Implant Use in Backgrounding Calves

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Dr. Chip Poland, Area Livestock Specialist, Dickinson R/E Center
Dr. Karl Hoppe, Area Livestock Specialist, Carrington R/E Center,
North Dakota State University

Backgrounding is a common practice in many beef cattle operations in North Dakota. Implanting calves during the backgrounding phase will produce more weight gain and can promote better feed conversion. More pounds of calf gain with less expense can be achieved with well managed implant programs.

Developing an implant use program is important for maximizing animal performance. Implanting lighter-weight feeder calves will require a longer exposure to implants prior to slaughter. Thus, lower potency implants need to be used initially with gradual increases in implant potency with subsequent implants. Higher potency implants can be used in cattle with relatively fewer days on feed prior to slaughter. Medium potency implants are more suited for use in backgrounding calves.

The use of growth-promoting implants has been a common practice in the beef cattle industry for over 30 years. The popularity of implants is sustained by the positive effects of implants on the economics of beef production. Aggressive implant usage has been shown to increase lifetime calf weight gain by 110 pounds, while maintaining or slightly improving post-weaning feed conversion when compared to the performance of non-implanted cattle. The return on investment to implanting is generally positive. Rarely is the return on investment of implant use less than 500 percent ($5 return for each $1 invested), with well managed programs exceeding 1000 percent.

Fall 1996 prices and cattle market conditions have been used to assess the economic value of various implant regimens (Table 1). Although the use of a single implant in feedlot cattle had the highest return per dollar invested, multiple implants provided for more total dollars returned per calf. Aggressive implant programs, i.e. implanting calves from suckling through slaughter, can reduce beef production costs per pound of gain by 6.5 percent. Because of the different types of implants, communication between segments of the cattle industry is needed to successfully manage a coordinated implant program throughout the life of the calf. Trying to maximize the response to an individual implant too early may reduce the ability of the animal to respond to subsequent implants.

Table 1. Return on investments to implanting using fall 1996 prices and cattle market conditions*.

Implant Conditions	$ returned/$ invested
Suckling calves	10
Stocker cattle - 1 implant	12-13
Feedlot steers - 1 implant	21-43
Feedlot heifers - 1 implant	17-22
Feedlot cattle - reimplant	4-20

* Gill, D. and J. Trapp. 1997. Economics of beef production with vs without implants. In: Impact of implants on performance and carcass value of beef cattle. Oklahoma Agricultural Experiment Station. P-957. pp167-181.

Implant Types and Responses

Implants contain hormone or hormone-like compounds (i.e. estrogens, androgens, progestins) in various concentrations and combinations as active ingredients. Table 2 lists the implant products that are currently available on the market and categorizes them by duration of response and potency. Duration of response refers to the amount of time an implant is effective at enhancing growth performance. While only Compudose® has a label claim for duration, duration of response for other implants reflect manufacture recommendations and industry practices.

Table 2. Classifying implants relative to class, trade name, potency and payout optimum.

Class and Trade Names	Hormonal Activity*	Potency**	Approximate Payout***
		(Days)	
Zeranol			
Ralgro	E	L	60-70
Magnum	E	M	80-120
Estradiol			
Compudose	E	M	150-200
Encore	E	-****	400
Estradiol benzoate and progesterone			
Synovex-C; Implus-C; Component E-C	E	L	60-70
Synovex-S; Implus-S; Component E-S	E	M	80-120
Trenbolone acetate			
Finaplix-S; Component T-S	A	L	80-100
Finaplix-H; Component T-H	A	L	80-100
Estradiol benzoate and testosterone proionate			
Synovex-H; Implus-H; Component E-H	A/E	M	80-120
Estradiol and trenbolone acetate			
Revalor-G	A/E	M	80-120
Revalor-H	A/E	H	100-110
Revalor-S; Component TE-S	A/E	H	100-110
Synovex Plus	A/E	H	100-110
Combinations of implants (S/H) (Finaplix or Component T) and (Ralgro, Synovex or Implus)	A/E	H	90-110

* A = androgenic activity, E = estrogenic activity, A/E = combination of androgenic and estrogenic activity.
** L = low potency, M = moderate potency and H = high potency.
*** Approximately equal to re-implant time.
**** Information not available at this time.

Implant potency refers to the magnitude of growth response that occurs with implant use. Higher potency implants were developed by increasing the concentration of active ingredients in the implant or by using the hormone trenbolone acetate in combination with estrogenic hormones. However, higher potency and longer duration do not necessarily imply better products. Many variables relating to specific situations (i.e. type of cattle, diet intake, diet composition, previous implant history, health status) will affect the actual response to an implant.

Reimplanting

Implant effectiveness decreases over time as the amount of active ingredient(s) released from the implant decreases. Calves need to be reimplanted to sustain an enhanced growth rate. The gain response to subsequent implants of the same type is typically reduced. If the first implant increased gain by 20 percent, re-implanting with the same product 100 days later may increase subsequent gain by only 15 percent. If cattle are regularly reimplanted at 60-day intervals with the same product, the response to a fourth implant (e.g. 180 days after initial implant) will be very low.

To determine the effect of subsequent implanting with the same implant, the University of Nebraska researched reimplanting calves with the same implant (36 mg of zeranol; Ralgro®) from branding (two to three months of age) to slaughter (Table 3). Calves were divided into four groups and received either three (branding, weaning and finishing), two (weaning and finishing), one (finishing) implant(s) or no implants. Compared to non-implanted cattle, implanting increased weight at slaughter by 53 pounds with similar days on feed. The cumulative response to implanting with the 36 mg zeranol implant was similar regardless of the number of implants administered (three, two or one).

Table 3. Effect of previous implant on finishing phase performance*.

	Implant Treatment**			
Suckling	**N**	**N**	**N**	**I**
Growing	**N**	**N**	**I**	**I**
Finishing	**N**	**I**	**I**	**I**
Finishing phase				
ADG, lb	2.60	2.91	2.89	2.80
Feed Intake, lb	20.20	20.50	21.30	21.10
Feed/gain	7.58	6.98	7.31	7.47
Final wt., lb	1124	1168	1186	1177
Advantage over control, lb	---	44	62	53
Proportion of weight advantage				
Pre-Finishing	---	0	34	47
Finishing	---	100	66	53

* Mader, T. 1997. Carryover and lifetime effects of growth promoting implants. In: Impact of implants on performance and carcass value of beef cattle. Oklahoma Agricultural Experiment Station. P-957. pp88-94.

** N = no implant, I = implanted with low potency implant (Ralgro®). Calves were either not implanted (NNN), implanted only in finishing phase (NNI), implanted in growing and finishing phases (NII) or implanted in suckling, growing and finishing phases (III).

However, the distribution of when the gain occurred was influenced by implanting regimen. Implanting once at the beginning of finishing phase resulted in additional weight gain during the finishing phase. When calves were implanted twice (growing and finishing), 34 percent of the additional weight gain occurred during the growing phase and 66 percent during the finishing phase. For calves given three implants, (suckling, growing and finishing), 47 percent of the additional weight gain occurred during the suckling and growing phases and 53 percent during the finishing phase.

Enterprise analysis would suggest that cow/calf producers, backgrounders, and feedlot finishers should prefer different implant strategies where the initial implant and a majority of its payout period occurs during their time of calf ownership. However, when ownership is retained through various phases of the production cycle, several possible implant strategies can produce similar overall weight gains using similar potency implants.

Progressively increasing potency in subsequent implants will help maintain a consistent growth response. University of Nebraska research compared three different long-term implant regimens (Table 4). This study indicated preweaning implants improved weaning weights by 26 pounds (average of steers and heifers). Postweaning performance was not affected by the preweaning implant when potency of the postweaning implant was increased from low to moderate. Overall, implanting during the backgrounding and finishing phases increased weight 16 and 50 pounds, respectively.

Table 4. Performance of cattle assigned to implant strategies using low, moderate and high potency implants[*].

Phase	Implant strategy**			
Suckling	N	N	L	L
Weaning	N	M	M	M
74 day postweaning	N	M	M	M
148 day postweaning	N	M	M	H
Performance:				
Weaning wt., lb	406	406	434	432
Feedlot daily gain, lb				
Growing	2.23	2.47	2.47	2.45
Finishing	2.67	3.00	2.98	3.11
Overall (growing/finishing)	2.54	2.82	2.78	2.89
Feedlot intake, lb	16.40	17.80	18.00	18.40
Feedlot feed/gain	6.51	6.32	6.43	6.37
Final wt., lb	988	1054	1078	1098

* Mader, T. 1997. Carryover and lifetime effects of growth promoting implants. In: Impact of implants on performance and carcass value of beef cattle. Oklahoma Agricultural Experiment Station. P-957. pp88-94.

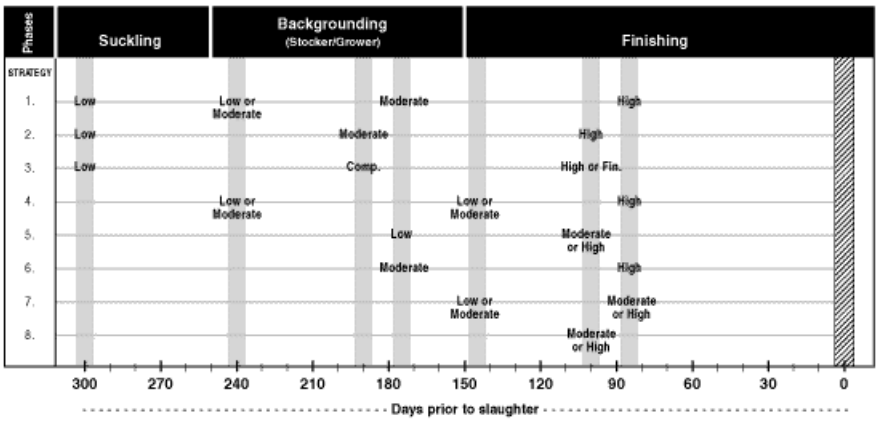
** N = no implant, L = low potency implant (Synovex-C®), M = moderate potency implant (Synovex®-S/H), H = high potency implant (Synovex®-S/H plus Finaplix®-S/H). Cattle were not implanted (NNNN), implanted at 0,74 and 148 day postweaning using M (NMMM), implanted with L preweaning and M at 0, 74 and 148 days postweaning (LMMM) or implanted with L preweaning, M at 0 and 74 days postweaning and H at 148 days postweaning.

Finishing performance was further enhanced when a high potency terminal implant was used as the final implant prior to slaughter. Using a strategy of increasing implant potency will optimize advantages in gain performance and feed efficiency while reducing the detrimental effects of using multiple high potency implants (i.e. excessive carcass weights, lowered marbling scores, reduced beef tenderness, increased percentage of dark cutters, advanced skeletal maturity).

Implant Strategies

Several possible implant strategies are depicted in Figure 1. Strategy #1 would represent an aggressive implant protocol that is a coordinated process involving various segments (e.g. cow/calf, backgrounder, finisher) of a beef production system. Strategies #1 and #4 are typical of traditional implant use in backgrounding operations. Both strategies involve implanting calves with either a low or moderate potency implant at the beginning of the feeding period. The other strategies involve some coordination between various production segments. Although each of these strategies has merit, maximum benefits are incurred by the system and not by any one particular segment.

Figure 1. Possible implant strategies relative to time of initial implant and days to slaughter [ab].



[a] Low = low potency implant, Moderate = moderate potency implant, High = high potency implant, Comp. = Compudose®, Fin. = Finaplix®.
[b] Strategy number (see text).

Implanting Replacement Heifers

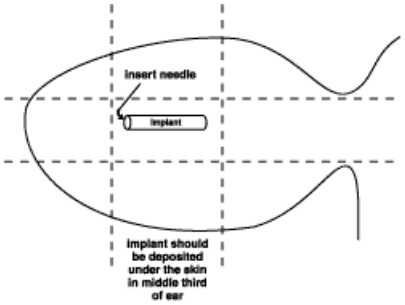
Implanting heifers presents special concerns, particularly if replacement heifers are to be selected from all available heifer calves. If replacement heifers can be identified early, the predominate recommendation is to not implant replacement heifers. Non-replacement heifers could then be implanted. However, if replacement heifers are not selected until after weaning, then all heifers could be implanted with a low-potency, estrogenic implant at two to three months of age. This allows producers to capitalize on growth enhancement from implants in heifers that are not kept as herd replacements. Implanting heifer calves before 30 days of age can reduce subsequent reproductive development and breeding performance.

> *No heifer should be implanted earlier than 30 days of age, nor should potential replacement heifers be re-implanted after an initial low potency implant at two to three months of age.*

Implant Location and Cleanliness

Implants must be placed in the middle one-third of the ear (see Figure 2). Implanting at other locations may decrease implant effectiveness by either reduced or enhanced implant absorption. Reduced absorption results in decreased circulating hormone levels that lead to little or no added growth. Enhanced adsorption leads initially to elevated hormone levels followed by subsequent rapid depletion of circulating hormone levels that limit implant persistence and can reduce gains. Overall, poorer gains would result from poorly placed implants as compared to properly placed implants.

Figure 2. Proper site for implant placement.



Proper sanitation should be practiced to prevent infection caused by poor implanting technique. Implant needles should be wiped with a mild disinfectant solution between implants to reduce needle contamination. Also, needles should be regularly checked for burrs, rough areas, or rolled edges and, if found, replaced immediately. Ears should have mud or manure removed by scraping with a knife or dull edge instrument. The contaminated area should be brushed with a mild disinfectant to reduce the risk of creating an infected implant site. When brushing the area, don't over brush and don't go back and forth, just wipe once in only one direction. Remove large particles with the knife, not the brush.

In one trial on reviewing implant sites, up to 30 percent of the implants were lost, abscessed or walled off due to poor implant technique. Consequently, 30 percent of the implants were not effective as a result of poor location or cleanliness. Implant failure increases the cost of production due to the loss of potential weight gain and the expense of a ineffective implant.

Summary

Implant strategy for backgrounders is dependent on several variables, including implant history, duration of ownership, desired performance, and cattle type. Low or moderate potency implants should be used in backgrounded calves. Calves targeted for higher average daily gain will have a greater magnitude of response to implants than calves fed for low daily gains (i.e. wintering for grass, less than 1.0 pound average daily gain).

In a segmented production system, cow/calf producers will use a preweaning implant to return extra calf weight at weaning. Also, the feedlot industry will continue to utilize implants for increased gain and feed conversions during the finishing phase. The backgrounding producer will find implanting calves with low or moderate potency implants will enhance growth performance. However, all segments of the industry will need to coordinate with the other production segments to ensure the appropriate implant strategy is used to produce high-quality, low-cost beef.

Use of trade names in this publication neither endorses nor discounts any product.

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