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Carcass merit traits: development of EPDS for Warner-Bratzler shear force and DNA marker validation

Abstract

Warner-Bratzler shear force data on strip loin steaks were obtained on 761 steers from contemporary groups of progeny from the most popular 38 Simmental sires, and 133 steers from nine Simbrah sires. The range for Warner-Bratzler shear force EPDs for the Simmental sires was from -0.51 lb (more tender) to +0.48 lb (less tender). The range in EPDs for the Simbrah sires was from -0.73 to +0.73 lb. In addition, DNA analyses and screening have been completed for 11 quantitative trait loci on several Simmental and Simbrah sires. Information from this project should allow cattle producers to improve carcass traits, tenderness, and other palatability traits through classical genetic selection or through DNA marker-assisted selection.

Keywords

Cattlemen's Day, 2001; Kansas Agricultural Experiment Station contribution; no. 01-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 873; Beef; EPDs; Warner-Bratzler shear force; DNA marker; Carcass merit traits

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CARCASS MERIT TRAITS: DEVELOPMENT OF EPDS FOR WARNER-BRATZLER SHEAR FORCE AND DNA MARKER VALIDATION

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Summary

Warner-Bratzler shear force data on strip loin steaks were obtained on 761 steers from contemporary groups of progeny from the most popular 38 Simmental sires, and 133 steers from nine Simbrah sires. The range for Warner-Bratzler shear force EPDs for the Simmental sires was from -0.51 lb (more tender) to +0.48 lb (less tender). The range in EPDs for the Simbrah sires was from -0.73 to +0.73 lb. In addition, DNA analyses and screening have been completed for 11 quantitative trait loci on several Simmental and Simbrah sires. Information from this project should allow cattle producers to improve carcass traits, tenderness, and other palatability traits through classical genetic selection or through DNA marker-assisted selection.

Introduction

The Carcass Merit Project is described in the preceding article. The specific objective reported here was to measure longissimus muscle (strip loin steak) Warner-Bratzler shear force and to calculate EPDs based on 761 progeny from 38 Simmental sires and 133 progeny from nine Simbrah sires.

Experimental Procedures

Strip loin steaks were obtained from 761 progeny of the 38 most widely used Simmental sires and 133 progeny from nine of the

most widely used Simbrah sires, both mated to commercial cows. Steaks were retrieved at the time of carcass data collection. One or more reference sires was used in each test herd. BIF guidelines for sire evaluation were followed. Steaks were vacuum packaged and aged at 33-37°F until 14 days postmortem. They were cooked in a Blodgett oven at 325°F to an endpoint temperature of 158°F. Eight ½-inch cores were removed and sheared on an Instron Universal Testing Machine using the Warner-Bratzler shear device. Researchers at Cornell University conducted the genetic evaluations and calculations of EPDs, using a heritability estimate of 30% for Warner-Bratzler shear force.

Preliminary Results

Table 1 lists Simmental and Simbrah sires that had seven or more progeny evaluated, their sire and maternal grandsire, their EPDs, the EPD accuracy, and the number of progeny slaughtered. The most tender Simmental sire had an EPD for Warner-Bratzler shear force of -0.51 lb and the least tender sire had an EPD of +0.48 lb. The most tender Simbrah sire had an EPD of -0.73 lb and the least tender, +0.73 lb. The accuracies are relatively low for some of the sires because of small progeny numbers. The differences in the accuracy values are somewhat analogous to meteorologists predicting a 20% versus a 40% chance of rain. In other words, an accuracy of 0.42 means that the EPD value is

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more reliable than one with an accuracy of 0.16. The differences in these EPD values are large enough to allow for genetic im-

provement in tenderness when used in selection, particularly in the Simbrah breed.

Table 1. Simmental and Simbrah Sire Names, Their Sire and Maternal Grandsire, Expected Progeny Difference, Accuracy, and Number of Progeny Evaluated

Simmental Sire Name	Sire/Maternal Grandsire	WBSF ¹		No. of Progeny
		EPD	Accuracy	
3C Pasque 8773	Mr Abondance/Siegfrieds Powerthe	0.03	0.33	22
3C Wally C240	Emmons Black Hercules/HPS Night Rider	0.35	0.26	13
ALR Mr Lincoln	Cherithbrook Mr Abe/DS Polltime	0.24	0.16	9
ASR Cactus Red Z002	Polled Stretch/Alpine Polled Proto	0.3	0.35	42
Black Irish Kansas	Irish Black Knight/Kansas Black Jim	-0.09	0.42	37
Black Mick	Black Knight U2/Irish Rover	-0.04	0.31	20
Bold Future	Bold Ruler/H&S Pete	0.28	0.33	20
Boz Red Jet	Red Brother/Landridge Jet Black	-0.01	0.2	9
Burns Bull X339U	Black Max/Buck	0.14	0.29	17
Charles Pride	Copper Black S72/Landridge Jet Black	0.2	0.39	28
Circle S Leachman 600U	Landridge Jet Black/Steelman	-0.41	0.46	50
DS Zinger 141B	Hercules 538P/3X	0.15	0.29	15
DS Pollfleck 809	ABR Sir Arnold G809/Urspring	-0.24	0.29	15
Emmons Black Hercules	Landridge Jet Black/Hercules 538P	-0.21	0.31	21
ER Americana 537B	Black Max/Hercules 538P	-0.11	0.26	13
ER Big Sky 545B	ER Black Mack 568Y/Siegfried	-0.2	0.36	26
ER Mackfrid 550B	ER Black Mack 568Y/Siegfried	-0.25	0.32	21
F Nichols Black Advantage	Nichols Dynamite 9X/Buck	-0.18	0.33	19
Five Oaks Black Stretch	Polled Stretch/Buck	-0.35	0.21	11
GW Tailor Made 515A	Meyers Black Equalizer/T N T Mr T	0.45	0.27	16
HF/GF1 Powerline 7F	MV Red Light 406/Black Max	-0.51	0.23	11
J&C Black Maxi Van	J & C Black Maximizer W5/Extra	-0.19	0.21	17
Klondike Arnie GNM 250Z	SRF Mr Bigfoot S138/Bold	0	0.33	21
KSR Dr Pepper D405	Red Pepper/Grand Desire	0.03	0.27	21
LRS Preferred Stock 370C	Circle S Leachman 600U/Irish Black Knight	-0.16	0.28	12
Meyers Blacktop 206Y	Buck/Eagle	-0.33	0.31	17
Meyers Red Top	Meyers Blacktop 206Y/Chocolate Chip K34	-0.21	0.26	11
Nichols Big Easy D56	Nichols Dynamite 9X/Leachman Blk Baron 235X	-0.16	0.16	9
Nichols Black Destiny D12	CircleS Leachman 600U/Buck	-0.08	0.44	59
Nichols Blockbuster D100	Nichols Dynamite 9X/Buck	-0.3	0.25	30
Nichols Prime Rib E160	Nichols Prime Rib C139/F Nichols Black Advantage	-0.05	0.3	51
NLC Good A Nuff 33G	NLC 64 Tomcat/Leachman Red Baldy 438W	0.02	0.27	25
PVF-BF26 Black Joker	Harts Black Casino B408/Hercules 538P	-0.13	0.16	7
SRS Franchise F601	LRS Preferred Stock 370C/Meyers Black Power	-0.13	0.19	8
SSS Craftsman 004F	DS Black Zinger 141B/Black Polled Dakota	0.48	0.19	8
SV Red Charlie	Charles Pride/TT Red Delight	0.12	0.22	8
TKBS Mr Pride F164	Charles Pride/Meyers Blacktop 206Y	0.13	0.21	8
WHF Desperado 212G	PLT Cutting Edge D209/LRS Preferred Stock 370C	0.11	0.15	7
Simbrah Sire Name				
HR Nile King	PRR King Aurthur/Mr Pete 535P	0.46	0.31	21
K Bar Southern Comfort	RBR Legacy/Red Rajah	-0.32	0.26	14
LL&L Blaze of Mississip	Mississippi	0.44	0.24	12
LMC Accountant 5A/174	LMC Money 8412P/5P Baliia 659	0.73	0.28	17
LMC Energizer 5B/155	Sir Nick 24Y/Wards Bravo 1/09	0.05	0.13	8
Parthenon Matador B218	K Bar Southern Comfort/Counter Sign	-0.48	0.29	18
PRR Pacesetter 205C	ISB MrX108X/RBR Net Profit	-0.06	0.28	16
RX Banner's B200	RX Polled Banner Zo2/AFI Honcho Supreme	-0.47	0.25	13
RX Colorado C332	HS Nail Z490 Abundance/RX Cognac 202	-0.73	0.26	14

¹Warner-Bratzler shear force.