Comparison between the 5-Day Cosynch and 7-Day estradiol-based protocols for synchronization of ovulation and timed artificial insemination in beef suckled cows

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The objective was to compare pregnancy per artificial insemination (AI) and follicular dynamics in beef suckled cows using either 7-Day estradiol-based protocol or the 5-Day Cosynch for timed artificial insemination (TAI) during four breeding seasons. We hypothesized that pregnancy per AI would be higher with the 5-Day Cosynch protocol and, that estrous cycle status, days postpartum (DPP), fat depth and plasma progesterone would modify this effect. Every year since 2014, cows with more than 30 DPP were randomly assigned into two treatment groups. Cows in the 7-Day estradiol-based group (n = 428) received 2.5 mg of estradiol benzoate and a 0.5 g progesterone intravaginal device (PID) on Day -9, PID removal, 0.125 mg of cloprostenol and 0.5 mg of estradiol cipionate on Day -2 and TAI 48 h later (Day 0). Cows in the 5-Day Cosynch group (n = 428) received 100 μg of GnRH and a 0.5 g PID on Day -8, PID removal and 0.125 mg of cloprostenol on Day -3, a second dose of cloprostenol on Day -2, and 100 μg of GnRH and TAI on Day 0. On Day -9, estrous cycle status (cyclic or anestrus) based on clinical signs at per rectum palpation and ultrasonography of the genital tract was recorded. In a subset of cows (N = 79) the size of dominant follicle was determined between Day - 2 and Day 0 using transrectal ultrasonography of the ovaries. In a subset of cows (N = 340), DPP, fat depth (mm) and plasma progesterone concentration (ng/mL) were obtained on Day – 9. Pregnancy per AI was determined by per rectum ultrasonography of the uterus on Day 30 after TAI. Pregnancy per AI was higher for cows in the 5-Day group than for cows in the 7-Day group (50.9 % vs. 41.3 %, P = 0.01) and was also higher for cyclic cows than for cows in anestrus (54.3 % vs. 33.2 %, P < 0.0001). There was also a significant effect of breeding season (P = 0.0002), sire (P = 0.03) and an interaction between treatment group by breeding season (P = 0.03). The dominant follicle was larger for the cows in the 5-Day group (10.1 ± 0.19 mm) than in the 7-Day group (8.9 ± 0.18 mm, P = 0.01), and there was also an effect of day (P < 0.0001). In the subset of cows were DPP, fat depth and plasma progesterone concentration were obtained on Day – 9, pregnancy per AI was higher for cows in the 5-Day group than in the 7-Day group (44.0 % vs. 30.8 %, P = 0.006), higher for cows with ≥ 55 DPP (47.0 % vs. 29.6 %, P = 0.001), higher for cows with fat depth ≥ 0.50 mm (44.7 % vs. 29.7 %) and higher for cows with high (≥ 1 ng/mL) plasma progesterone concentration (47.2 % vs. 28.7 %, P = 0.01). There was also an interaction between breeding season and treatment group (P = 0.002) and a tendency for interaction between treatment group and plasma progesterone concentration (P = 0.07). In cows with high plasma progesterone concentration, pregnancy per AI was higher for cows in the 5-Day group (60.5 %) compared to cows in the 7-Day group (34.9 %), but there was no difference in cows with low plasma progesterone. In conclusion, pregnancy per AI was higher for cows in the 5-Day group. The increase in pregnancy per AI with the 5-Day protocol was greater when plasma progesterone concentration at initiation of the treatment was higher than 1 ng/mL.

Keywords: Beef suckled cows, artificial insemination, synchronization, ovulation, pregnancy