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# Effect of Sorting and Feeding Optaflexx on Performance and Economics of Long Yearling Steers

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## Summary

*A two-year experiment evaluated the effects of sorting long yearling steers by initial feedlot BW and supplementing 200 mg/steer of Optaflexx daily the last 28 days of the feeding period on ADG, F/G, carcass characteristics and profitability. Feedlot ADG, F/G, and profitability were not effected by sorting. However, sorted cattle exhibited increased fat thickness, increased ribeye area, and increased percentage of carcasses with a yield grade of four or higher. Supplementing Optaflexx the last 28 days of the feeding period had no effect on feedlot performance, carcass characteristics, or profitability.*

## Introduction

Sorting may be used in production systems to reduce variability or reduce overweight carcasses and BW of yearlings entering the feedlot is a good predictor of final BW (*2003 Nebraska Beef Report*, pp. 61-65).

Optaflexx, the trade name for ractopamine hydrochloride, is a βeta-1 adrenergic agonist that increases weight gain the last 28 to 42 days of the finishing period. However, data on the use of Optaflexx in long yearling production are limited.

Therefore, the objectives of this study were to 1) to determine the effects on performance and economics of sorting yearling steers by initial BW, and to 2) determine the effects of feeding 200 mg/steer daily of Optaflexx the last 28 days to yearling steers.

## Procedure

### *Yearling Steer Development*

Two hundred medium-framed English-cross steers (517 ± 46 lb) were used in each year of a two-year study conducted from December 2003 to January 2006. Steers were purchased in the fall and were allowed a 28-day adaptation period prior to the beginning of the trial. Steers were managed as one group in the winter and allowed to graze cornstalk residue from December 2nd until April 20th in year 1 and November 11th until April 20th in year 2. Steers were supplemented 5 lb/steer daily of wet corn gluten feed (WCGF) for the entire wintering period to achieve a gain of at least 1.5 lbs/day.

On April 20th of each year cattle were implanted with Revelor-G and placed on smooth brome grass pastures near Mead, Neb., until May 20th. On May 20th steers were transported to native warm-season grass pastures near Rose, Neb. Cattle were removed from pasture on September 8th in year 1 and September 13th in year 2. While on grass steers were managed as one group.

### *Finishing Period*

Steers were adapted to the final finishing diet in 21 days using four step-up diets containing 45, 35, 25, and 15% roughage, fed for 3, 5, 6, and 7 days, respectively. The final finishing diet contained 48% high moisture corn, 40% WCGF, 7% alfalfa, 5% supplement, and contained a minimum of 12% CP, 0.7% Ca, 0.35% P, 0.6% K, 30g/ton Rumensin, and 10g/ton Tylan. Half the cattle in this experiment were supplemented Optaflexx the last 28 days of the feeding period at a rate of 200 mg/steer daily.

Initial and final weights for all periods of the system were based on 2 day consecutive weights following 5 days of limit feeding 50% alfalfa and 50% WCGF fed at 2% of BW. All steers were implanted with Synovex-Choice, weighed, and sorted into pens at feedlot initiation. Final BW was calculated assuming a constant dressing percent of 63%. Steers were harvested at the same commercial abattoir. On the day of slaughter hot carcass weight (HCW) and liver scores were collected. Following a 48-hour chill 12th rib fat thickness (FT), ribeye area (REA), USDA Yield Grade (YG), and USDA quality grade were collected.

### *Sorting*

In both years after the summer grazing period, steers were weighed and stratified into groups of 25 by BW, with each group having equal average BW. Steers were then allotted to one of four treatment groups. The treatments were 1) sorted without Optaflexx supplementation, 2) sorted with Optaflexx supplementation, 3) Unsorted without Optaflexx supplementation, and 4) Unsorted with Optaflexx supplementation. Steers that were sorted were placed into one of three sort groups, the heavy sort (32%, BW = 1030 lb) contained eight steers per replication, the medium sort (44%, BW = 950 lb) contained 11 steers per replication, and the light sort (24%, BW = 878 lb) contained six steers per replication. Steers in the unsorted control (BW = 959 lbs) were fed for an average of 111 days. Steers in the heavy group were fed for an average of 96 days and were marketed two weeks earlier than the unsorted controls. Because of the removal of the heavy steers, the middle sort was fed for an average of 118 days, and marketed one week later than the unsorted controls. Steers in the light sort were fed an average of 132 days, and marketed three weeks later than the unsorted controls.

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Cattle in the unsorted treatments were fed in the same pen (25 steers/pen). Cattle in the sorted treatments were assigned to pens based on sort groups leading to heavy cattle having eight steers/pen, medium cattle having 11 steers/pen, and light cattle having six steers/pen. Pen space and available bunk space per animal was kept constant at 226 $ft^2$ and 18 inches, respectively.

*Economic Analysis*

Cost of animal and feed ingredients were calculated using seven-year average pricing for the month that cattle were bought and the months that feed ingredients were used. For steer initial cost, average BW of a replicate was multiplied by the USDA Nebraska auction markets 1998 to 2004 average December calf price ($102.97/cwt) for a 500 to 600 lb calf. Steers were charged $8.33/head for health and processing cost during the winter period. Simple interest was charged on initial steer cost and health over the entire ownership. Interest was charged using prime interest rate plus 1% (7.6%) for all costs.

The cost of corn residue was charged at a rate of $0.32/steer daily while steers grazed cornstalk residue. This cost includes $0.12/steer for the rent of cornstalk residue and $0.20/steer daily charged as yardage while steers grazed cornstalk residue. This yardage cost includes the cost of fencing stalk fields and cost of labor to deliver WCGF and water to the cattle while grazing cornstalk residue.

Steers were supplemented with 5 lb/steer daily (DM basis) of WCGF for the entire winter period at a cost of $84.20/ton (DM basis). Interest was charged on the WCGF for half of the winter period and the remainder of ownership. Total winter cost was calculated using a 1.5% death loss, steer purchase price, health, feed, yardage, and interest charges.

Summer grazing cost was charged using the seven-year average animal unit month (AUM) value of $23.29 for native range. To determine the animal unit equivalent of the steers used in this study the initial BW and BW of cattle when they were removed from grass was averaged and divided by 1,000 lbs.

Cattle were charged $8.33 for summer health cost and a death loss of 0.5% was assessed during the summer grazing period. Interest was charged for the cost of grazing using prime plus 1% for the cost of the AUM and health cost.

Finishing cost includes feed and yardage. Feed costs were determined by multiplying the cost of the finishing ration ($99.53/ton) by the average DMI for each replicate. Cattle fed Optaflexx were charged a cost of $0.26/steer daily the last 28 days of the finishing period to account for the cost of Optaflexx. Feedlot yardage was charged at a rate of $0.35/steer daily. Interest was charged on feed and yardage costs for half the finishing period. Slaughter breakeven was calculated by dividing total cost by carcass-adjusted final BW.

Profit was calculated two ways. First, profit was calculated using seven year average live price for the month of December ($74.23/cwt) and subtracting the total cost of production from the value of the animal. Second, profit was calculated by selling cattle on the rail in a value based market that rewards quality. The grid used was calculated using two years of grid prices from the plant where cattle were sold and averaging the premiums and discounts received for the carcasses. The grid used is presented in Table 1. The base carcass for this grid was a carcass with a minimum quality grade of Choice$^0$ and YG 3. The base price used for the animal was the average Nebraska dressed fed cattle price of a Yield Grade 3, Choice$^0$ for December ($121.59/cwt) from 1998 to 2004. This price was calculated using the Nebraska Dressed Price (1998 to 2004) adjusted by adding the sum of 1 minus the average Choice grading percentage for the month of December multiplied by the Choice/Select spread for the month of December.

**Table 1. Premiums and discounts for grid marketing analysis.**

| Item, $/cwt | Premium/Discount |
|---|---|
| Prime | 8.00 |
| Upper Choice | 6.00 |
| Choice | 0.00 |
| Select | -8.10 |
| Standard | -15.00 |
| Yield Grade 1 | 3.00 |
| Yield Grade 2 | 3.00 |
| Yield Grade 3 | 0.00 |
| Yield Grade 4 | -10.00 |
| Yield Grade 5 | -17.49 |
| Carcass weight > 950 lbs | -10.00 |
| Carcass weight > 1,000 lbs | -20.00 |

## Results

*Sorting Performance*

Feedlot performance as a main effect of sorting is presented in Table 2. Initial BW for the finishing period was not different ($P$=0.82), however, sorted cattle exhibited a numerical increase in final BW of 9.6 lbs ($P$=0.15) compared to unsorted cattle. This is

**Table 2. Feedlot performance as a main effect of sorting yearling steers by initial feedlot weight.**

| Item | Sorted | Unsorted | SEM | P-value |
|---|---|---|---|---|
| Initial BW, lb | 515 | 520 | 10 | 0.14 |
| GINT [a] , lb | 758 | 760 | 11 | 0.73 |
| FINT [b] , lb | 959 | 959 | 21 | 0.82 |
| Final BW, lb | 1419 | 1410 | 4 | 0.15 |
| Winter ADG, lb/day | 1.63 | 1.61 | 0.1 | 0.32 |
| Summer ADG, lb/day | 1.40 | 1.39 | 0.04 | 0.65 |
| Feedlot ADG, lb/day | 4.05 | 4.05 | 0.20 | 0.88 |
| DOF [c] | 114 | 111 | 0 | < 0.01 |
| DMI, lbs/day | 28.86 | 28.69 | 0.17 | 0.35 |
| G/F | 0.140 | 0.141 | 0.006 | 0.50 |

[a]GINT = initial BW at the beginning of summer grazing.
[b]FINT = initial BW at the beginning of the finishing period.
[c]DOF = days on feed.

**Table 3. Carcass characteristics as a main effect of sorting yearling steers by initial feedlot weight.**

| Item | Sorted | Unsorted | SEM | P-value |
|---|---|---|---|---|
| Carcass weight, lbs | 894 | 888 | 3 | 0.14 |
| Fat thickness, in | 0.50 | 0.44 | 0.04 | 0.02 |
| Ribeye area, in [2] | 14.51 | 13.70 | 0.12 | < 0.01 |
| Yield grade | 2.90 | 2.80 | 0.11 | 0.27 |
| Marbling Score [a] | 576.6 | 571.6 | 32.2 | 0.35 |
| % Choice | 80.3 | 78.8 | 9.1 | 0.72 |
| % Carcasses > 950 lb | 14.1 | 15.1 | 2.1 | 0.75 |
| % Carcasses > 1000 lb | 1.5 | 3.0 | 0.9 | 0.25 |
| % Yield grade 4+ | 16.7 | 7.5 | 2.3 | 0.02 |

[a]marbling score = 400=slight[0], 500=small[0], etc.

**Table 4. Feedlot performance as a main effect of supplementing 200mg/steer of Optaflexx daily to yearling steers the last 28 days of the feeding period.**

| Item | Optaflexx | Control | SEM | P-value |
|---|---|---|---|---|
| Initial BW, lb | 519 | 516 | 10 | 0.29 |
| GINT [a] , lb | 759 | 759 | 11 | 0.89 |
| FINT [b] , lb | 959 | 959 | 21 | 0.82 |
| Final BW, lb | 1415 | 1414 | 4 | 0.86 |
| Winter ADG, lb/day | 1.61 | 1.63 | 0.10 | 0.32 |
| Summer ADG, lb/day | 1.40 | 1.39 | 0.04 | 0.72 |
| Feedlot ADG, lb/day | 4.06 | 4.04 | 0.20 | 0.85 |
| DOF [c] | 113 | 113 | 0 | 1.00 |
| DMI, lb/day | 28.80 | 28.75 | 0.17 | 0.75 |
| G:F | 0.141 | 0.140 | 0.006 | 0.82 |

[a]GINT = initial BW at the beginning of summer grazing.
[b]FINT = initial BW at the beginning of the finishing period.
[c]DOF = days on feed.

**Table 5. Economic analysis as a main effect of sorting yearling steers by initial feedlot weight.**

| Item | Sorted | Unsorted | SEM | P-value |
|---|---|---|---|---|
| Steer cost, $ | 530.66 | 538.70 | 8.25 | 0.08 |
| Interest [a] , $ | 79.91 | 79.30 | 3.90 | 0.03 |
| Feed cost, $ | 162.73 | 158.47 | 1.25 | < 0.01 |
| Yardage, $ | 39.88 | 38.85 | 0.09 | < 0.01 |
| Total Cost, $ | 1021.72 | 1020.30 | 21.65 | 0.68 |
| Feedlot COG [b c] , $ | 46.04 | 45.80 | 2.34 | 0.71 |
| System COG [b d] , $ | 45.84 | 46.02 | 1.50 | 0.64 |
| Breakeven [b] , $ | 72.17 | 72.58 | 1.62 | 0.34 |
| Live Value [e] , $ | 1053.57 | 1046.45 | 3.25 | 0.15 |
| Grid Value [f] , $ | 1061.54 | 1057.32 | 10.67 | 0.55 |
| Live p/l [g] , $ | 31.86 | 26.15 | 22.43 | 0.33 |
| Grid p/l [g] , $ | 39.82 | 37.02 | 31.91 | 0.73 |

[a]Interest is the total amount of interest accrued from the animal and all cost of production.
[b]All prices on a cwt carcass basis.
[c]Feedlot COG is the cost of gain during the finishing period.
[d]System COG is the cost of gain for the entire production system.
[e]Live sale price of $74.23/cwt.
[f]Carcass base price of $121.59/cwt.
[g] p/l is profit or loss.

because sorted cattle were fed an average of three days longer than unsorted cattle ($P<0.01$). However, DMI ($P=0.35$), ADG ($P=0.88$), and G:F ($P=0.50$) were not different when comparing sorted cattle to unsorted cattle. Carcass characteristics as a main effect of sort are presented in Table 3. Sorted cattle exhibited a numerical increase in HCW ($P= 0.14$) of 6.1 lb compared to unsorted cattle. However, there was not a difference in the percentage of carcasses that were over 950 lb ($P= 0.75$). Sorted cattle had increased FT ($P= 0.02$) and increased REA ($P<0.01$). Yield grade ($P= 0.27$) and marbling score ($P= 0.35$) were not different when compared to unsorted cattle. However, sorted cattle had 9.2% more carcasses with a YG 4 or higher ($P= 0.02$) compared to unsorted cattle due to the increase in the number of days fed.

*Optaflexx Performance*

Feedlot performance as a main effect of Optaflexx supplementation is presented in Table 4. There was no difference in feedlot initial BW of Optaflexx supplemented cattle compared to cattle not supplemented Optaflexx. Supplementing Optaflexx the last 28 days of the feeding period did not lead to an increase in final BW, ADG, improvement in G/F or difference in DMI. Feeding Optaflexx had no impact on HCW, fat thickness, LMA, YG, or marbling score compared to control cattle.

*Sorting Economics*

The economics of sorting steers at the initiation of the finishing period are presented in Table 5. Sorting cattle increased yardage cost $1.03/steer ($P<0.01$) due to the increased days fed (114 vs. 111 days) compared to unsorted cattle. This increase in days fed led to an increased feed cost of $4.26/steer ($P<0.01$) for sorted cattle. The increase in yardage cost, feed cost, and days fed led to an increased interest cost of $0.61/head ($P=0.03$) for sorted cattle. However, the differences in the production cost for the sorted cattle did not lead to an increase in the total cost of the animal and production, this is because there were no differences in cost of gain for the system or the cost of gain in the feedlot. This led to no difference in the breakeven for sorted cattle compared to unsorted cattle.

When comparing final animal value of sorted and unsorted cattle, sorted cattle were $7.12 more valuable on a live basis ($P= 0.15$) due to a 6.2 lb increase in HCW; however, the increase in final animal value did not lead to increased profitability of sorted cattle. When comparing

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sorted to unsorted cattle using grid pricing, animal value was not different due to the increase in the number of discounts sorted cattle received for carcasses with YG 4 and because sorting did not reduce the number of carcasses receiving overweight discounts. Since animal value was not increased for sorted cattle, profitability of sorted cattle was not different than unsorted cattle.

*Optaflexx Economics*

Interest cost ($P<0.01$) and total cost of production ($P<0.01$) were increased $0.87 and $11.10, respectively, for cattle supplemented Optaflexx. The increase in interest and total cost is due to the slight increase in initial animal cost and the price of supplementing Optaflexx ($0.26/steer daily).

The cost of supplementing Optaflexx led to a slight increase in the breakeven cost of $0.78/cwt ($P=0.09$), increased system cost of gain of $1.03 ($P=0.02$), and increased feedlot cost of gain of $1.90 ($P=0.01$) compared to control cattle. Final animal value on a live ($P=0.85$) and grid marketing ($P=0.52$) basis were not different for Optaflexx supplemented cattle compared to control cattle. When comparing live profitability and grid profitability, Optaflexx supplemented cattle tended to be $10.23 ($P=0.09$) and $15.66 ($P=0.07$) less profitable, respectively, than control cattle.

In this study sorting cattle was not successful because the percentage of overweight carcasses was not reduced and the incidence of YG 4 carcasses increased leading to increased discounts for sorted cattle. Sorting did increase REA. However, these increases did not lead to an economic advantage for sorted cattle. Feeding Optaflexx to long yearlings had no impact on performance.

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