

Final Report Review

Project Title: Ability of fixed time resynchronization in beef cattle to decrease costs and increase production efficiency

Principal Investigators: Dr. George A. Perry Dr. Julie Walker

Co-investigators: None

Primary institution: South Dakota State University

Award Amount: \$17,000

Reviewer: Dr. James Russell

Date: April 3, 2019

Project Objectives:

- In proposal:
 - To develop a resynchronization fixed-time AI method to inseminate beef cows/heifers that will increase the proportion of animals conceiving to AI during the first month of the breeding season.
- In report:
 - To evaluate the necessity of a controlled internal drug releasing device (CIDR) in a fixed-time AI resynchronization protocol.

Project Results:

- The use of a CIDR in this resynchronization protocol increased estrus expression, but decreased CL number and had no effect on follicle diameter or overall pregnancy success. Thus, a CIDR is not needed in this resynchronization protocol.
- Overall, 40% to 95% of animals conceived to AI in a 30-day breeding season with no estrus detection. Thus, in well managed herds that have good first service conception rates, two rounds of fixed-time AI can result in the majority of animals becoming pregnant in a 30-day breeding season with no estrus detection or cleanup bulls.
- Through the purchase of some animals, 4 herds in this study were exposed to BVDV during the breeding season. Even though all these herds were previously vaccinated, BVDV exposure still had a negative effect on both first service AI conception rate (20% decrease) and overall breeding season pregnancy success (10% decrease)

Final Report Summary

Nontechnical Summary:

Title: Ability of fixed-time resynchronization in beef cattle to decrease costs and increase production efficiency.

Lead Project Directors:

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The objective of this study was to evaluate the necessity of a controlled internal drug releasing device (CIDR) in a fixed-time AI resynchronization protocol. Beef cows and heifers from eight herds were inseminated using the 7-day CO-Synch+CIDR protocol (n = 1,058). On day 21 following the first insemination, the protocol was repeated, with animals either receiving a CIDR or no-CIDR. Pregnancy status was determined on day 28 by transrectal ultrasonography and the IDEXX Rapid Visual Pregnancy Test. Non-pregnant animals by both methods (n = 567) received an injection of PGF2 α and were inseminated 54 (heifers) or 63 (cows) hours later. Corpora lutea (CL) number and largest follicle diameter (LF) were recorded on a subset of non-pregnant animals (n = 101) from each herd and treatment at time of pregnancy diagnosis. Estrus expression was recorded at time of insemination. Pregnancy status was determined 31-80 days following the second AI. There was a positive effect of treatment on estrus expression with CIDR treated animals having greater expression of estrus (70% CIDR vs. 48% no-CIDR), but no-CIDR treated animals had a better response to the synchronization protocol as evident by the increased number of CL present (1.0 CIDR vs. 1.2 no-CIDR). There was no effect of treatment on follicle diameter (11.8 mm CIDR vs. 11.8 mm no-CIDR). There was no effect of treatment or a treatment by estrus interaction on second service pregnancy success (39% CIDR vs. 33% no-CIDR). However, there was an effect of estrus expression on pregnancy success (45% estrus vs. 26% no estrus). Thus, the use of a CIDR in this resynchronization protocol did not affect overall pregnancy success. Furthermore, resynchronization resulted in over 65% of animals conceiving to AI in a 30-day breeding season with no estrus detection. This can greatly decrease the need for producers to purchase expensive bulls that only breed a few animals each year. It also allows smaller producers to breed heifers to easier calving bulls and cows to higher growth potential bulls without having to purchase multiple bulls. In confined beef operations, the ability to reduce or eliminate bulls greatly increases the safety of these operations, and allows producers to select cows that fit the environment they live in but still allows production of offspring that meet the demands of a high-quality product. Furthermore, with no difference in conception rates between the two protocols, the protocol without a CIDR is more economical for producers (CIDRS cost between \$10 and \$14 a piece, thus the protocol without the CIDR substantially decreases expensive). This project was funded by the Iowa Beef Industry Council.

Impacts

- The use of a CIDR in this resynchronization protocol increased estrus expression, but decreased CL number and had no effect on follicle diameter or overall pregnancy success. Thus, a CIDR is not needed in this resynchronization protocol.
 - The economic impact of not using a CIDR in this protocol is a savings of \$12 to \$15 per animals or a savings of \$1,200 to \$1,500 on a group of 100 animals.
- Overall, 40% to 95% of animals conceived to AI in a 30-day breeding season with no estrus detection. Thus, in well managed herds that have good first service conception rates, two rounds of fixed-time AI can result in the majority of animals becoming pregnant in a 30-day breeding season with no estrus detection or cleanup bulls.
 - Over the past seven years the average price of a herd bull has increased 65% from \$3,031 to \$4,997 [semen cost per service (bull price/30 cows per yr./4 yr.) increased from \$25.26 to \$41.64]. These bulls are not proven industry leaders, and these costs do not include any expenses for annual maintenance of the bull. However, over this same time period the average price increase for a straw of semen has only been 23% (\$17.62 to \$21.72), and these bulls have often been proven as industry leaders for economically important traits. Thus, utilizing this resynchronization method can reduce or even eliminate the need for costly cleanup bulls.

- Through the purchase of some animals, 4 herds in this study were exposed to BVDV during the breeding season. Even though all these herds were previously vaccinated, BVDV exposure still had a negative effect on both first service AI conception rate (20% decrease) and overall breeding season pregnancy success (10% decrease).
 - The impact of BVDV exposure during the breeding season was a 10 to 20% reduction in conception and breeding season pregnancy rates. This would result in not only lost weight from calves being born later, but also lost income from an additional 10% of females being open at the end of the breeding season and not calving during the subsequent calving season.

Conclusions

- The use of a CIDR in this resynchronization protocol increased estrus expression, but decreased CL number and had no effect on follicle diameter or overall pregnancy success. Thus, a CIDR is not needed in this resynchronization protocol.

Deliverables

Refereed journal publications:

Epperson, K.M., J. J. J. Rich, S. Menegatti Zoca, S. D. Perkins, E.J. Northrop, R. F. Daly, J. A. Walker, J. R. Rhoades, and G. A. Perry. Influence of BVDV exposure on AI conception and breeding season pregnancy success in beef herds. In preparation.

Epperson, K.M., J. J. J. Rich, S. Menegatti Zoca, S. D. Perkins, E.J. Northrop, R. F. Daly, J. A. Walker, J. R. Rhoades, and G. A. Perry. Effect of Progesterone Supplementation in a Resynchronization Protocol on Follicular Dynamics and Pregnancy Success. In preparation.

Reviewed abstracts:

Epperson, K.M., J. J. J. Rich, S. Menegatti Zoca, S. D. Perkins, E.J. Northrop, R. F. Daly, J. A. Walker, J. R. Rhoades, and G. A. Perry. 2019. Influence of BVDV exposure on AI conception and breeding season pregnancy success in beef herds. J. Anim. Sci Midwest

Epperson, K.M., J. J. J. Rich, S. Menegatti Zoca, S. D. Perkins, E.J. Northrop, R. F. Daly, J. A. Walker, J. R. Rhoades, and G. A. Perry. 2019. Effect of Progesterone Supplementation in a Resynchronization Protocol on Follicular Dynamics and Pregnancy Success. Biology of Reproduction Annual Meeting

Extension/Outreach publications:

None

Scientific presentations:

The data on the impact of BVDV exposure was presented at the Midwest Section of the American Society of Animal Science Meeting March 11th to 13th, 2019

The data on the resynchronization protocol will be presented at the Society for the Study of Reproduction meeting July 18th to 21st, 2019

Extension/Outreach presentations:

The data on the impact of BVDV exposure was also included in a presentation at the 2019 NCBA Cattleman's College in New Orleans

Podcasts:

None

Other:

None

Personnel Support:

Faculty:

None

Post-doctoral associates:

None

Technicians:

None

Farm labor:

None

Graduate students:

None

Undergraduate students:

None

Other:

None