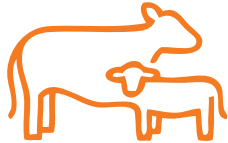


# TECHNICAL BULLETIN

April 2016



## SYNOVEX<sup>®</sup> ONE-FEEDLOT Implants in Feedlot Heifers: 4-Site Clinical Trial Results

**Zoetis**

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### Summary

- A multi-location clinical study was conducted in feedlot heifers to evaluate the effect of SYNOVEX<sup>®</sup> ONE-FEEDLOT (SYNOVEX ONE) on growth performance over a 200-day period and carcass traits.
- Feedlot beef heifers in ID, TX, KS, and CO were sham-implanted (n=342) or implanted with SYNOVEX ONE (n=342). Growth performance was measured for approximately 200 days and carcasses were evaluated in commercial slaughter plants.
- SYNOVEX ONE improved performance over the approximately 200-day period. ADG was increased 12% and final live body weight was increased 64 lb. Feed efficiency was improved 6.6% in spite of a 4.5% increase in dry matter intake (DMI).
- SYNOVEX ONE increased carcass value. Hot carcass weight was increased 45.4 lb and ribeye area was increased 0.89 in<sup>2</sup>.
- Compared with negative controls, marbling score was decreased 6.8% and the decrease in choice and better carcasses was 4.5 percentage units for SYNOVEX ONE.

**F**ew beef cattle management practices are more cost-effective or provide a higher return on investment (ROI) than growth-promoting implants. Because cattle feedlots operate on narrow profit margins, costs of production are critically important and the ROI for implants is greater than for any other technology. Animals with implants grow faster, use less nitrogen, produce less CO<sub>2</sub> and CH<sub>4</sub> per pound of protein, and have heavier carcasses than animals without implants. Of the variety of implants used routinely in the commercial feedlot industry, most have a duration ranging from 60 to 120 days and typical programs include reimplantation. Although reimplantation is sometimes combined with other

prophylactic treatments and vaccinations, it is associated with additional costs of handling and loss of performance. Thus, use of a single implant that maintains production benefits over an entire finishing period is of significant value to the producer compared to reimplant strategies.

Zoetis has developed a single implant with a coating that prolongs release of 200 mg of trenbolone acetate (TBA) and 28 mg of estradiol benzoate (EB) to improve performance over a 200-day finishing period. This bulletin summarizes the growth and carcass responses of feedlot heifers to the SYNOVEX<sup>®</sup> ONE-FEEDLOT (SYNOVEX ONE) implant administered approximately 200 days before slaughter.

## Experiment Design

A randomized block design consisting of 9 blocks of cattle and 2 treatment groups was used at each site.<sup>1</sup> The treatment groups were:

- sham-implanted control (implant gun needle inserted subcutaneously at ear injection site and withdrawn, but no growth implant administered);
- SYNOVEX ONE implant containing 200 mg TBA and 28 mg EB.

After the completion of the study, the animals were harvested at a commercial beef processing facility and carcass data were obtained.

Animals were housed in outdoor pens that were naturally lighted and ventilated, 8 to 10 head/pen. No other growth promoters or feed additives (ionophores, in-feed antibiotics, etc.) were fed during the study.



Figure 1 – Live body weights of control and SYNOVEX ONE heifers.

## Results

### Growth performance

Starting on day 70, animals with the SYNOVEX ONE implant weighed significantly more than the sham-implanted animals such that by day 198 they had gained 64 lb more live weight than the sham-implanted animals (Figure 1). In addition, the shape of the growth curve showed the body weights continued to diverge to the end of the study, indicating that the implants were continuously active for the full duration of the study.

Animals treated with SYNOVEX ONE implants had 12.0% faster ADG ( $P = 0.0027$ ), 4.5% higher DMI ( $P = 0.0003$ ), and 6.6% better feed efficiency ( $P = 0.0069$ ) than sham-implanted control animals (Figure 2).

### Carcass composition

Hot carcass weights were increased 45.4 lb ( $P = 0.0044$ ), ribeye areas were increased 0.89 in<sup>2</sup> ( $P < 0.0001$ ), and dressing percent was increased 0.42 percentage units ( $P < 0.0040$ ) (Figure 3). There were no treatment effects on KPH percent fat, backfat thickness or yield grade.

The percentage of choice and better carcasses across both treatment groups was 71.4%; however, there was a 4.5 percentage unit decrease ( $P = 0.0060$ ) in choice and better carcasses for SYNOVEX ONE than for sham-implanted controls (Figures 4 and 5) and marbling score was decreased 6.8% ( $P = 0.0310$ ).

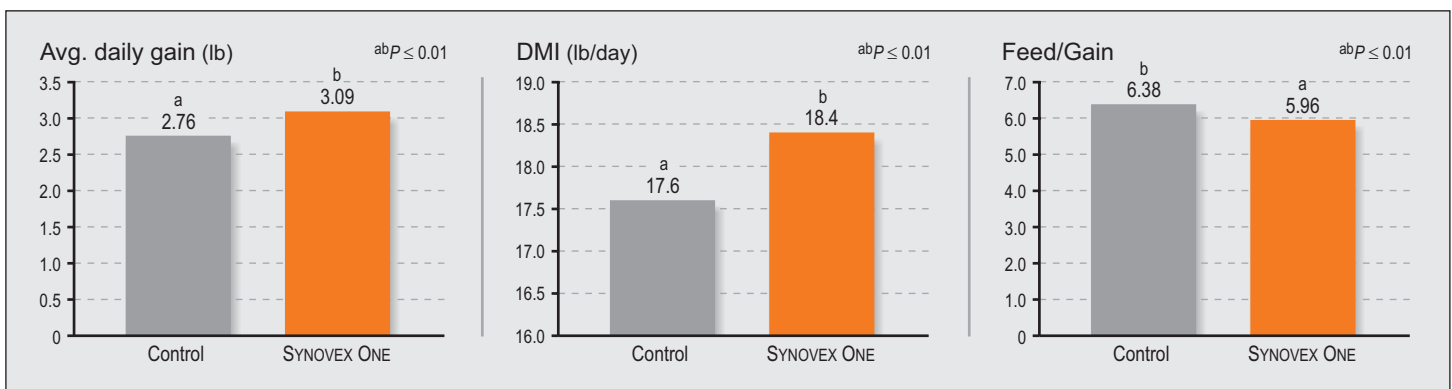
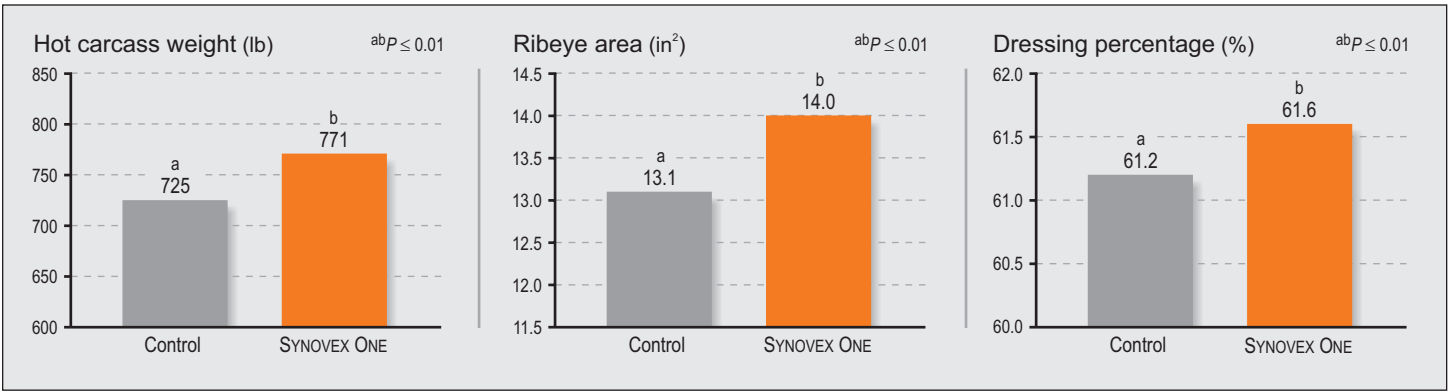
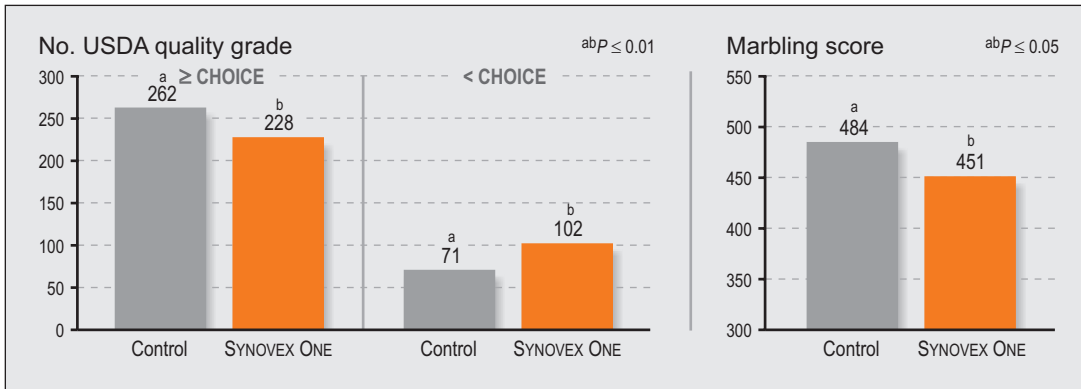


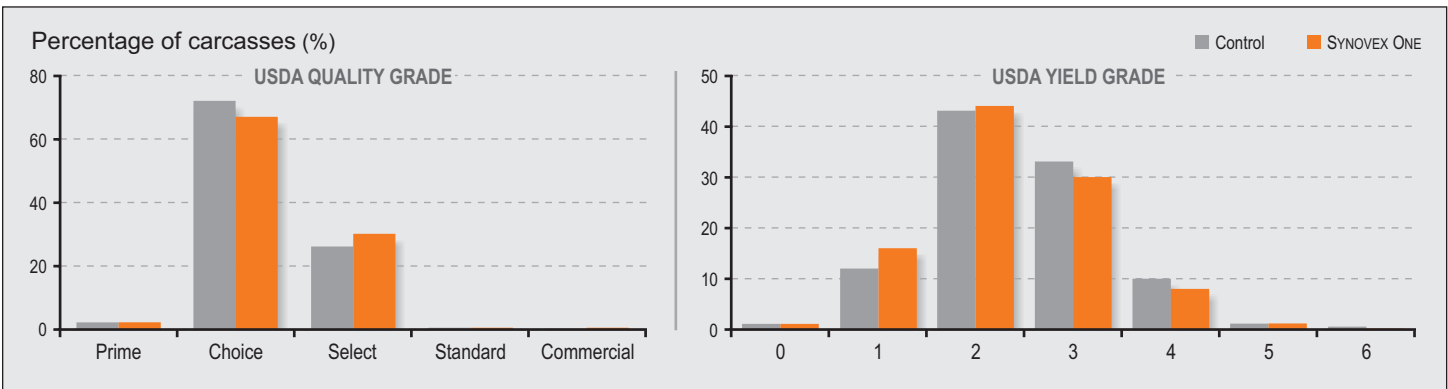
Figure 2 – Performance results.



**Figure 3** – Carcass parameters.

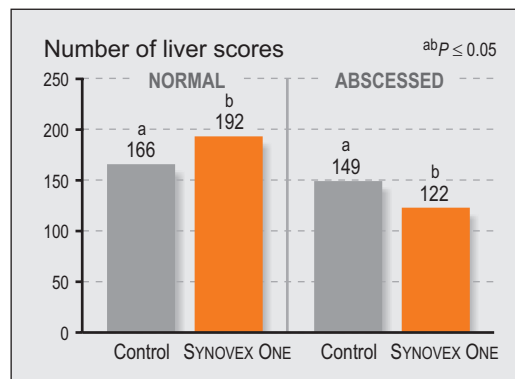


**Figure 4** – Number of USDA quality grade and marbling score.



**Figure 5** – Percentage of USDA quality grade and yield grade carcasses.

The percentage of abscessed livers in the sham-implanted controls was higher ( $P = 0.0363$ ) than in the SYNOVEX ONE animals (Figure 6), but there was no obvious reason for the difference. Across treatment groups, 43.1% of animals that completed the study had a liver score with abscesses of varying severity. The incidence rate would have been reduced had diets included ionophores and/or antibiotics.



**Figure 6** – Number of normal and abscessed liver scores.

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## Conclusions

Use of the 200-day SYNOVEX ONE implant effectively improved 200-day growth performance and carcass attributes compared to sham-implanted controls.

- **Growth performance.** Average daily gain and feed efficiency were increased 12% and 6.6%, respectively, in spite of a 4.5% increase in dry matter intake.
- **Carcass attributes.** Final live body weight and hot carcass weight were increased 64 and 45.4 lb, respectively, and ribeye area was increased 0.89 in<sup>2</sup>.
- Marbling score was decreased by 6.8% and choice and better reduced by 4.5 percentage units.

**Table 1 – Summary of performance and carcass characteristics.**

Parameter	SYNOVEX ONE	Control	SEM	P value
No. pens	36	36		
Average daily gain (lb)	3.09	2.76	0.046	0.0027
Dry matter intake (lb/day)	18.40	17.60	0.411	0.0003
Gain efficiency (ADG/DMI)	0.168	0.157	0.002	< 0.0001
Feed efficiency (DMI/ADG)	5.96	6.38	---	0.0069
Hot carcass weight (lb)	770.5	725.1	23.3	0.0044
Kidney, pelvic, heart fat (%)	1.91	1.86	0.035	0.1764
Ribeye area (in <sup>2</sup> )	14.00	13.11	0.198	< 0.0001
Backfat thickness (in)	0.60	0.58	0.033	0.4172
Marbling score	450.8	483.9	13.1	0.0310
Yield grade	2.82	2.89	0.108	0.2607
Dressing percent	61.63	61.21	0.182	0.0040
<b>USDA Quality Grade (%)</b>				
Carcasses with grades (n)	330	333	NA	0.0060 <sup>1</sup>
Prime	1.8	1.5		
Choice	67.3	72.1		
Select	30.3	26.1		
Standard	0.3	0.3		
Commercial	0.3	0.0		
<b>Calculated Yield Grade (%)</b>				
Carcasses with grades (n)	330	334	NA	NA
0	0.9	1.2		
1	15.5	12		
2	44.2	43.1		
3	30.3	32.9		
4	8.2	9.9		
5	0.9	0.6		
6	0.0	0.3		
<b>Liver scores (n)</b>				
Normal liver	192	166	NA	0.0363
Abscessed liver	122	149		

<sup>1</sup> Quality grade data were evaluated by comparing proportions grading Prime and Choice vs. lower than Choice for each treatment by the 2-sided Fisher's Exact test ( $P < 0.05$ ).

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Do not use SYNOVEX products in veal calves. Refer to label for complete directions for use, precautions, and warnings.

## References

1. Data on file, Report No. GASD 16-21.00, Zoetis Inc.



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