

- Negative correlations of traits afford substantial lower minimum-requirements than positive correlated traits.
- The best relation of the selection limits of the individual traits is at function of the percentage of selection, of the phenotypic and genetic covariances between the traits, and of the economic weights. To find the optimal selection limits a very high calculation expense is require, if there are more than two traits considered.
- The relative inferiority of an optimal simultan-selection in comparison with index selection ranges from 2 to 40 per cent. The inferiority increases if more traits are considered, if the percentage of selection is enlarged and if the antagonism between the traits is more pronounced.
- Therefore the simultan-selection can be recommended as an alternative to index selection only, if we can select very intense and if the selection is restricted to two positive correlated traits, which can't be recorded at the same time.

CORRELATED EFFECTS OF EXTREME SELECTION ON FATTENING  
AND CARCASS TRAITS IN PIGS

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Results of the progeny testing of 181 Czech *Large White* boars in 1978 were used to analyze the effectiveness of extreme selection. Groups with extreme average daily gain (835 g) showed a less favourable backfat thickness (2.77 cm) and a low lean from ham (17.38 p. 100). These unfavourable relations were already not so expressive in the case of eye muscle area. As a consequence of selection for low backfat thickness (2.50 cm) less favourable value of average daily gain (763 g) was found. On the basis of these results it is possible to conclude that selection for high daily gains is not suitable. Generally it is to emphasize that by extreme selection still a corresponding response can be achieved but this effect has to be evaluated with regard to negatively correlated effects.

SELECTION FOR PROLIFICACY IN SHEEP IN RELATION  
TO MEAT PRODUCTION CHARACTERS

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In diesem Beitrag werden die vorläufigen Ergebnisse einer Untersuchung über die Eigenschaften von Mutterschafen untersucht, die sich deutlich in Merkmalen der Fruchtbarkeit unterscheiden.

In dem Versuch wurden die Mutterschafe in 3 Gruppen aufgrund ihrer Fruchtbarkeitsmerkmale eingeordnet. Trotz unterschiedlicher Ablammzahlen ergeben sich wenig Unterschiede in den Nachkommengruppen, mit der Ausnahme, daß in der Gruppe mit der höchsten Fruchtbarkeit die Verluste hoch waren und gelegentlich unfruchtbare weibliche Lämmer geboren wurden.

Die Ergebnisse zeigen, daß weitreichende Unterschiede in der Fruchtbarkeit von Mutterschafen verbunden sind mit einigen wenigen Unterschieden in anderen Merkmalen. Eine bessere Lämmerproduktion ohne nachteilige Folgen kann mit der Verwendung von Mutterschafen mit sehr guter Fruchtbarkeit erreicht werden.

ANTAGONISTIC SELECTION FOR CORRELATED BODY WEIGHT TRAITS OF MICE

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To verify the effects of antagonistic selection, mice were selected for high 3- to 5 weeks body weight gain and low body weight at 8 weeks of age. The selection program involved also single trait mass selection for high 3- to 5 weeks body weight gain and high and low 8 weeks

body weight. Mice from two different basepopulations were allotted randomly to selection lines with one replicate each and were selected for eight generations. Two way mass selection for 8 weeks body weight showed asymmetrical selection results opposite in the two populations. Antagonistic selection showed no response in the desired direction. This may be due to the high positive genetic correlation realized in the single trait selection lines between the two traits.

EFFECT OF SELECTION FOR DIFFERENT QUANTITATIVE TRAITS  
UPON GENETIC DIFFERENTIATION AMONG LINES OF MICE

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In a selection experiment with mice at the Zentralinstitut für Versuchstiere, Hannover, the effect of selection for the quantitative traits litter size (B), weaning weight (W), postweaning gain (G) and efficiency (E) and fat content (F) as direct and correlated response in these traits over 17 generations and upon genetic differentiation among these lines, measured as genetic distance at 8 polymorphic protein loci, were studied. Lines were kept in 50 pair matings with two replicates, selection was practised between families and polymorphisms were analyzed every second generation.

The experiment is to be finished after 20 generations of selection with some test cross diallels to establish heterosis effects in line crosses. Here only 17 generations of selection were analyzed, which showed largely linear direct responses in lines B, W and F, whereas lines G and E did not progress much the last 5 generations. Correlated responses were strongly unfavourable between weaning weight on the one hand and postweaning gain, efficiency and fat content on the other hand. There was also some indication that litter size was negatively affected by selection for gain and efficiency.

Genetic differentiation was very rapid up to generation 13 but slowed down thereafter in 14 out of 30 line combinations. There was some indication of selection effects but final conclusions can only be drawn from the forthcoming testcross diallels.

EFFECT OF SELECTION ON SOME PHYSIOLOGICAL AND BIOCHEMICAL TRAITS IN MICE

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The mice were selected on the base of the highest postweaning weight gains throughout 26 generations. In 21-st generations as well as after reciprocal crosses of 3 replicates after 16th and 26st generations, certain traits differing between selected and unselected animals were examined.

1. The differences in postweaning weight gain, between unselected and animals were highly significant (Tables 1 and 2).
2. Selected mice consumed more feed than the unselected ones, but the feed intake calculated by 1 g of body weight gain was much lower in selected animals than in the control ones.
3. The basal metabolic rate cal/h/g, of selected animals was lower than of those unselected, and this differences were highly significant. Only in generation 21 the differences was not significant.
4. No significant differences were found in percentage content of water in the body of selected and unselected animals.
5. The females selected were characterised by a higher percentage of fat than the unselected ones. The differences were always highly significant. Between males, selected and unselected, the differences are not so clear.
6. Selection resulted in a decreasing percentage content of protein and ash in the body of animals, and the differences between selected and unselected mice were highly significant.