

Growth Implants for Suckling and Growing Beef Cattle

Shane Gadberry
Associate Professor -
Animal Science

Introduction

Growth-promoting implants are compressed pellets placed under the skin of the ear. They have been used throughout the United States for more than a quarter of a century to improve rate of gain and feed efficiency in commercial beef cattle. Proper use of implants returns \$20 or more for each \$1 invested.

Mode of Action

To a great extent, animal growth is regulated by the pituitary gland and its secretions of growth hormone (somatotropin). Implants work by increasing (via the pituitary gland) growth hormone and insulin at the cellular level, which results in increased synthesis of muscle tissue and, frequently, reduced deposition of body fat. This causes a measurable increase in growth rate and improved feed efficiency.

Implant Benefits

Implants improve both rate and efficiency of weight gain (Table 1). The response of gaining weight rapidly is greater in animals that have genetic potential and proper management. Therefore, implants complement good management (genetics and feeding) but do not compensate for poor management because of limited responses under poor management conditions.

For optimal benefit, calves should be implanted multiple times during

the growing period when using implants that last approximately 70 days. Alternatively, longer-acting implants that last from 200 to 400 days are available. Added weight gain responses of spring-born suckling calves to reimplanting on farm demonstrations in Arkansas have been minimal. This lack of added response is likely due to reimplanting during a period nursing calves are transitioning from a high-quality milk diet to increased intake from lower-quality, late summer forages.

Table 1. Estimated Response to Implants

Class of Cattle	Expected Improvement	
	Gain	Feed Efficiency
Suckling calves	4%-8%	
Growing cattle	10%-20%	6%-8%
Finishing cattle	15%	8%-10%

Likewise, research has shown that implant response is reduced under limited nutrient intake. In a USDA-ARS study, implanted steers fed a 12 percent CP diet (total crude protein) had a 135 percent greater feed efficiency than implanted steers fed an 8 percent CP diet. In addition, feeding more energy with a low-protein diet did not improve weight gain or feed efficiency. In an implant demonstration with stocker calves in Arkansas during the winter feeding period on wheat straw and limited

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supplementation (2 lb/d), rates of gain did not differ from those of nonimplanted cattle. However, during the spring small-grain grazing period, gains were greater with implanted than nonimplanted cattle.

Implanting Replacement Heifers and Intact Bulls

Some implants are approved for use in replacement heifers. Follow label instructions to avoid negatively affecting future reproductive ability. If planning (well in advance of weaning) to retain heifers, do not use implants. Although not statistically significant, numerical reductions in pregnancy rates have been observed. Therefore, it may be advantageous to avoid implanting selected

replacement heifers. Alternatively, if undecided about keeping replacement heifers or planning to sell the majority of the female calf crop, it would be advantageous to implant the heifers (Table 2) to improve market weights. Never implant intact bull calves. Implanting intact bull calves is detrimental to reproductive performance.

Delayed Castration Versus Castrating and Implanting

One common misconception in the debate between castrating nursing calves versus leaving them as intact males is that intact males will grow out to a heavier weaning weight. However, testosterone, the hormone produced by the testes, does

Table 2. Implants Approved for Nursing and Stocker Steers and Heifers

Time of Use	Implant	Active Ingredient	Anabolic Effect (months)	Heifers	Steers
Birth	Ralgro	Zeranol – 36 mg	2.5-3.5	X ^b	X
	Compudose	Estradiol – 25.7 mg	5.5	X	X
	Encore	Estradiol – 42.9 mg	11	X	X
45 days old	Synovex C	Progesterone – 100 mg Estradiol benzoate – 10 mg	3-4	X ^b	X
	Component E-C ^a	Progesterone – 100 mg Estradiol benzoate – 10 mg	3-4	X ^b	X
400 pounds	Synovex S	Progesterone – 200 mg Estradiol benzoate – 20 mg	3-4		X
	Component E-S ^a	Progesterone – 200 mg Estradiol benzoate – 20 mg	3-4		X
	Synovex H	Testosterone – 200 mg Estradiol benzoate – 20 mg	3-4	X	
	Component E-H ^a	Testosterone – 200 mg Estradiol benzoate – 20 mg	3-4	X	
Pasture cattle	Revalor G	Trenbolone acetate – 40 mg Estradiol – 8 mg	3-4	X	X
	Component TE-G ^a	Trenbolone acetate – 40 mg Estradiol – 8 mg	3-4	X	X

^aComponent brand implants available with Tylan (Tylosin tartrate) pellet.

^bMay be used with replacement heifers. Follow labeled instructions to avoid reproductive failure.

not begin to rapidly increase until near weaning. Researchers at the University of Arkansas observed that calves castrated at birth or left intact had similar weaning weights. Castrated weanling-age male calves will grow at a slower rate than intact male calves because the testes produce a natural steroid, testosterone. Implanted castrated calves recover weight gain lost from castrating. Castrating weanling-age calves results in a reduction in calf performance due to added stress during the receiving period (the first month) for cattle buyers. Freshly castrated shipping-stressed bull calves are two to three times more likely to get sick than shipping-stressed steer calves. Due to the cost of reduced performance and illness, cattle buyers discount bull calves at the sale barn. A survey of the value of Arkansas feeder cattle revealed that bull calves were discounted \$4.60/cwt compared to steer calves. Therefore, castrating and implanting can add value by increasing market weight while avoiding the cost of discounts for intact males.

Implants and Carcass Quality

Since the early 1990s, the beef industry has strived to improve carcass quality (tenderness, flavor, juiciness) to meet consumer demands. During this same period, evaluating the effects of implanting on carcass quality has been emphasized. Studies have shown that implant programs, especially aggressive implant programs, can improve weight gain, feed efficiency, carcass weights and yield grade while reducing the percentage of cattle grading Choice. Research from Colorado State University indicated that two or more implants during a calf's lifetime were sufficient to cause a reduction in marbling and to reduce tenderness.

Although implanting a nursing calf or a weaned stocker calf has the potential to cumulatively affect its future carcass characteristics, cattle producers must also look at what they are getting paid for and what practices can improve their added return on investment. Cow-calf producers selling weaned calves are getting paid for the weight and breed characteristics of the calf, not its specific quality and yield grade. In addition, the cow-calf producer marketing calves at an early age will have no control over the remaining lifetime implant programs and, therefore, should make implanting decisions based on the economics of value from added weight as opposed to strict concerns with carcass quality. Producers in the subsequent stages of the beef cattle production chain will most likely be implanting to improve their return from feeding. Currently, the only reward to cow-calf and stocker producers for not

implanting is obtained by participating in special calf sales that offer potential premiums for cattle on a management protocol that does not include implants. Another implant misconception is buyers discount implanted calves. A survey of prices for previously implanted or nonimplanted calves marketed through Superior Livestock Auction revealed no price difference for implanting.

Implants and Residues

Implants are approved for use by the Food and Drug Administration and have undergone extensive evaluation to ensure meat safety is not compromised. As long as labeled guidelines for use of implant products are followed, beef will remain a safe product. Although estrogenic activity in beef from implanted cattle is slightly increased above nonimplanted cattle, the activity is far less than that contained in other foods. Remember, there is no such thing as "hormone free." Hormones are naturally occurring in both animals and plants.

Proper Procedures for Using Implants

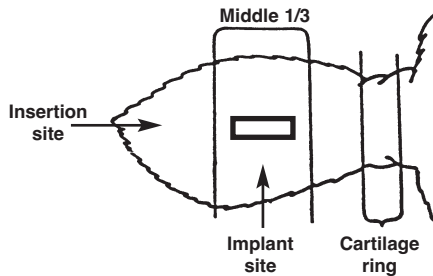
Improper implanting technique may result in implant loss or implant site abscesses that may also lead to implant loss. If implants are lost, the program is ineffective. Industry data (Vetlife) suggests that improper implanting costs the industry \$33 million in lost performance. In a Kansas study, implant site contaminated with diluted fecal material was compared to cleaning and disinfecting the site prior to implanting. Results showed that cattle with abscesses had a lower rate of gain. Because of concerns with losses associated with abscesses, implants that also contain an antibiotic pellet have been developed. Studies with these products have shown a reduction in abscesses, resulting in improved animal performance. The added benefit from using an implant containing an antibiotic pellet may be limited under good chute-side management that allows adequate time for proper site and needle disinfection to minimize abscessing. To assess accurately whether it would be cost effective to use this type of implant, evaluate the occurrence of implant losses likely caused from abscessing because of current implanting practices.

Implanting Technique

1. Properly restrain the animal in a squeeze chute or headgate to allow access to the ear.
2. Disinfect the skin at the implant insertion site.

3. Deposit the implant between the skin and cartilage on the back side of the ear as shown in Figure 1.

Figure 1. Proper Implant Site



4. Check implant placement to ensure adequate implanting.
5. Disinfect the implant needle between applications.

Areas to Avoid During Implanting

Avoid the following when implanting:

- Implanting at the site of an old implant.
- Implanting where an ear tag will be placed.
- Crushing/bunching implants.
- Injuring major blood vessels.

Always read the instructions and follow manufacturer's recommendations on the use of the product. Be especially careful to follow recommendations on correct implant usage, implant replacement and implanting technique.

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SHANE GADBERRY, Ph.D., is associate professor - animal science, University of Arkansas Division of Agriculture, Department of Animal Science, Little Rock.

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