COMPARISON OF THREE WEANING AGES ON COW-CALF PERFORMANCE AND STEER CARCASS TRAITS

S. E. Myers, D. B. Faulkner, F. A. Ireland, and D. F. Parrett

SUMMARY

An experiment was conducted to compare three weaning ages on cow-calf performance and steer carcass traits. One hundred sixty-eight (½ Simmental x ¼ Angus x ¼ Hereford) crossbred steers were randomly assigned to three treatments with eight pens per treatment. Treatments were: 1) weaned at an average of 90 d of age (90 ± 13 d) and placed in the feedlot, 2) weaned at an average of 152 d of age (152 ± 13 d) and placed in the feedlot, and 3) weaned at an average of 215 d of age (215 ± 13 d) and placed in the feedlot. The number of days steers were finished decreased by 55 and 38 d (linear, P = .0001) as weaning age increased when harvested at a constant fat endpoint (.81 cm). Weaning at an average of 90 and 152 d of age improved overall ADG by .15 and .07 kg/d, respectively, over weaning at an average of 215 d of age (linear, P = .005). Over the entire finishing period, intake increased (linear, P = .0006) and efficiency was poorer (linear, P = .004) as weaning age increased. Due to differences in finishing days and intake, total concentrate consumed increased (linear, P = .03) as weaning age decreased. No differences (P > .21) were observed for carcass weight, longissimus muscle area, or yield grade. No differences (P > .19) were observed in marbling score, percentage of steers grading greater than or equal to Choice or Average Choice. Cow body condition score improved (linear, P = .0001) as weaning age decreased. Pregnancy rate improved 12 percentage units (linear, P = .15) for cows on the 90 d weaning treatment. In this study, early weaning improved gain and feed efficiency, but increased total concentrate consumed when compared to steers weaned at an average of 215 d.

INTRODUCTION

Economic pressures to improve production efficiency have prompted the beef cattle industry and researchers to evaluate different production systems. Maintaining pasture productivity and calf gain during midsummer is a problem for most cattle producers. Reduced calf gain is due, in part, to reduced milk consumption after the third month of lactation (Neville, 1962; Robison et al., 1978), and also to reduced productivity of pastures (Burns et al., 1983). Early weaning (Peterson et al., 1987; Myers et al., 1998) has shown promise as a means of increasing calf growth. Green and Buric (1953) concluded that 90-d weaning did not adversely affect beef calves, and the main difference between 90- and 180-d weaned groups was in rate of gain, wherein the average gain per 28-d feeding period was much more uniform for the 90-d group. This study was conducted to evaluate the effects of three weaning ages on 1) steer performance and carcass traits, and 2) cow performance, body condition score, and pregnancy rates.

MATERIALS AND METHODS

Steers and Diets. One hundred sixty-eight commercial Angus x Hereford crossbred cows (414 ± 61 kg initial weight; 129 ± 5 cm initial height; body condition score (BCS) 4 ± .65) nursing Simmental sired steer calves (90 ± 5 kg) were used in a study at the Dixon Springs Agricultural Center, in Simpson, IL. The study was conducted from May 9, 1996 to June 25, 1997. Steers were born from
January-March and nursed their dams while grazing endophyte infected tall fescue (Festuca arundinacea Schreb.)- red clover (Trifolium pratense L.) pastures until May when they were randomly assigned to one of three weaning age treatments where the steer calves were: 1) weaned at an average of 90 d of age and placed in the feedlot (90 ± 13 d; 89 ± 9 kg), 2) weaned at 152 d of age and placed in the feedlot (152 ± 13 d; 89 ± 3 kg), or 3) weaned at 215 d of age and placed in the feedlot (215 ± 13 d; 93 ± 4 kg). We utilized 24 pens with 8 pens per treatment. The cows were maintained on endophyte infected tall fescue pastures for the duration of the experiment. Dams in the study were estrous synchronized and artificially inseminated by multiple sires.

Steers were vaccinated with Cattlemaster 4 + L5, and Ultrabac 7/Somubac® (Smith Kline Beecham, West Chester, PA) on the 90 d weaning. They received boosters of the same vaccinations 3 wk later. On the 152 d weaning, steers were given Cattlemaster 4 + VL5, and Ultrabac 7/Somubac® (Smith Kline Beecham). Prior to calving (January, 1996), cows received an injection of ScourGuard 3 (Smith Kline Beecham, West Chester, PA). Cows were vaccinated with an injection of Cattlemaster 4 + VL5, and Ultrabac 7/Somubac® (Smith Kline Beecham), and were treated for parasites with Ivomec® (Merck, Rahway, NJ) on the 152 d weaning.

At each of the respective weaning ages, all steers were weighed, measured at the hip, and implanted with 36 mg of zeranol (Ralgro®, Mallinckrodt Veterinary Inc., Mundelein, IL). Additionally, dams were weighed and assigned a BCS (1 to 9 scale). All individual steer and cow weights were taken without withdrawal from feed and water. Steers were implanted with 120 mg of trenbolone acetate and 24 mg of estradiol (Revalor®-S, Hoechst Roussel Vet, Somerville, NJ) as a treatment 146, 132, and 104 d prior to harvest for the 90, 152, and 215 d weaning age treatments, respectively.

Beginning at the time of weaning, steers were given ad libitum access to diet one (Table 1). Chopped hay was removed from and corn gluten feed was added to the finishing diet in a stepwise fashion, and steers were adapted to their final diet within 44 d. Steers were allowed to consume the high-concentrate diet on an ad libitum basis for the remaining feeding period. Each treatment had eight pens with seven steers per pen during finishing. Steers were finished in an outdoor confinement facility with overhead shading and solid concrete floors. Pens were equipped with self feeders and automatic waterers.

Steer backfat was monitored by ultrasound. Steers were harvested at a constant fat endpoint (.81 ± .21 cm actual). Four dates were used to harvest steers at a commercial packing facility. Three additional dates were used to process nine lighter weight steers at the targeted external fat thickness. Steer hip height was recorded prior to shipping. Harvest weight was determined by dividing hot carcass weight by .61. Average daily gain, DMI, efficiency (gain/feed), and total concentrate consumed were calculated. Feed intakes are expressed as a daily average over the entire feeding period on a pen basis.

Hot carcass weights were obtained from all steers at the time of harvest. After carcasses were chilled for 24 h, the following measurements were obtained by trained University of Illinois personnel: 1) longissimus muscle area (LMA) taken by direct grid reading of the longissimus at the 12th rib, 2) subcutaneous fat over the longissimus muscle at the 12th rib (subjectively adjusted for unusual fat distribution), 3) kidney, pelvic, and heart fat estimated as a percentage of carcass weight,
Statistical Analysis. Feedlot performance and carcass characteristics were analyzed as a completely randomized design experiment (Steel and Torrie, 1980) using the GLM procedure of SAS (1985). Pen was the experimental unit for the performance data. Steer was the experimental unit for the carcass data. External fat thickness at harvest was used as a covariate for the analysis of both the performance and carcass characteristics.

RESULTS AND DISCUSSION

Effect of Weaning Age on Calf Performance. The effects of weaning age on steer performance traits are shown in Tables 2 and 3. There were no differences (P > .27) in initial weight or harvest weight due to weaning age. The number of days steers were finished decreased by 55 and 38 d (linear, P = .0001) as weaning age increased when harvested at a constant fat endpoint. The age at harvest of the steers increased by 10 and 34 d (linear and quadratic, P = .0001) as weaning age increased (419, 429, and 463 d of age for the 90, 152, and 215 weaning age treatments, respectively).

Steers that were weaned at an average of 90 d exhibited .34 kg/d higher ADG (linear and quadratic, P = .0001) between 90 and 152 d of age than steers that were still nursing their dams. Steers weaned at an average of 90 and 152 d of age exhibited .85 kg/d higher ADG (linear and quadratic, P = .0001) between 152 and 215 d of age than steers weaned at an average of 215 d. Harvey et al. (1975) and Williams et al. (1975) observed differences of .18 and .29 kg between early-weaned and normal-weaned calves, respectively. Neville and McCormick (1981) reported results which indicated that spring-born, early-weaned calves had higher ADG than normal-weaned calves (noncreep-fed) from early (62 d of age) to normal (230 d of age) weaning. Lusby et al. (1981) reported no differences in calf weights between early- and normal-weaned calves (noncreep-fed) born to spring-calving, 2-yr-old cows. However, they concluded the calves needed a complete mixed diet or a better quality forage than was used to make adequate gains without milk.

There were no differences (P > .17) in ADG when all steers were in the feedlot. Weaning at an average of 90 and 152 d of age improved overall ADG by .15 and .07 kg/d, respectively, over weaning at an average of 215 d of age (linear, P = .005). These results are consistent with Myers et al. (1998) who found early weaning improved overall ADG by .07 kg/d over normal-weaned steers. There were no differences in initial height (P > .48), or height change from 90 to 152 d of age steers. Earlier weaning resulted in a linear (P = .0001) increase in height change between 152 and 215 d of age. From 215 to 438 d of age there was a linear (P = .02) decrease in height change. No differences (P > .21) in overall height change were observed due to weaning age. These results are consistent with Myers et al. (1998).

Steers weaned at an average of 90 d of age consumed 3.39 kg/d and exhibited gain:feed ratio of .325 units prior to 152 d of age. During 152 to 215 d of age, intake for the steers weaned at an average of
90 and 152 d of age were 6.19 and 5.58 kg/d (linear, $P = .04$), respectively. Treatment did not affect efficiency ($P = .15$) during this time period. Harvey et al. (1975) used equal numbers of steer and heifer calves and found that feed efficiency (feed:gain) from 150 to 234 d of age was 5.67 for early-weaned calves. Williams et al. (1975), using only bull calves, reported a feed efficiency of 4.56 (feed:gain) from 106 to 205 d of age for early-weaned calves. Intake and efficiency were similar ($P > .32$) among treatments after d 215 of age. Over the entire feedlot period, intake increased (linear, $P = .0006$) and efficiency (gain:feed) was poorer (linear, $P = .004$) as weaning age increased. From 215 to 438 d of age, steers consumed 1.9, 2.0, and 2.2% of body weight for the 90, 152, and 215 d weaning age treatments, respectively. This may help explain some of the differences observed in efficiency overall. Although these intakes are lower than typical feedlot cattle, they are consistent with Fox et al. (1988) which suggested a 10% decrease in predicted DMI by cattle started on feed as calves compared with cattle started on feed as yearlings. Due to differences in finishing days and intake, total concentrate consumed increased (linear, $P = .03$) as weaning age decreased.

**Carcass Evaluation.** The effects of weaning age on carcass quality traits are shown in Table 4. No differences ($P > .23$) were observed for carcass weight, percentage of carcasses under 250 kg, or LMA. Kidney, pelvic, and heart fat tended (linear, $P = .14$) to increase as weaning age increased. No differences ($P > .21$) were observed for yield grade, except for the percentage of yield grade 3 carcasses which were lower (quadratic, $P = .02$) for the steers weaned at an average of 152 d. Eighty-seven percent of the steers had a yield grade of 2.9 or below, with an average yield grade of 2.4.

No differences ($P > .19$) were observed in marbling score, percentage of steers grading greater than or equal to Choice or Average Choice. Over 90% of the steers in all three treatments graded Choice or higher. In an experiment by Myers et al. (1998), early weaning improved marbling score ($1,100 = \text{Modest}^{90}$) by 66 units over normally weaned (with and without creep feed) Angus x Hereford crossbred steers. Similar results were also observed using Simmental crossbred and Wagyu crossbred steers. However, in that experiment steers were harvested at .30 cm more external fat thickness than those in this study.

**Health of Steers.** A quadratic response was observed for the percentage of morbidity-respiratory steers treated ($P = .004$) and morbidity-digestive steers treated ($P = .04$, Table 5). The steers weaned at an average of 90 d had not received a vaccination prior to weaning, which could explain the high percentage of morbidity-respiratory treated steers. The high percentage of morbidity-respiratory for the steers weaned at an average of 215 d may be attributed to effects of weather. In the 30 days after weaning for each treatment, steers weaned at an average of 215 d had a maximum daily variation that was 5.6°C higher and had an average of 1.7°C more daily variation compared to steers weaned at an average of 90 or 152 d of age. A similar response for morbidity-respiratory was observed by Myers et al. (1998) for steers early and normal weaned compared to steers weaned at an average of 152 and 215 d in this study. No differences ($P > .15$) were observed between treatments for the percentage of mortality-respiratory, mortality-digestive, or mortality-unknown. One steer on the 90 d treatment died of polio. Two steers died on the 152 d treatment, one due to respiratory problems and one due to unknown reasons. Three steers died on the 215 d treatment, two due to respiratory problems, and one due to an injury.
**Effect of Weaning Age on Cow Performance.** The effects of weaning age on cow performance are shown in Table 6. Initial weights and weights 152 d postpartum were similar (P > .47) among treatments. Cow weight, at 215 d postpartum, was increased linearly (P = .01) as weaning age decreased. Higher ADG (linear and quadratic, P < .0003) were observed between 90 and 152 d postpartum for those cows whose calves were weaned at an average of 90 d of age. Early weaning improved ADG between 152 and 215 d postpartum (linear, P = .0001) as weaning age decreased. The ADG from 90 to 215 d postpartum increased (linear and quadratic, P > .003) as weaning age decreased. These differences were reversed (linear, P = .006) from d 215 to 375 postpartum, but some of the difference in ADG still remained. Myers et al. (1998) also reported that cows with early weaned steers improved ADG by .53 kg/d over cows with normal weaned calves (creep and noncreep fed).

There were no differences (P > .32) in initial BCS due to weaning age. Weaning at an average of 90 d improved cow BCS at 152 d postpartum (linear and quadratic, P = .05). The BCS improved (linear, P = .0001) as weaning age decreased. Weaning at an average of 90 d increased BCS change (linear and quadratic, P < .009) from 90 to 152 d postpartum. The BCS change decreased (linear, P = .0001) as weaning age increased between 152 and 215 d postpartum. The BCS change from 90 to 215 d postpartum increased (linear and quadratic, P > .09) as weaning age decreased. Myers et al. (1998) gave further evidence that early weaning improved BCS compared to cows with normal weaned steers (creep and noncreep fed). These differences were reduced (linear and quadratic, P < .07) from d 215 to 375 postpartum, but some of the difference in BCS still remained. The BCS changes agreed with changes in ADG.

Peterson et al. (1987) reported that cows with early-weaned calves gained 2.5 kg, while cows with normal-weaned calves lost 18.2 kg between early and normal weaning. Cows with normal-weaned calves lost body weight and condition due to the greater energy requirements for lactation as compared with early-weaned cows. The lactating cows did not consume enough feed to meet their energy requirements for lactation; thus, body stores were utilized. The cows with early-weaned calves consumed enough feed to meet energy requirements for maintenance and weight gain.

Pregnancy rate improved by 18% (linear, P = .15) for cows on the 90 d weaning treatment. Pregnancy results were similar for the 152 and 215 d treatments which would be expected since the calves were removed after the breeding season. Laster et al. (1973) reported that weaning prior to the breeding season increased overall conception by 25.9% in 2-yr-old cows, 15.6% in 3-yr-olds, and 7.9% in cows 4 yr old and older.

In a study by Smith and Vincent (1972), calves were early-weaned at 30 d of age. The breeding period on pasture for the dams and dams nursing their calves began at that time and continued for 70 d. Dams of early-weaned calves had a higher pregnancy rate and a shorter interval from parturition to conception than dams that nursed their calves. In a study by Laster et al. (1973), calves were early weaned at 57 d of age and cows began a 42-d breeding period 1 wk after early weaning. Dams of early weaned calves had an overall higher conception rate than dams nursing calves; conception rate was higher for 2 yr olds than for mature dams. However, among the cows bred, the interval from calving to conception was not affected by early weaning but was affected by breed of cow and calving date.

**CONCLUSIONS**
Early weaned steers increased number of days in the feedlot, reduced harvest age, improved gain, improved feed efficiency, and reduced daily intake, but increased total concentrate consumed compared to weaning at an average of 215 days of age. Cow gain, body condition score and subsequent pregnancy rate were improved by early weaning.

LITERATURE CITED


Table 1. Composition of finishing diets fed to steers

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<td>.55</td>
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Feed Analysis

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<td>Crude Protein, %</td>
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<td>17.64</td>
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<td>18.51</td>
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<td>NE&lt;sub&gt;G&lt;/sub&gt;, Mcal/kg</td>
<td>.23</td>
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<td>.27</td>
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<sup>a</sup>DM basis.

<sup>b</sup>Composition (%): NaCl (82 to 87), Fe (≥2.85), Zn (≥2.30), Mn (≥.22), Cu (≥.20), I (≥.01), Se (≥.0086).

<sup>c</sup>Contains 132 g of monensin/kg.

<sup>d</sup>Contains 22 g of tylosin/kg.
Table 2. Effects of three weaning ages on steer performance$^{ab}$

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<th>Item</th>
<th>Weaning age, d</th>
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<tr>
<td></td>
<td>90</td>
<td>152</td>
</tr>
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<td>No. of pens</td>
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<td>8</td>
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<td>Initial wt, kg</td>
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<td>89</td>
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<td>Harvest wt$^e$, kg</td>
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<td>Days in feedlot</td>
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<td>ADG, kg</td>
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<td>90-152 d of age</td>
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<td>152-215 d of age</td>
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<td>215-438 d of age</td>
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<tr>
<td>Overall</td>
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<td>Initial ht, cm</td>
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<td>90-152 d of age</td>
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<td>152-215 d of age</td>
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<td>215-438 d of age</td>
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<td>Overall</td>
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<td>40.7</td>
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$^a$Least squares means.  
$^b$External fat thickness was used as a covariate (mean = .81 cm).  
$^c$P value of a linear (L) and quadratic (Q) affect of treatment.  
$^d$Greatest standard error of treatment means (SEM) reported.  
$^e$Calculated as hot carcass weight/.61.
Table 3. Effects of three weaning ages on steer performance$^{ab}$

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<tr>
<th>Item</th>
<th>90</th>
<th>152</th>
<th>215</th>
<th>SEM$^d$</th>
<th>L</th>
<th>Q</th>
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<td>DMI, kg/d$^e$</td>
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<td>90-152 d of age</td>
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<td>152-215 d of age</td>
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<td>Overall</td>
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<td>1,826</td>
<td>1,758</td>
<td>58</td>
<td>.03</td>
<td>.41</td>
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$^a$Least squares means.
$^b$External fat thickness was used as a covariate (mean = .81 cm).
$^c$P value of a linear (L) and quadratic (Q) affect of treatment.
$^d$Greatest standard error of treatment means (SEM) reported.
$^e$Greatest standard error of treatment means (SEM) reported.
$^f$Total concentrate, during finishing phase.
Table 4. Effects of three weaning ages on carcass quality$^{ab}$

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<th>Item</th>
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<th>215</th>
<th>SEM$^d$</th>
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<tr>
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<td>285</td>
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<td>≤250 kg, %</td>
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<td>LMA$^e$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sq cm</td>
<td>78.0</td>
<td>77.6</td>
<td>79.1</td>
<td>1.18</td>
<td>.50</td>
<td>.49</td>
</tr>
<tr>
<td>Sq cm/kg HCW$^f$</td>
<td>.27</td>
<td>.27</td>
<td>.28</td>
<td>.01</td>
<td>.23</td>
<td>.45</td>
</tr>
<tr>
<td>Est. KPH$^g$, %</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>.1</td>
<td>.14</td>
<td>.69</td>
</tr>
<tr>
<td>Avg. Yield grade</td>
<td>2.45</td>
<td>2.33</td>
<td>2.39</td>
<td>.06</td>
<td>.50</td>
<td>.21</td>
</tr>
<tr>
<td>Yield grade 1, %</td>
<td>15</td>
<td>21</td>
<td>22</td>
<td>5</td>
<td>.37</td>
<td>.63</td>
</tr>
<tr>
<td>Yield grade 2, %</td>
<td>66</td>
<td>74</td>
<td>64</td>
<td>7</td>
<td>.88</td>
<td>.27</td>
</tr>
<tr>
<td>Yield grade 3, %</td>
<td>19</td>
<td>5</td>
<td>14</td>
<td>4</td>
<td>.39</td>
<td>.02</td>
</tr>
<tr>
<td>Marbling score$^h$</td>
<td>1,140</td>
<td>1,121</td>
<td>1,115</td>
<td>15</td>
<td>.24</td>
<td>.69</td>
</tr>
<tr>
<td>≥Choice, %</td>
<td>98</td>
<td>96</td>
<td>92</td>
<td>3</td>
<td>.19</td>
<td>.76</td>
</tr>
<tr>
<td>≥Avg. Choice, %</td>
<td>65</td>
<td>53</td>
<td>56</td>
<td>7</td>
<td>.38</td>
<td>.34</td>
</tr>
<tr>
<td>≥Prime, %</td>
<td>11</td>
<td>9</td>
<td>6</td>
<td>4</td>
<td>.37</td>
<td>.84</td>
</tr>
</tbody>
</table>

$^a$Least squares means.
$^b$External fat thickness was used as an covariate (mean = .80 cm).
$^c$P value of a linear (L) and quadratic (Q) affect of treatment.
$^d$Greatest standard error of treatment means (SEM) reported.
$^e$Longissimus muscle area.
$^f$Hot carcass weight.
$^g$Kidney, pelvic, heart fat.
$^h$Marbling score = 1,100 = Modest $^{00}$. 
Table 5. Health of steers weaned at three ages

<table>
<thead>
<tr>
<th>Item</th>
<th>90</th>
<th>152</th>
<th>215</th>
<th>SEM</th>
<th>L</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morbidity-respiratory, %</td>
<td>25</td>
<td>6</td>
<td>22</td>
<td>.05</td>
<td>.70</td>
<td>.004</td>
</tr>
<tr>
<td>Morbidity-digestive, %</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>.05</td>
<td>.95</td>
<td>.04</td>
</tr>
<tr>
<td>Mortality-respiratory, %</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>.03</td>
<td>.15</td>
<td>.99</td>
</tr>
<tr>
<td>Mortality-digestive, %</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>.02</td>
<td>.23</td>
<td>.49</td>
</tr>
<tr>
<td>Mortality-unknown, %</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>.02</td>
<td>.38</td>
<td>.62</td>
</tr>
</tbody>
</table>

*a* Least squares means.

*b* P value of a linear (L) and quadratic (Q) affect of treatment.

*c* Greatest standard error of treatment means (SEM) reported.
Table 6. Effects of three weaning ages on cow performance\textsuperscript{a}

<table>
<thead>
<tr>
<th>Item</th>
<th>Weaning age, d</th>
<th>P =</th>
<th>Contrast\textsuperscript{b}</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cows</td>
<td>90 152 215</td>
<td></td>
<td>SEM\textsuperscript{c} L Q</td>
</tr>
<tr>
<td>Initial wt, kg</td>
<td>411 418 417</td>
<td>8</td>
<td>.54 .59</td>
</tr>
<tr>
<td>d 152\textsuperscript{d} wt, kg</td>
<td>414 404 408</td>
<td>8</td>
<td>.58 .47</td>
</tr>
<tr>
<td>d 215\textsuperscript{d} wt, kg</td>
<td>459 439 432</td>
<td>8</td>
<td>.01 .47</td>
</tr>
<tr>
<td>ADG, kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d 90-152\textsuperscript{d}</td>
<td>.05 - .22 - .15</td>
<td>.04</td>
<td>.0003 .0002</td>
</tr>
<tr>
<td>d 152-215\textsuperscript{d}</td>
<td>.72 .56 .38</td>
<td>.03</td>
<td>.0001 .98</td>
</tr>
<tr>
<td>d 90-215\textsuperscript{d}</td>
<td>.39 .17 .12</td>
<td>.03</td>
<td>.0001 .003</td>
</tr>
<tr>
<td>d 215-375\textsuperscript{de}</td>
<td>-.08 -.02 .04</td>
<td>.03</td>
<td>.006 .82</td>
</tr>
<tr>
<td>Initial BCS\textsuperscript{f}</td>
<td>4.2 4.3 4.2</td>
<td>.09</td>
<td>.86 .32</td>
</tr>
<tr>
<td>d 152\textsuperscript{d}</td>
<td>4.4 4.1 4.2</td>
<td>.09</td>
<td>.04 .05</td>
</tr>
<tr>
<td>d 215\textsuperscript{d}</td>
<td>4.9 4.5 4.2</td>
<td>.08</td>
<td>.0001 .30</td>
</tr>
<tr>
<td>BCS change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d 90-152\textsuperscript{d}</td>
<td>.12 -.23 -.08</td>
<td>.08</td>
<td>.09 .009</td>
</tr>
<tr>
<td>d 152-215\textsuperscript{d}</td>
<td>.53 .39 .07</td>
<td>.08</td>
<td>.0001 .35</td>
</tr>
<tr>
<td>d 90-215\textsuperscript{d}</td>
<td>.67 .16 .00</td>
<td>.09</td>
<td>.001 .09</td>
</tr>
<tr>
<td>d 215-375\textsuperscript{de}</td>
<td>-.66 -.22 -.33</td>
<td>.13</td>
<td>.06 .07</td>
</tr>
<tr>
<td>Pregnancy, %</td>
<td>79 67 67 6</td>
<td>.15</td>
<td>.45</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Least squares means.
\textsuperscript{b}P value of a linear (L) and quadratic (Q) affect of treatment.
\textsuperscript{c}Greatest standard error of treatment means (SEM) reported.
\textsuperscript{d}Postpartum.
\textsuperscript{e}Only pregnant cows (subsequent calving day of 375, ± 20 d, n = 111).
\textsuperscript{f}Body condition score (1=emaciated, 9=extremely fat).