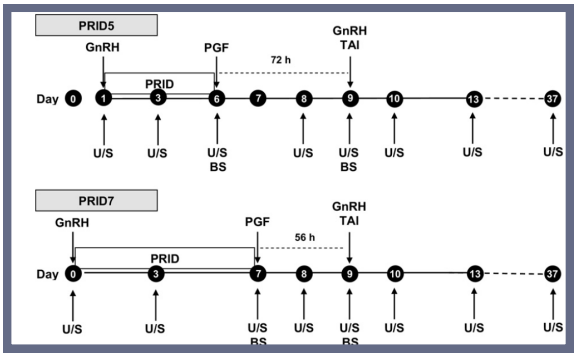
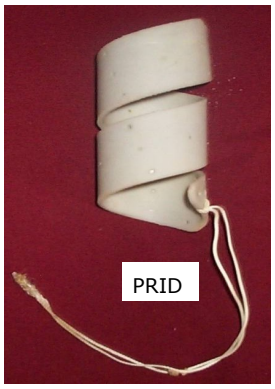
Simplifying the Cosynch Protocol While Achieving Acceptable Pregnancy Rates in heifers

The Cosynch protocol is a modified ovulation synchronization protocol which involves an initial dose of gonadotropin-releasing hormone (GnRH), followed by prostaglandin F2α (PGF) 7 days later, and then a second dose of GnRH approximately 3 days later at the same time as artificial insemination (AI). This method reduces the number of handling events, but has been shown to decrease pregnancy rates in heifers. However, adding intravaginal progesterone-releasing devices (PRID) to the protocol and shortening the length of the protocol has shown promise in improving these rates.



Experiment 1 procedure

In our first experiment, 64 heifers were fitted with a PRID on the same day as the first GnRH treatment. Half had the PRID removed after 5 days; the others had their PRID removed after 7 days (see figure at left). PGF was given at the same time as PRID removal in all heifers. The 5-day group was inseminated 72 hours afterwards whereas the 7-day group was inseminated 56 hours after PRID removal.



Our second experiment investigated the necessity of the first GnRH injection in the same 5-day protocol that was used in the first study. Twenty-eight heifers received GnRH at the time of PRID insertion; 28 did not. All received a single PGF treatment at PRID removal and a second GnRH treatment concurrently with AI 72 hours later. Ultrasonography was used regularly to determine ovarian responses to the various treatments and also to confirm pregnancy 28 days after AI.

5-day and 7-day Cosynch protocols resulted in similar pregnancy rates

The percentage of heifers that ovulated (released an egg) in response to the first GnRH treatment did not differ between the two protocols; it was 32% overall.

Overall pregnancy rate at 28 days did not differ between the experimental groups (59 and 58% for the 5-day and 7-day group, respectively). However, stage of estrous cycle at PRID insertion did influence pregnancy rates: those initially in diestrus (the period when the corpus luteum is producing progesterone) were more likely to become pregnant.

Pregnancy rates were highest in heifers ovulating within 24 hours before or after AI

Although the 5-day group experienced more ovulations (27 versus 10%) within 24 hours before AI, due to the longer period of time between PRID removal and AI (72 hours vs. 56 in the 7-day group), these did not decrease fertility.

More heifers in the 5-day Cosynch group ovulated within the 24 hours before or after AI than in the 7-day group; those that ovulated within this timeframe in either group experienced a 75% pregnancy rate, compared to only 50% in those that did not. Therefore, the 5-day Cosynch + PRID protocol may potentially improve pregnancy rates by increasing the proportion of heifers ovulating within this desired timeframe.

The first GnRH treatment did not affect pregnancy rates

Results from our second experiment indicated that pregnancy rates between the heifers given GnRH at the time of PRID insertion and those that did not receive GnRH were not significantly different (68 versus 71%). These results suggest that the initial GnRH injection is probably unnecessary in a 5-day Cosynch protocol plus a PRID. This GnRH treatment is meant to trigger ovulation and the emergence of a new wave of follicles; however, heifers that did not ovulate in response to the first GnRH actually had a greater pregnancy rate in our study.

3-day long proestrus phases resulted in higher probability of pregnancy

Heifers with a 3-day long proestrus ovulated between 72 and 96 hours after PRID removal/ PGF treatment had a predicted probability of pregnancy of 80%. The predicted probability of pregnancy was lower when proestrus was either shorter or longer than 3 days.

Conclusions

A 5-day Cosynch protocol combined with a PRID led to pregnancy rates comparable with a 7-day protocol. Furthermore, the 5-day protocol may be beneficial in increasing the proportion of heifers that ovulate before or within 24 hours after AI; these heifers, regardless of treatment group, had greater pregnancy rates. The first GnRH treatment in the 5-day Cosynch + PRID can be avoided without adverse effects on fertility.

Acknowledgements

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Source article:

Colazo, M. G. and D.J. Ambrose. *Neither duration of progesterone insert nor initial GnRH treatment affected pregnancy per timed-insemination in dairy heifers subjected to a Co-synch protocol.* 2011. Theriogenology 76:578-588.