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J D. Wheat

Donald H. Kropf

P Na-Lampang

See next page for additional authors

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Selection for muscling in Durocs

Authors

J D. Wheat, Donald H. Kropf, P Na-Lampang, and Robert H. Hines

Summary

Select line pigs were compared with those in the control line for growth patterns, production traits, and carcass quality. Heritability and genetic correlations were calculated for certain production and carcass traits after five generations of selection.

Introduction

Heritability of backfat thickness (BF) is moderately high so rapid progress was made in reducing BF when the metal probe, and later ultrasonic techniques of measuring BF in live animals became available. Unfortunately the porcine stress syndrome (PSS) and pale, soft exudative (watery) carcasses (PSE) accompanied production of the leaner, more muscular "meat-type" hogs. Observations on 904 pigs, in a line selected for maximum loin eye area (LEA) and minimum BF and a control line, including production and carcass traits were analyzed to evaluate the effects of selection.

Procedure

All animals were initially from the same base population. Select line animals were selected for maximum LEA and minimum BF (estimated by the

An/Scan and adjusted to 220 pounds live weight); the controls were randomly chosen. Pigs were farrowed in May and June and produced litters a year later. Carcass information was obtained in the department's meat laboratory.

Results and Discussion

Selection increased LEA and decreased BF, both from live animal and carcass measurements. Gilts had more BF than boars but estimated LEA's were similar. Selection had no effect on litter size and weight at early ages but decreased growth rate to 220 pounds. Control line pigs reached 220 pounds at 177.5 days and select line pigs at 184.4 days.

Selection increased carcass length, chine depth at 1st and 5th lumbar locations, and ham and loin yield, lean cuts, and primal cuts and decreased total fat trim. Selection also increased fiber diameter of the longissimus and semitendinosus muscles and volatile cooking losses but decreased drip cooking loss.

Select line pigs were more susceptible to stress.

Heritability estimates from full-sib and half-sib correlations for LEA were .41 and .52 (live) and .53 (carcass, full-sib). Corresponding

estimates for BF were .51 and .38 (live) and .46 and .11 (carcass). Among carcass quality traits studied, heritability estimates ranged from .03 for moisture percentage to .74 for ham marbling.

Adjusted LEA correlated negatively genetically with weight at birth and 2 weeks but positively with weight at 4 weeks and adjusted age at 220 pounds and BF. Adjusted BF correlated positively genetically with most traits studied except weight at birth. Carcass LEA correlated genetically with most carcass yield and measurement traits except BF, carcass length, and total fat trim. Carcass BF correlated negatively genetically with most carcass yields and measurements except total fat trim percentage.

Genetic correlations between carcass LEA and carcass quality traits were positive except those with ham color and marbling. Carcass BF correlated negatively with loin color, marbling and firmness, ham color, Warner-Bratzler shear force, moisture, percentage, and total and drip cooking loss percentage.

Selecting for increased muscling increased susceptibility to stress but did not alter ham or loin quality.