## CORRELATED SELECTION RESPONSES TO UPWARDS AND DOWNWARDS SELECTION FOR BACKFAT AND DAILY GAINS IN PIGS

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Index selection combining scores for backfat and daily gain was practiced in a selection experiment with upwards (HP-line) and downwards (LP-line) selection on the index. A control line was maintained from the 3. year. Results from 8 generations are presented: in this study. The LP-line (low growth, high backfat) showed higher standardized selection differentials, selection responses and realized heritability than the HP-line (high growth, low backfat) ($\widehat{h^2}_{LP} = .52$ $\widehat{h^2}_{IP} = .34$). Calculations of actual weights on backfat and daily gain in retrospect showed a shift towards backfat in the LP-line and towards daily gain in the HP-line. Joint estimates o, realized $h^2$ and $r_G$ of the index traits gave $\widehat{h^2} = .80$ for backfat and .36 in daily gain. Geneticf correlation between the index traits was calculated to .16.

Correlated responses in slaughter traits showed higher values in the LP-line than in the HP-line. Joint estimates of $r_G$ to the index showed favourable values for all slaughter traits except number of inverted teats. Correspondance to the $r_G$ values estimated from half sib analyses in the control line were very good. Daily food consumption increased in both lines. Feed conversion ratio showed higher response in the HP-line than in the LP-line.

Regressions on generation number for litter size traits were all negative. Correlated responses to the index were unfavourable but genetic correlations between fertility traits and the index would have fallen in the range of o $\pm$ .10.

## PRODUCTION CHARACTERISTICS OF *DUTCH LANDRACE* AND *DUTCH YORKSHIRE* PIGS AS RELATED TO THEIR SUSCEPTIBILITY FOR THE HALOTHANE-INDUCED MALIGNANT HYPERTHERMIA SYNDROME

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During a one year survey a total of 1,304 *Dutch Yorkshire* and 1,640 *Dutch Landrace* pigs were subjected to the halothane-test after their arrival at one of the national pig testing stations.

The average percentage reactors was 3.07 p. 100 in the *Dutch Yorkshire* breed and 22.2 p. 100 in the *Dutch Landrace* breed.

Death losses during the fattening period and during the transport of the sows to the slaughterhouse were almost ten times higher in reacting as in non-reacting *Dutch Landrace* pigs (5,27 p. 100 vs 0.56 p. 100).

In the *Dutch Landrace* breed significant differences were found between reactors and non-reactors in the growth traits of the boars and in all carcass and meat quality characteristics of the sows, which confirm previous observations. Hovewer, in the *Yorkshire* breed no significant differences were found in these traits between reacting and non-reacting animals. The conflicting results obtained in this breed are discussed.

It is suggested that the halothane-test will be most effective for elimination of stress-susceptibility and abnormal meat quality when used as a selection criterion in commercial pig breeding and selection of *Dutch Landrace* pigs.

## HALOTHANE-TEST IN PIG BREEDING

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A simulation study describing the influence of direct and indirect selection on the gene frequency for hypersensitivity to halothane is presented in this paper. The factors studied are fitness, culling level on index, initial gene frequency and type of inheritance of the trait.

The results show that indirect selection (effect of fitness and positive effect on the selection index) will rise the gene frequency for hypersensitivity to halothane, as long as no direct selection is applied against the trait.

It is estimated that the gene frequency without direct selection in the *Dutch Landrace* will increase within 5 generations from 0.47 to about 0.65 and within 10 generations to 0.83.

In order to select against hypersensitivity to halothane, 3 alternatives are discussed: building in the trait in a selection index, direct selection by excluding all positive boars and possibly also gilts from performance testing, and the set-up of lines of homozygous negative pigs.

## CONSEQUENCES OF SELECTION FOR EGG WEIGHT ON HATCHABILITY

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Genetic correlations were estimated between hatchability traits of purebreds and egg number and egg weight of crossbreds. While hatchability and egg number were positivly correlated genetically in one strain, essentially no correlation existed in the other. Correlations pertaining to egg weight were unfavorable in both strains but more so in one. Correlations with number of saleable chicks were positive for egg number and negative for egg weight. Selection according to a restricted selection index egg number and egg weight (this to be held constant) should impair hatchability in one strain.

## BEZIEHUNGEN ZWISCHEN DEN EIGENLEISTUNGSERGEBNISSEN VON PRÜFBULLEN UND DEN ABKALBEERGEBNISSEN AUS DEM TESTEINSATZ

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Am Material der *Fleckvieh*-Eigenleistungsbullen in Bayern wurden die Beziehungen zwischen Wachstumsdaten und Körpermaßen von Bullen und den Abkalbeergebnissen der von ihnen gezeugten Kälber untersucht, wobei sowohl der Anteil and Totgeburten als auch der mit tierärztlicher Hilfe und die Trächtigkeitsdauer herangezogen wurde. Die Beziehungen zwischen den ELP-Daten und den Abkalbeergebnissen sind alle positiv, wobei kein Körpermaß besonders herausticht. Der Anteil tierärztlicher Hilfe ist mit den ELP-Daten enger korreliert als derjenige der Totgeburten, während die Trächtigkeitsdauer weniger einheitliche Ergebnisse zeigte. Die Korrelationen waren für männliche Kälber deutlich höher.

Die Heritabilitätsschätzweite für Totgeburten lagen im Bereich von 0.005 bis 0.022, für tierärztliche Hilfe zwischen 0.008 und 0.028. Die genetischen Korrelationen zwischen dem 420-Tage-Gewicht und den Abkalbeergebnissen betrugen + 0.40 bzw. + 0.43, während die Zunahme in der Prüfperiode vom 112. — 420. Tag Werte von + 0.21 bzw. + 0.31 zeigte. Dieser Unterschied deutet daraufhin, daß das Geburtsgewicht des Vaters die Hauptursache für die hohen genetischen Korrelationen ist. Deshalb sollte das Schwergewicht der Selektion auf die Zunahme in der Prüfperiode bzw. einem Index unter Berücksichtigung des Geburtsgewichtes erfolgen, um negative Auswirkungen auf das Abkalbeverhalten zu vermeiden.

## DIRECT AND CORRELATED EFFECTS OF VARIOUS SELECTION STRATEGIES IN PERFORMANCE TESTS OF BULLS

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The investigation described in this paper is based on 2,330 veal calves and young bulls after 136 sires of the breeds *Red Danish, Black Pied Danish* and *Danish Red* and *White.* For these animals information on gestation length, birth weight, daily gain, feed intake and carcass compo-