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Initial heifer body composition has little impact on response to Zilmax

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Abstract
Using a growth promotant at the correct time of finishing is critical for maximizing profit potential. Previous studies have shown that zilpaterol-HCl (Zilmax; Intervet/ Schering-Plough Animal Health, Millsboro, DE) improves carcass characteristics. The objective of this study was to determine effects of prior body composition on subsequent changes in carcass weight, fatness, and muscle in heifers fed Zilmax so producers can introduce Zilmax at the level of finish that will result in the most desirable response. We hypothesized that fatter heifers use fat as the fuel for muscle growth.

Keywords
Cattlemen's Day, 2010; Kansas Agricultural Experiment Station contribution; no. 10-170-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1029; Beef Cattle Research, 2010 is known as Cattlemen's Day, 2010; Beef; Heifer; Zilmax; Growth promotant

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Introduction
Using a growth promotant at the correct time of finishing is critical for maximizing profit potential. Previous studies have shown that zilpaterol-HCl (Zilmax; Intervet/Schering-Plough Animal Health, Millsboro, DE) improves carcass characteristics. The objective of this study was to determine effects of prior body composition on subsequent changes in carcass weight, fatness, and muscle in heifers fed Zilmax so producers can introduce Zilmax at the level of finish that will result in the most desirable response. We hypothesized that fatter heifers use fat as the fuel for muscle growth.

Experimental Procedures
Crossbred heifers (n = 353; 941 ± 19.5 lb) were fed finishing diets consisting of a combination of steam-flaked corn and processed grain by-products with 3% alfalfa hay and 6% corn silage. Diets provided 300 mg monensin, 90 mg tylosin, and 0.5 mg melengestrol acetate per animal daily. Before initiation of the study, heifers were assigned randomly to experimental diets and pens within weight block. Cattle were placed into 1 of 48 concrete-surfaced pens; there were seven to eight animals per pen. Cattle were fed once daily and had free-choice access to feed and water.

Prior to feeding Zilmax, cattle were weighed, and ribeye area, rump fat thickness, and 12th rib fat thickness were measured by ultrasound. Average daily gains for individual heifers were calculated for the 66-day period preceding initiation of Zilmax feeding, and pre-Zilmax hot carcass weights were estimated by regression using ribeye area, rib fat thickness, and pre-Zilmax body weight. Zilmax was added to finishing diets at 7.56 g/ton (dry matter basis) beginning 23 days before harvest and withdrawn for the final 3 days on feed. Heifers were slaughtered at a commercial abattoir, where carcass data were collected.

Regression formulas were developed to estimate the effects of the means of pre-Zilmax body weight, rump fat thickness, rib fat thickness, ribeye area, and average daily gain on subsequent post-Zilmax changes in 12th rib fat thickness, yield grade, ribeye area, and carcass average daily gain.

Results and Discussion
The following formulas were used to estimate the relationship between initial carcass measurements and changes in fatness or carcass weight that developed during the Zilmax feeding period:

> Change in 12th rib fat thickness (in inches) = (0.43 × rump fat) – 0.08 ($R^2 = 0.09$, $P<0.01$).

Change in carcass average daily gain (lb/day) = (0.007 × pre-Zilmax body weight) – (0.18 × ribeye area) – 3.67
($R^2 = 0.13$, $P<0.01$). This formula is shown in Figure 1.

Yield grade change = (2.21 × rump fat) + (0.002 × pre-Zilmax body weight) – (0.10 × pre-Zilmax average daily gain) – (0.11 × ribeye area) – 2.16
($R^2 = 0.28$, $P<0.01$).

The following formulas illustrate that increases in ribeye areas were more pronounced in leaner, heavier heifers that started with smaller ribeyes:

Change in ribeye area (square inches) = 6.88 – (0.68 × ribeye area) – (2.06 × rump fat) – (2.96 × rib fat) + (0.004 × pre-Zilmax body weight) + (0.26 × pre-Zilmax average daily gain)
($R^2 = 0.58$, $P<0.01$).

Change in carcass efficiency = (-0.67 × ribeye area) – (2.07 × rump fat) – (2.93 × rib fat) + (0.004 × pre-Zilmax body weight) + (0.26 × pre-Zilmax average daily gain) + 6.91
($R^2 = 0.58$, $P<0.01$).

Implications

Feeding Zilmax can be an effective management tool for feedlot operators. This study suggests that benefits of Zilmax are similar for lean and fat heifers. Carcass gain efficiency is also similar for lean and fat heifers. Feeding Zilmax to fatter heifers does not elicit a better response that would justify costs of the extended feeding period. Zilmax should be fed to heifers with a typical degree of finish because degree of fatness does not drive the Zilmax response. Formulas from this study may help predict changes in carcass composition when feeding Zilmax to heifers.

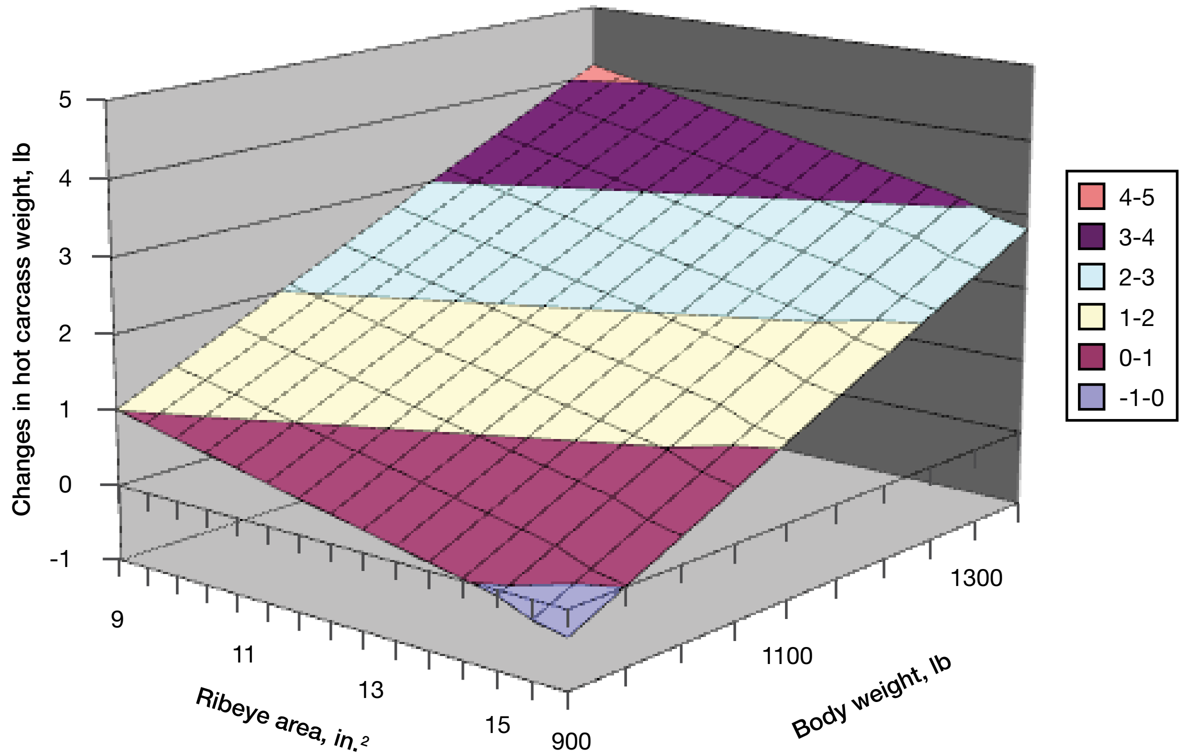

Figure 1. Changes in hot carcass weight as affected by ribeye size and live body weight of feedlot heifers.