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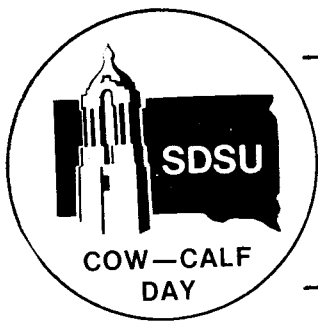
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GROWTH IMPLANTS FOR THE COW-CALF PRODUCER--  
RALGRO<sup>1</sup>, SYNOVEX<sup>2</sup> AND COMPUDOSE<sup>3</sup>

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With today's high production costs, the cow-calf producer needs to use any tool, product or management scheme which will return more net dollars to his enterprise. Growth implants increase the net return potential and have shown to be cost effective.

Commercial companies now offer implants which will increase the performance of suckling calves and yearlings on grass. Producers should be aware that no implants are approved for breeding stock. This eliminates the use of implants in purebred herds and for replacement heifers in commercial herds.

This report will summarize research information on the three implants currently on the market for beef cattle--Ralgro, Synovex and Compudose.

Mode of Action

Growth implants are described as anabolic compounds. This simply means that they promote constructive metabolism, generally increasing protein deposition. This is accomplished by low levels of estrogenic or hormone-like substances which increase pituitary size and the secretion of growth hormones, which in turn increase protein deposition.

Estrogens are widespread in our normal physiological environment and in our food supply. In the strictest sense, an estrogen is a phenolic steroid which is synthesized mainly in the ovary but also in the testes and the adrenal cortex. The primary function of estrogens is to affect various facets of female reproduction and secondary sexual characteristics. Extensive research has shown that estrogens and substances with estrogenic activity improve the growth rate and feed conversion of cattle when administered at relatively low levels.

Ralgro, a synthetic substance which exhibits estrogenic activity, known as Zeranol is a fermentation product of Gibberella zeae. Synovex implants are from natural estrogens and are recommended for specific sexes. Synovex-S, for steers, is a compound of 20 mg estradiol benzoate plus 200 mg progesterone and Synovex-H, for heifers, is made up of 20 mg estradiol benzoate plus 200 mg of testosterone. Compudose is also a natural estrogen, estradiol-17 $\beta$ . The mode of action of all implants is basically the same as the following flow chart will illustrate.

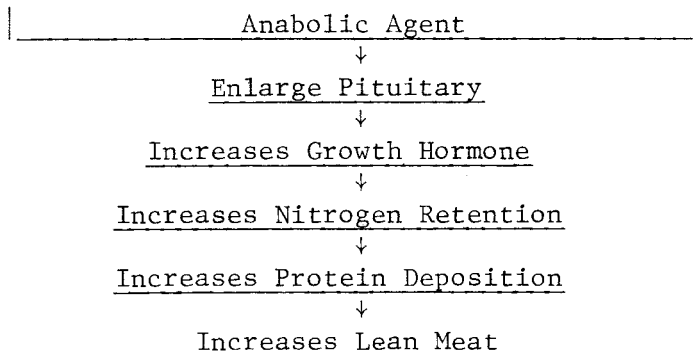
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<sup>1</sup> Ralgro is the registered trademark of International Minerals and Chemical Corporation.

<sup>2</sup> Synovex is the registered trademark of Syntex Agribusiness, Inc.

<sup>3</sup> Compudose is the registered trademark of Elanco Products Company.

<u>Natural</u>	<u>Synthetic</u>
Estradiol 17 Beta (Compudose)	Zeranol (Ralgro)
Estradiol Benzoate (Synovex)	



Proper Use of Implants

Table 1 will show the comparative use procedures for the implants. As mentioned earlier, implants are not approved or recommended for breeding stock. Proper use of implants in compliance with FDA regulations will also insure effective performance.

Since Synovex is not approved for calves less than 400 lb, it does not fit the management scheme of implanting suckling calves. Both Ralgro and Compudose are approved from birth to slaughter. However, all of the implants available can be used with yearlings on grass.

Table 1. Proper Use of Implants

Implant used	Ralgro	Synovex-S	Synovex-H	Compudose
Sex	Both	Steers	Heifers	Steers
Age or weight	Birth on	400 lb up	400 lb up	Birth on
Implant site in ear	Base	Middle	Middle	Middle
Withdrawal time (days)	65	60	60	0
Reimplantation (days)	90	90	90	200

Location of the implant is important to achieve maximum performance. Synovex and Compudose should be implanted in the middle of the ear (diagram 1). Ralgro should be located in the ear at the base of the head (diagram 1).

Implants are available for both steer and heifer calves. However, one needs to be aware of the FDA regulations for their proper use. Ralgro is approved for both steers and heifers. Synovex-S is approved for steers and Synovex-H is approved for heifers. Compudose is only approved for steers.

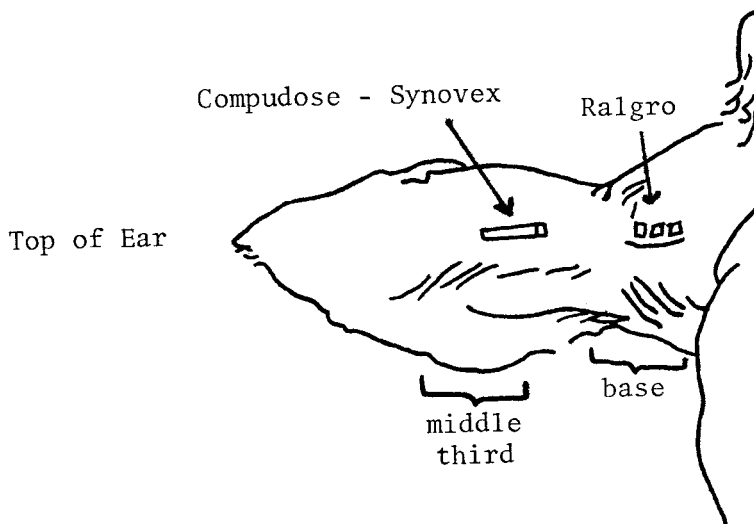


Diagram 1. Implant location.

Withdrawal times before slaughter are established for all drugs and drug-like products to insure that no harmful residues enter our human food chain. Ralgro has a 65-day withdrawal period, Synovex a 60-day period and Compudose has no withdrawal period.

The manufacturers of Ralgro and Synovex recommend reimplantation at 90-day intervals, while Compudose is effective for 200 days. Management should consider whether reimplanting is possible and/or profitable during the suckling phase.

#### Implant Performance

As with many products, implants have not always shown a consistent benefit to producers. However, over the range of many trials and several thousand head of calves and yearlings, implanting has shown to be a productive management practice. The variation in response obtained may be due to the genetic ability of the cattle to grow, quality and/or quantity of the forage available or possibly due to extremes in environment such as water quality, temperature, rainfall, etc. In analysis of the mode of action of implants and their effect on increasing protein deposition, it follows that the greater the rate of growth of a calf or yearling the more benefit received by implanting.

Starting in the spring of 1982 we now have two implants available for use on newborn calves. Ralgro has been available for this purpose for 10 years and therefore more study has been done with it. Compudose, the newcomer, does not have a great deal of research data accumulated. Table 2 presents a comparison of Ralgro and Compudose as calfhood implants using the summaries of several trials available. As indicated in the summary, it appears that Ralgro has an advantage in calf performance over Compudose (26.7 vs 15 lb). However, as more field data become available, this apparent advantage could become less. The Ralgro data summarized here are for one implant only. Several trials have indicated that reimplanting at 90 to 100 days will result in additional gains. Compudose has the advantage of no reimplantation as it is effective for 200 days.

Table 2. Performance of Implanted Suckling Calves--Trial Summaries

Item	Ralgro	Compudose
No. of trials	11	6
No. of calves	1000	81
Avg trial length, days	147	148
Avg initial wt, lb	198	188
Avg wt response, lb	26.7	15

Table 3 summarizes implant data available for yearlings on grass. Again, much more data are available on Ralgro and Synovex than on Compudose. The summaries indicate similar performance between Ralgro and Synovex, both being superior to Compudose. As indicated before, Compudose could very well prove to be as effective an implant as the other two products as more data become available. Again, the data for Ralgro and Synovex are for one implant.

Table 3. Performance of Implanted Yearlings on Grass--Trial Summaries

Item	Ralgro	Synovex	Compudose
No. of trials	5	22	9
No. of yearlings	1606	2000	156
Avg length of trial, days	110	130	130
Avg initial wt, lb	460	--	488
Avg final wt, lb	687	--	652
Avg wt response, lb	27	31	13

Effect of Implanting on Replacement Heifers

Since most commercial producers do not know which heifers they plan to keep for replacements, they may want to implant all the calves. Since Ralgro is the only implant approved for calfhood vaccination of heifers, we will restrict our discussion to its use in this regard.

Most research work has shown no reproductive problems with one Ralgro implant given shortly after birth, but a second Ralgro implant given 70 to 100 days later has shown decreased conception rates. Work conducted at Kansas State University confirms these results (table 4).

Table 4. Effect of Calthood Ralgro Implants on Subsequent Reproductive Performance - Kansas State University

Treatment	No. heifers	Percentage first service conception	Percent pregnant 60-day breeding season
Control	26	46.1	73.1
One Ralgro implant near birth	24	54.2	79.2
One Ralgro implant near birth and 70 days later	12	16.7	33.3

Work conducted at Miles City, Montana, and Kansas State University has shown possible nutritional interactions with Ralgro implants given to heifers at weaning time. These heifers have had conception rates equal to or better than controls with the added benefit of increased weight gain and larger pelvic areas. However, one should keep in mind that FDA has not approved Ralgro or any of the other implants for use with replacement heifers.

#### Summary

Implanting suckling calves and yearlings on grass has been shown to be an effective means of increasing growth. Calves implanted at birth should be 10 to 30 lb heavier at weaning and yearlings 10 to 30 lb heavier coming off grass than nonimplanted cattle.

Your results from implanting should be good if you follow the following guidelines:

1. Read directions thoroughly before implanting.
2. Consider potential return versus implant cost.
3. Use the proper equipment.
4. Use the proper technique.
5. Follow FDA guidelines.