangus cows synchronized with a Select Synch + CIDR and timed-AI synchronization protocol.[a] With the exception of estrous response estrous characteristics are presented as LS means ± SE.[a]

| Variable | n | Estrous response, %[b] | Interval from $PGF_{2\alpha}$ to onset of estrus (hr, min)[c] | Duration of estrus (hr, min)[d] | Total mounts during estrus[e] |
|---|---|---|---|---|---|
| Angus | 25 | 28.0 (25) | 49 h 2 m ± 3h 39 m | 8 h 46 m ± 1 h 14 m | 20.3 ± 10.4 |
| Brangus | 25 | 48.0 (25) | 54 h 26 m ± 2h 47 m | 11 h 15 m ± 57 m | 53.9 ± 8.0 |
| d 2 | 10 | 0.0 (10)[f] | . | . | . |
| d 6 | 10 | 10.0 (10)[g] | 64 h 24 m ± 8h 48 m[f,g] | 12 h 15 m ± 3 h 28 m | 30.0 ± 31.8 |
| d 10 | 10 | 30.0 (10)[g,h] | 62 h 20 m ± 5h 5 m[f] | 11 h 38 m ± 2 h 0 m | 61.7 ± 18.3 |
| d 14 | 10 | 60.0 (10)[h,i] | 50 h 2 m ± 3h 35 m[f,g] | 11 h 18 m ± 1 h 25 m | 49.7 ± 13.0 |
| d 18 | 10 | 90.0 (10)[i] | 49 h 26 m ± 2h 56 m[g] | 9 h 3 m ± 1 h 9 m | 30.7 ± 10.6 |
| P values | | | | | |
| Breed | | P = 0.05 | P > 0.05 | P = 0.12 | P < 0.05 |
| DOC | | P < 0.01 | P = 0.11 | P > 0.05 | P > 0.05 |

[a] All cows received GnRH at initiation of the 7 d CIDR treatment, with $PGF_{2\alpha}$ administered at the time of CIDR removal. Estrus was detected for 3 d, and cows that exhibited estrus were AI approximately 8 to 12 h later. Cows which had not displayed estrus were timed-AI at 76 to 80 h and given GnRH.

[b] Percentage of cows displaying estrus 3 d after $PGF_{2\alpha}$ of the total treated.

[c] Time from $PGF_{2\alpha}$ administration to the first mount of estrus, as determined by HeatWatch®.

[d] Time from the first mount of estrus to the last mount of estrus, as determined by HeatWatch®.

[e] Total mounting events which occurred during estrus, as determined by HeatWatch®.

[f,g,h,i] Means without a common superscript within a column differ (P<0.05).

**Table 5.** Effect of breed and day of estrous cycle on estrous response and pregnancy rates in cycling Angus and Brangus cows synchronized with a Select Synch + CIDR and timed-AI synchronization protocol.[a]

| Variable | n | Estrous response, %[b] | Conception rate, %[c] | Timed-AI pregnancy rate, %[d] | Synchronized pregnancy rate, %[e] |
|---|---|---|---|---|---|
| Angus | 25 | 28.0 (25) | 57.1 (7) | 38.9 (18) | 44.0 (25) |
| Brangus | 25 | 48.0 (25) | 50.0 (12) | 23.1 (13) | 36.0 (25) |
| d 2 | 10 | 0.0 (10) | 0.0 (0) | 10.0 (10) | 10.0 (10)[f] |
| d 6 | 10 | 10.0 (10) | 100.0 (1) | 11.1 (9) | 20.0 (10)[f] |
| d 10 | 10 | 30.0 (10) | 100.0 (3) | 57.1 (7) | 70.0 (10)[g] |
| d 14 | 10 | 60.0 (10) | 33.3 (6) | 100.0 (4) | 60.0 (10)[g] |
| d 18 | 10 | 90.0 (10) | 44.4 (9) | 0.0 (1) | 40.0 (10)[f,g] |
| P values | | | | | |
| Breed | | P = 0.14 | P > 0.05 | P > 0.05 | P > 0.05 |
| DOC | | P < 0.05 | P < 0.05 | P < 0.05 | P < 0.05 |

[a] All cows received GnRH at initiation of the 7 d CIDR treatment, with $PGF_{2\alpha}$ administered at the time of CIDR removal. Estrus was detected for 3 d, and cows that exhibited estrus were AI approximately 8 to 12 h later. Cows which had not displayed estrus were timed-AI at 76 to 80 h and given GnRH.

[b] Percentage of cows displaying estrus 3 d after $PGF_{2\alpha}$ of total treated.

[c] Percentage of cows pregnant to AI of the total that exhibited estrus and were AI.

[d] Percentage of cows pregnant to timed-AI of the total that were timed-AI.

[e] Percentage of cows pregnant during the synchronized breeding of the total treated.

[f,g] Means without a common superscript within a column differ (P<0.05).