

Practical Developments for Reproductive Management of Beef Cows

G. C. Lamb, V. Mercadante, G. Marquezini, D. Henry, F. Ciriaco,
N. DiLorenzo¹

¹North Florida Research and Education Center, University of Florida, Marianna, FL

Estrous synchronization (ES) and fixed-timed artificial insemination (TAI) protocols have been developed that yield pregnancy rates similar to protocols requiring detection of estrus (Lamb et al., 2006; Larson et al., 2006). Accordingly, the utilization of ES and TAI has potential to influence the economic efficiency of cow/calf enterprises. Possible outcomes from the combined use of ES and TAI include: shortened calving season, increased calf uniformity, earlier births during the calving season, enhanced preweaning growth, and heavier calves at weaning (Odde, 1990). In three recent publications we determined the following:

1) Equine chorionic gonadotropin (eCG) is a viable alternative to increase follicle growth rate and diameter before TAI. Calf removal was more effective at stimulating a luteinizing hormone (LH) surge and ovulation than eCG, and the combination of both treatments did not have a positive additive effects on fertility. The variability of pregnancy outcomes in response to eCG may be related to the dose and timing of eCG treatment, body condition score (BCS), and days postpartum of the cows. More research is warranted to clarify the effect of eCG in low BCS cows (Marquezini et al., 2013a).

2) Calf removal (CR) increases concentrations of estradiol (E2) after 24 h, and increases growth rate of the dominant follicle from d 0 to 3, but did not increase the diameter of the pre-ovulatory follicle on d 3. However, CR failed to enhance pregnancy rates. Calf performance was negatively affected by CR, and young calves had the greatest weight loss during CR. Young and old calves exposed to CR for 72 hours were lighter on d 63 compared to Control calves. Medium aged calves exposed to CR lost weight during CR, but did not differ in body weight on d 33. Milk production of cows exposed to 48 or 72 h CR was not affected. Therefore, CR had inconsistent results, tending to enhance pregnancy rates in only one location in this

study. In addition CR had a negative impact on subsequent calf performance, which differed depending on age of the calf when exposed to CR (Marquezini et al., 2013b).

3) Until now, no experiment had been conducted that examined the economic outcomes of the management decision to intervene with ES and TAI technologies in commercial cow/calf production. Utilizing a partial budget analysis, we examined the economic implications of the intervention with ES and TAI on the value of weaning weight of exposed cows in commercial cow/calf production. This study explored a sub-sample of the total system of cow/calf production and examined the impact of ES and TAI on increased and decreased returns and costs. Weaning weight of cows exposed to ES and TAI was a major driver of profit. The decision to use ES and TAI affects many parts of the production system and producers can use partial budget analysis as an aid in defining the success of ES and TAI reproductive management program. Based on the results of this study, we developed a mobile application that allows producers to determine whether implementation of ES and TAI would be a viable option in their operations using their own input costs (Rodgers et al., 2012).

References.

- Lamb, G.C., J.E. Larson, T.W. Geary, J.S. Stevenson, S.K. Johnson, M.L. Day, R. P. Ansotegui, D. J. Kesler, J.M. DeJarnette, and D. Landblom. 2006. Synchronization of estrus and artificial insemination in replacement beef heifers using GnRH, PGF_{2α} and progesterone. *J. Anim. Sci.* 84:3000-3009.
- Larson, J. E., G. C. Lamb, J. S. Stevenson, S. K. Johnson, M. L. Day, T. W. Geary, D. J. Kesler, J. M. DeJarnette, F. N. Schrick, A. DiCostanzo, and J. D. Arseneau. 2006. Synchronization of estrus in suckled beef cows for detected estrus and artificial insemination and timed artificial insemination using gonadotropin-releasing hormone, prostaglandin F_{2α}, and progesterone. *J. Anim. Sci.* 84:332-342.
- Marquezini, G.H.L., V.R.G. Mercadante, K.M. Bischoff, T.E. Black, N. DiLorenzo, S.L. Bird, B.J. Funnell, S. I. Klein, C.R. Dahlen, J.E. Larson, G.C. Lamb. 2013. Effects of temporary calf removal prior to fixed-time AI (TAI) on pregnancy rates and subsequent calf performance in suckled beef cows. *J. Anim. Sci.* (published ahead of print: doi:10.2527/jas.2012-5743)
- Marquezini, G. H. L., V. R. G. Mercadante, KC Olson, J. R. Jaeger, G. A. Perry, J. S. Stevenson, and G. C. Lamb. 2013. Equine chorionic gonadotropin influences follicle development and pregnancy rates in suckled beef cows with or without calf removal. *J. Anim. Sci.* (published ahead of print doi:10.2527/jas.2012-5382)
- Rodgers, J. C. *, S. L. Bird, J. E. Larson, N. DiLorenzo, A. DiCostanzo, G. C. Lamb. 2012. An economic evaluation of estrous synchronization and timed artificial insemination in beef cows. *J. Anim. Sci.* 90:4055-4062.