BEEF CATTLE RESEARCH UPDATE

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Effects of Growth-Promoting Implants Administered during the Suckling Phase on Growth, Conception Rates, and Longevity in Replacement Beef Heifers

Growth-promoting implants have been utilized in beef production systems to increase body weight gains and feed efficiency, and are a potential option for increasing efficiency in production systems. A 1997 review of research trials that evaluated the effectiveness of implanting nursing beef calves showed that implanting steer calves with zeranol (Ralgro, Intervet/Merck Animal Health; 23 trials reviewed) or estradiol-progesterone implants (13 trials reviewed) increased average daily gains (ADG) by approximately 0.1 lb/day from the time of implant insertion to weaning.[1] In this review, the gain response in heifers was slightly greater (0.12 to 0.14 lb/day). However, concerns about reproductive performance have limited the use of growth implants in heifer calves that are potential herd placements. Research in the 1997 review showed that heifers implanted at birth had nearly a 40% reduction in later pregnancy rates. However, the average loss in percentage pregnant due to one implant at calf working time (1 to 3 months of age) was quite small. In 13 trials where heifers were implanted with Ralgro, the percent pregnant was reduced by only 0.8%. In 9 trials where heifers were implanted with estradiol-progesterone implants, the percent pregnant was reduced by 3.2%. Heifers implanted multiple times had greater reductions in fertility. These results illustrate the timing of implanting and the number of implants given can impact fertility. Other reviews have also generally concluded that one implant given at or after the heifer is two months of age has little or no impact on future female reproductive performance.[2,3]

Recent New Mexico State University research determined the effects of growth-promoting implants administered during the suckling phase on growth performance, puberty attainment, reproductive efficiency, and survivability in beef heifers developed on native range.[4] These researchers hypothesized that heifers receiving a growth-promoting implant would have increased weaning weights, while having similar overall reproductive efficiency and remain in the herd at a similar rate as control heifers. In this study over a course of 4 years, 161 spring-born Angus-crossbred heifers were used to compare utilization of growth-promoting implants on developing heifers grazing dormant native range at the New Mexico State University Corona Range and Livestock Research Center. The heifers were randomly assigned to one of two treatments at approximately 3 months of age at branding: 1) non-implanted controls or 2) received an estradiol-progesterone implant (Synovex C, Zoetis Animal Health). Heifers were offered supplements as needed after weaning to provide a minimum ADG of 0.20 lb/day. At breeding, estrus was synchronized with fixed-time artificial insemination (AI). Approximately 10 days following the last day of AI, heifers were exposed to bulls for approximately 60 days in years 1 and 2 and 45 days in years 3 and 4.

The effects of the implant administered during the suckling phase on heifer growth and reproductive performance are shown in Table 1. As would be expected, heifers receiving implants were heavier (31 lb, 516 vs. 485 lb; $P < 0.01$) at weaning than control heifers. This weight advantage was maintained through yearling (31 lb) and breeding weights (35 lb). ADG did not differ ($P \geq 0.59$) among treatments from weaning to breeding or yearling to breeding. The proportion of heifers attaining puberty prior to the breeding season was similar ($P = 0.54$) among treatments. Implanted and non-implanted heifers had similar ($P = 0.12$) first-service conception rates. In addition, there was no difference ($P = 0.30$) in overall pregnancy rates between treatments. They noted that "similar reproductive tract scores and pubertal status indicated that implants did not deleteriously impact reproductive development prior to the onset of the breeding season." These researchers also reported that longevity through four calving seasons was not negatively impacted in heifers receiving Synovex C at 3 months of age (Figure 1).

Table 1. Effect of growth-promoting implants administered during the suckling phase on heifer body weight, ADG, and reproductive performance.

Item	Control	Implant	P-value
Number of heifers	79	82	
Body Weight, lb			
Weaning weight	485	516	<0.01
Yearling weight	527	558	<0.01
Breeding weight	589	624	<0.01
ADG, lb/day			
Yearling to breeding	1.10	1.15	0.59
Total[1]	0.46	0.46	0.66
Pubertal, %	64	68	0.54
1st service conception rate, %	45	58	0.12
Overall pregnancy rate, %	97	94	0.30

[1]Heifer ADG from weaning to the start of the breeding season.
Adapted from Rosaco et al., 2018.

These authors concluded that "utilization of growth-promoting implants in beef heifers during the suckling phase (implanted once at about 3 months of age) can increase efficiency through increased weaning weights without causing detrimental effects on reproductive performance of heifers that will potentially be retained as replacement animals." "Furthermore, the additional weight at weaning is advantageous for producers making replacement heifer selection decisions at weaning, providing additional marketing options and potential profit advantages for heifers not retained as replacements."

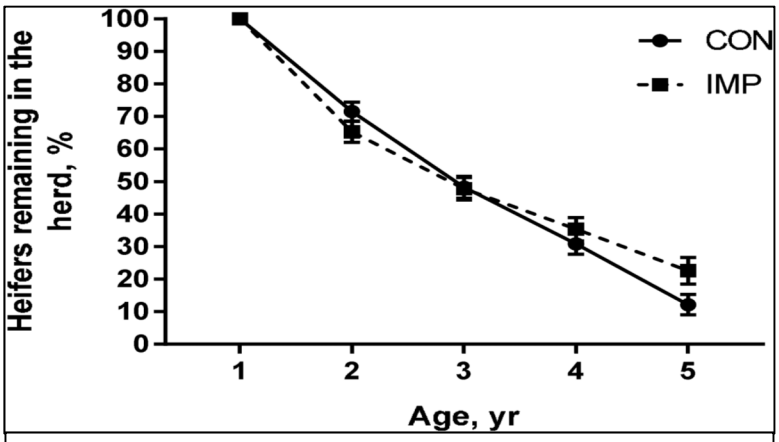

Figure 1. Influence of growth-promoting implant administration at 3 months of age (IMP) or no implant (CON) on herd survival. Similar proportions (P = 0.63) of heifers receiving growth-promoting implants and non-implanted heifers remained in the herd to produce a fourth calf. Adapted from Rosaco et al., 2018.

[1] Selk, G. 1997. Implants for suckling steer and heifer calves and potential replacement heifers. p. 40-50 in: Symposium: Impact of Implants on Performance and Carcass Value of Beef Cattle. Okla. Agric. Exp. Sta., Oklahoma State University, Stillwater.

[2] Hargrove, D. D. 1994. Use of growth promotants in replacement heifers. In: Factors Affecting Calf Crop. ed. M.J. Fields and R. S. Sands. CRC Press. Boca Raton, FL. p. 91-104.

[3] Deutscher, G. H., 1994. Growth promoting implants on replacement heifers--A research review. Proc. Society for Theriogenology Annual Meeting. Kansas City, Mo. pp. 76-85.

[4] Rosasco, S. L., L. H. Schmitz, S. H. Cox, R. C. Dunlap, D. M. Hallford, A. F. Summers, and E. J. Scholljegerdes. 2018. Effects of growth-promoting implants administered during the suckling phase on growth, conception rates, and longevity in replacement beef heifers grazing native range. Transl. Anim. Sci. 2:S180-S184.