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The Effects of Sire Line, Slaughter Weight, and Gender on Pork Quality and Yield Characteristics

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Objectives

Pork continues to be a significant source of highly valued animal protein for the growing global population. Due primarily to the push for lean yield in the US swine industry, there is a demand from consumers for higher quality pork, while producers continue to desire improved yields. The purpose of this study is to determine the effects of gender and slaughter endpoint on carcass quality and composition attributes for pork from lean yield and meat quality sire lines.

Materials and Methods

Boars from a meat quality line (MQL) and a lean yield line (LYL) were mated to females from a commercial swine genetics company. Pigs were farrowed, weaned, and processed according to a typical industry protocol at the University of Georgia Swine research unit. As the pigs reached approximately 23 kg, three pigs from each gender within a litter were selected and randomly assigned a slaughter weight of 113, 136, or 159 kg. When the pigs reached their assigned slaughter weight, they were harvested at The University of Georgia Meat Science and Technology Center under inspection. A total of 151 pigs from 26 litters (13 per sire line) were evaluated. After carcasses were chilled for 24 h, carcass length was measured, and carcasses were then ribbed. Tenth rib back fat (TRBF), last rib back fat (LRBF), loin pHu, carcass muscle score (CMS), NPPC color and marbling scores, Hunter L*a*b*, loin eye area (LEA), and temperature were measured in the longissimus dorsi (LD). Primal and subprimal weights were collected and recorded from the fabricated carcass. Length, width, and depth (thickness) as well as firmness of the skinless belly was assessed. Samples were removed from the LD anterior to the 11thrib for proximate analysis, drip loss, Warner-Bratzler, and slice shear force collection. Data were analyzed using PROC MIXED procedures in SAS with the fixed effects of sire line, gender, and slaughter endpoint and their interactions. LSMEANS were generated and separated using LSD.

Results

Backfat thickness (TRBF and LRBF) was higher in MQL ($P < 0.01$) than LYL, and lower in females ($P < 0.01$) than males. The LYL had a greater LEA ($P < 0.01$) than MQL, and females had a larger LEA ($P < 0.01$) than males. Marbling and firmness scores (NPPC) were greater in MQL ($P < 0.01$) than in LYL. As a percent of carcass weight, loin and ham weights were higher for LYL ($P < 0.01$) than MQL; however, belly weight was greater for MQL ($P < 0.01$) when compared to LYL. Belly dorsal firmness was greatest in MQL lines with slaughter weight of 159 kg ($P < 0.01$). Belly dimensions increased ($P < 0.01$) as slaughter weight increased. Proximate analysis of the LD showed that lipid content was higher ($P < 0.01$) and moisture content was lower ($P < 0.01$) in the MQL compared to LYL. Protein levels of the LD were lower from pigs slaughtered at 113 kg ($P < 0.01$) than both 136 kg and 159 kg. Shear force, by both measurements, was lower in chops from pigs slaughtered at 113 kg ($P < 0.01$) compared to those slaughtered at 136 and 159 kg. Percent fat free lean was greater ($P < 0.01$) in LYL, females, and pigs slaughtered at 113 kg compared to MQL, males, and pigs slaughtered at 136 and 159 kg, respectively.

Conclusion

Overall, there were meat quality advantages for the MQL, but they occurred at the expense of yield, where LYL is superior. Increasing slaughter weights increased primal and subprimal weights and reduced lean yield but had little effect on carcass quality.