

Title: The effect of long term selection for reduced backfat and increased loin muscle area on meat and eating quality traits in Duroc swine – **NPB #02-221**

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Abstract: A study was conducted to evaluate differences in performance, carcass composition, and eating quality characteristics of pigs sired by purebred Duroc boars currently available and pigs sired by purebred Duroc boars from the mid 1980's. Two lines were developed by splitting and randomly allocating littermate and ½ sib pairs of females to matings by current (CTP) or old (OTP) time period boars. Subsequent boar, barrow, and gilt progeny from two replications were weighed on test at a group mean live weight of 140 lbs. Off-test ultrasonic LMA, BF10, and IMF measurements were collected on 789 pigs at a mean live weight of 240 lb. Records on pigs sired by CTP boars, from both replications (n=556), represented 23 sires while pigs sired by OTP boars (n=231) consisted of 15 sire groups. All available barrows and randomly selected gilts (n=277) were sent to a commercial abattoir and measurements of tenth-rib backfat (CBF10), last rib backfat (CLRBF), last lumbar backfat (CLLBF), and loin muscle area (CLMA) were collected. Chemical intramuscular fat percentage was determined by lab analysis of a loin sample from the 10th rib face of the longissimus muscle. Additional meat and eating quality traits measured were: Minolta reflectance and Hunter L (24 and 48 h); pH (24 h and 7 d); water holding capacity; subjective visual scores for color, marbling, and firmness (48 h); Instron tenderness, cooking loss, and trained sensory panel evaluations (7 d). Six serial ultrasonic measurements of 10th rib loin muscle area (LMA), off-midline backfat (BF10), and intramuscular fat percentage (IMF) from the first replication were collected every two weeks and used to assess deposition rate and growth pattern differences.

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There was no significant difference in average daily gain of pigs sired by boars from the two time periods. Pigs sired by CTP boars had larger ($P < 0.05$) LMA measurements and less BF10, while pigs sired by OTP had significantly more IMF. Carcass evaluation revealed larger CLMA measurements, and significantly less CBF10, CLRBF, and CLLBF measurements for pigs sired by CTP boars. Pigs sired by OTP boars had a higher intramuscular fat percentage, lower Instron tenderness values, and higher subjective marbling and color scores than pigs sired by CTP boars ($P < 0.05$). There were no significant differences between time periods for Minolta reflectance, Hunter L (24 and 48 h), water holding capacity, pH (24 h and 7 d), and subjective firmness scores. Trained sensory evaluations revealed higher ($P < 0.05$) flavor scores and lower off-flavor scores for OTP sired pigs; however, no significant differences in tenderness score, juiciness score, chewiness score, and cooking loss were found between lines. Mean deposition rates for ultrasonically measured LMA, BF10, and IMF were not significantly different between the two lines. Pigs sired by CTP boars had more LMA ($P < 0.05$) than those sired by OTP boars at scan 1 (3.83 in² vs. 3.55 in²), scan 3 (4.98 in² vs. 4.44 in²), and scan 5 (6.04 in² vs. 5.21 in²). Likewise, CTP pigs had less backfat ($P < 0.05$) than OTP pigs at scan 1 (0.52 in vs. 0.59 in), scan 3 (0.65 in vs. 0.79 in), and scan 5 (0.72 in vs. 0.95 in). Time period differences for ultrasonically measured IMF percentage were not significant at scan 1; however, pigs sired by CTP boars deposited less IMF ($P < 0.05$) than pigs sired by OTP boars at scan 3 (3.55% vs. 3.96%), and scan 5 (3.99% vs. 4.51%).