THE EFFECT OF IMPLANTING CULL COWS ON GAIN, INTAKE, FEED CONVERSION, AND CARCASS CHARACTERISTICS

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ABSTRACTS

For cull cows, implants generally increase rate of gain and improve feed conversion. While research results on effects on carcass traits have been inconclusive, muscle deposition tends to be increased. The major impact on carcass characteristics is an increased hot carcass weight. *None of the implants currently (1997) approved for use in suckling calves, stockers, or finishing cattle are approved for use in cull cows.*

INTRODUCTION

Between six to eight million beef cows are culled annually in the U. S. Many culled cows are thin and have the potential to make very rapid gains during a relatively short (50-70 days) feeding period. While most cows are slaughtered shortly after they are culled, many are fed with the goal of increasing both weight and value per pound. Feeding programs vary from simply putting cull cows on a very high quality pasture to feeding very high concentrate diets typical of those fed to finishing cattle. Because many producers who feed cull cows also finish other classes of cattle and routinely implant those cattle, they wonder about the value of implanting cull cows. Several universities have evaluated implants for cull cows. However, the number of implant experiments is far less than with other classes of cattle. This paper, summarizes research for each specific implant when compared to non-implanted control cows. Most of the research has focused on this comparison rather than comparing different implants and(or) combinations.

Implanting Cull Cows With Zeranol - Early research conducted in the U.S. evaluated the impact of zeranol (Ralgro®) on cull cow performance. A summary of these six trials with zeranol is shown in Table 1.

Table 1. Summary of research trials evaluating the effect of implanting cull cows with Zeranol (Ralgro®) on rate of gain.

Study	Management	Control	Zeranol (36 mg)	Zeranol (72 mg)	% Improvement
		ADG, kg			
Bellows et al. (1979)	Native pasture	0.64	0.71		10.9
Bellows et al. (1979)	Native pasture	0.92	1.08		17.4
Corah et al. (1980)	Fescue pasture	1.93	2.15		11.2
Price et al. (1982)	High concentrate, Young cows	1.71	1.82	1.84	6.4;7.6
Price et al. (1982)	High concentrate, Old cows	1.82	1.64	1.66	-9.9;-8.8
Waggoner et al. (1985)	High concentrate	1.21[a]	1.34[b]		10.7

[a,b] Values in the same row differ significantly (P<.01)

Table 2. Summary of research trials evaluating the effect of implanting cull cows with 200 mg progesterone + 20 mg estradiol benzoate (Synovex-H®) on rate of gain.

Study	Control	Synovex-H®	% Improvement
	ADG, kg		
Jones (1982)	1.61	1.66	3.1
Corah & Goehring (1986)	1.22	1.16	-4.9
Matulis et al. (1987)	Not reported	Not reported	No difference
Brethour & Cranwell (1993)	1.07	1.24	15.9
Cranwell et al. (1996)	1.69[a]	2.16[b]	21.8

[a,b] Values in the same row differ significantly (P<.05)

Except for old cows in the study by Price et al. (1982), the gain response of cull cows both on pasture and on high concentrate feeding programs in drylot has been fairly consistent; gain has averaged approximately 10% above controls. In both trials reported by Bellows et al. (1979) conducted at the Miles City Station, cows grazed high quality, native spring grass which allowed a good rate of gain. Correspondingly, the fescue pasture utilized in the trial reported by Corah et al. (1980) also provided for rapid gains. Implant responses for cows grazing low quality pasture or crop residue haven't been reported.

In the study by Price et al. (1982), when cows were classified by age (young <4 yr), implant response differed with age group. Unfortunately, in the other studies presented in Table 1, young and old cows were grouped together; this prevents a similar age comparison. The difference between age groups in the trial by Price et al. (1982) indicates that more research comparing the effect of age on implant response is needed.

Effects on carcass data, provided in three of these studies has been inconsistent. Bellows et al. (1979) found that zeranol tended (P=.08) to increase ribeye area in their first trial but not in a second trial where the results were confounded by an interaction between implant and spaying treatments. Price et al. (1982) reported that zeranol did not alter carcass traits in either the young or the old cows. The only carcass trait influenced in the study by Waggoner et al. (1985), ribeye area, was significantly increased by the implant. Consequently, zeranol may increase muscle deposition as reflect by ribeye area, but results have not been conclusive.

Implanting Cull Cows With Estradiol Benzoate Plus Progesterone (Synovex-H®) - Summaries of five research trials evaluating estradiol benzoate and progesterone are shown in Table 2. Results have been less consistent than with zeranol, but again, in general, this implant has increased rate of gain.

Matulis et al. (1987) found no difference in feed conversion between control and Synovex-H® implanted cows. In the experiments by Brethour and Cranwell (1993) and Cranwell et al. (1996), gain/feed was superior numerically for the implanted cows, but the differences were not significant.

Both Jones (1982) and Matulis et al. (1987) detected no effect on carcass characteristics as a result of implanting with Synovex-H®. Conversely, Cranwell et al. (1996) reported that hot carcass weight and ribeye area were increased while yield grade was decreased by implanting.

Implanting Cull Cows With Trenbolone Acetate (TBA)- Research with TBA implants is summarized in Table 3. The earliest trials by Drennan et al. (1983) and Garnsworthy et al. (1986) were conducted in Europe using a 300 mg dosage of TBA; for the remaining trials the 240 mg dosage found in Finaplix was used. Although rate of gain was increased significantly in only two of these six research trials, there was a consistent trend for a large increase in rate of gain.

Table 4 shows the impact of TBA with or without an estrogenic implant on DMI and feed conversion. The impact of TBA on DMI has not been consistent. For example, TBA resulted in decreased DMI in one trial (Pritchard and Burg 1993), no effect in another

trial (Cranwell et al., 1996), and a dramatic increase in a third trial (Brethour and Cranwell, 1993). Feed conversion was improved numerically in all of the trials where such information was reported.

Table 5 shows the effect of TBA on carcass characteristics. In both trials, TBA alone had a minimal effect except for reducing external fat in the study by Cranwell et al. (1996). However, when TBA was combined with an estrogenic implant, i.e., Synovex-H®, carcass weights and soft tissue were increased reflecting greater protein deposition.

Table 6 shows the effect of implanting with either TBA alone, an estrogenic implant alone, or the combination on sensory panel evaluation and Warner-Bratzler shear force. Trenbolone acetate alone increased juiciness, myofibrillar tenderness, and overall tenderness as measured by taste panel. However, shear force values remained similar to control. When TBA was combined with an estrogenic implant, sensory scores all were similar to those of control cows.

Implanting Cull Cows with Testosterone Propionate - Faulkner et al. (1989) evaluated the effect of testosterone propionate on performance and carcass characteristics of cull cows. Gain, intake, and feed/gain were similar for control and implanted cows and No differences in carcass traits were detected.

Table 3. Summary of research trials evaluating the effect of implanting cull cows with trenbolone acetate with or without estrogen on rate of gain.

Study	Control	Trenbolone Acetate[a]	TBA & Estrogen[b]	% Improvement
Drennan et al. (1983)	0.78	0.88		12.8
Garnsworthy et al. (1986) at 60 d	1.12	1.35		20.5
Garnsworthy et al. (1986) at 100 d	.92[a]	1.31[b]		42.4
Pritchard & Burg (1993)	1.31	1.37		4.6
Brethour & Cranwell (1993)	1.07	1.42	1.26	32.7;17.8
Cranwell et al. (1996)	1.69[c]	2.11[d]	2.26[d]	24.9;33.7

[a] Drennan et al. (1983) and Garnsworthy et al. (1986) used 300 mg trenbolone acetate while the remaining trials used 240 mg TBA supplied by Finaplix-H®

[b] Estrogen supplied by Synovex-H®.

[cd] Value differs significantly (P<.05)

Table 4. Summary of research trials evaluating the effect of implanting cull cows with trenbolone acetate with or without estrogen on intake and feed conversion.

	Intake, kg				Feed/Gain		
Study	Control	TBA[a]	TBA + EB[b]		Control	TBA[a]	TBA + EB[b]
Garnsworthy et al. (1986) at 60 d	11.6	11.9			10.1	7.9	
Garnsworthy et al. (1986) at 100 d	12.9	14.7			12.7	9.5	
Pritchard & Burg (1993)	12.2	12.0			9.4	8.7	
Brethour & Cranwell (1993)	15.2	15.0	14.7		14.3	10.6	11.7
Cranwell et al. (1996)	12.3	12.6	12.5		7.1	5.9	5.6

Table 5. Summary of research trials evaluating the effect of implanting cull cows with either estrogen or trenbolone acetate or the combination on carcass characteristics.

	Treatment			
Study and Item	**Control**	**TBA[a]**	**Estrogen (EB)[b]**	**TBA & EB**
Pritchard & Burg (1993)				
Carcass wt., kg	310	310		
Dressing percentage, %	55.1	55.9		
Fat, cm	0.14	0.13		
REA, cm^2	73.5	75.5		
Cranwell et. al. (1996)				
Carcass wt., kg	275.9^{c}	281.8^{c}	292.2^{d}	292.0^{d}
Dressing percentage, %	52.1^{cd}	51.3^{c}	53.1^{d}	52.6^{cd}
Fat, cm	1.02^{c}	$.77^{d}$	$.91^{cd}$	$.95^{cd}$
REA, cm^2	72.6^{c}	75.9^{c}	82.7^{d}	78.5^{cd}
Carcass soft tissue, kg	221^{c}	221^{c}	234^{cd}	238^{d}

[a] TBA supplied by Finaplix-H®.
[b] Estrogen (EB) supplied by Synovex-H®.
[cd] Values in the same row differ significantly (P<.05).

Table 6. Effect of implanting with either trenbolone acetate, an estrogenic implant, or the combination on sensory panel evaluation and Warner-Bratzler shear force (Cranwell et al. 1996).

	Implant Treatment[a]			
Sensory Trait	**Control**	**TBA**	**EB**	**TBA + EB**
Flavor intensity[b]	5.4	5.7	5.5	5.5
Juiciness[b]	5.5^{c}	6.0^{d}	5.4^{c}	5.6^{cd}
Myofibrillar tenderness[b]	5.0^{c}	6.2^{d}	5.3^{cd}	5.4^{cd}
Overall tenderness[b]	5.2^{c}	6.2^{d}	5.5^{cd}	5.6^{cd}
Connective tissue amount[b]	5.6^{c}	6.6^{d}	6.3^{cd}	6.4^{cd}
Warner-Bratzler shear, kg	5.1	4.6	4.9	5.1

[a]TBA = 200 mg of trenbolone acetate; EB = 200 mg of testosterone propionate + 20 mg of estradiol benzoate.
[b] Scores of 1 to 8:3 = moderately bland, moderately dry, moderately tough, moderately tough or slightly tough; 4 = slightly bland, slightly dry, slightly tough, slightly tough, or moderate; 5 = slightly intense, slightly juicy, slightly tender, slightly tender, or slight; 6 = moderately intense, moderately juicy, moderately tender, moderately tender, or traces.
[c,d] Means in the same row without a common superscript are different (P < .05).

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QUESTIONS & ANSWERS

Q: Does the amount of fat in the animal's body influence the cow's response to implants? Do cows exhibit compensatory growth?

A: Amount of fat or condition score may alter the implant response. One theory is that a cow with a condition score of 5 is going to respond differently to an implant than a thin cow will. I did not find any data for implant effects on cows with different condition scores. Presumably, according to that theory, response by cows with lower condition will be greater because more of their weight gain is protein. Regarding compensatory gain, cows that are healthy and are thin for no reason other than energy shortage will show a tremendous gain response for feeding periods of 30 to 45 days.

Q: What about combining somatotropin with implants?

A: I did not find any trial data on that combination. If anybody knows of data on this or other trials that I've missed, please let me know; I would like to include all pertinent information in my review paper.

Q: What was your measurement of connective tissue and is more connective tissue good or bad?

A: I was not involved in that part of the procedure. It is an estimate of the amount of connective tissue on a scale of 1 to 8 or 1 to 9. The higher the number on that scale, the better (or the less) the connective tissue.