

## SELECTION FOR GROWTH RATE AND POSSIBILITIES FOR GENETIC CHANGE IN ATLANTIC SALMON

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The possibility for genetic change in production traits of salmon looks good when considering the magnitude of genetic variation together with the selection differential which can be applied. At the *Fish Breeding Experimental Stations Sunndalsøra* and *Averøy* a selection programme is being carried out. Selection for body weight is based on strain, full- and half sibs and individuals information. Strongest selection was applied on weight after two years in the sea. The first generation responds of salmon fingerlings to selection for high weight at 190-day old was as high as 30 p. 100. This response is higher than expected and can not be explained as a direct selection response only. It is thought that part of this response is a domestication effect.

5. — *Biochemical studies*

CHOLESTEROL CONCENTRATION IN BOVINE BLOOD PLASMA  
RELATION WITH GROWTH RATE ALKALINE PHOSPHATASE ACTIVITY  
AND THYROXINE DEGRADATION

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Cholesterol concentration and alkaline phosphatase activity in blood plasma were analysed in 244 Swedish calves of both sexes and 249 young Danish bulls. Thyroxine degradation rate was in addition determined in the Danish bulls. In both animal materials, blood samples were taken one to three times per animal at different ages. The cholesterol level was higher in the heifers than in the bulls at all ages, while the alkaline phosphatase activity was higher in the heifers at 10 and 16 months. Both cholesterol concentration and thyroxine degradation rate rose with increasing age, while the age influence on alkaline phosphatase activity was more complicated.

The repeatabilities of cholesterol concentration between ages were in the range 0.2 to 0.4. The repeatability estimates of alkaline phosphatase activity were between 0.3 and 0.5. For thyroxine degradation rate, the estimate for bulls was 0.4. When average data from the three ages were used, the following estimates of heritabilities and genetic correlations were calculated. The heritability of cholesterol concentration was 0.4 and 0.8 for the two animal materials. The heritability estimates of alkaline phosphatase activity were 0.3 and 0.7 respectively, and for thyroxine degradation rate, the estimate was 0.8. The genetic correlations between growth rate and the blood parameters were 0.7 and 0.8 for cholesterol concentration, 0.2 and 1.0 for alkaline phosphatase activity and 0.9 for thyroxine degradation rate.

Due to the positive genetic correlations in bulls between growth rate and the blood parameters studied, it may be possible to include them in an indirect selection for growth rate.

SIMULTANEOUS TYPING OF ALFA S<sub>1</sub>, BETA, KAPPACASEINS, BETALACTOGLOBULIN, ALFA-LACTALBUMIN AND SERUM ALBUMIN IN COW MILK BY POLYACRYLAMIDE GEL ELECTROPHORESIS

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A simple method of horizontal polyacrylamide gel electrophoresis in a discontinuous buffer system (Tris-citrate-borate, pH 9.0) was described for the simultaneous phenotyping of  $\alpha_{S1}^T$ ,  $\beta$ -,  $\kappa$ -caseins and  $\beta$ -lactoglobulin,  $\alpha$ -lactalbumin and serum albumin in cow milk. A step gra-

dient gel was used. Polymorphism was observed for  $\alpha_{s1}$ -,  $\beta$ -,  $\kappa$ -caseins and  $\beta$ -lactoglobulin. The pretreatment of milk samples was found to be an important step for the improved separation observed. As serum albumin fraction in mastitic cows was considerably stronger than in milk from normal cows, this method also may be suitable for an indirect diagnosis of mastitis.

POST ALBUMIN VARIANTS IN PIG PLASMA DETECTED  
BY POLYACRYLAMIDE GEL ELECTROPHORESIS

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Horizontal polyacrylamide gel electrophoresis with a discontinuous buffer system (Tris-citrate-borate, pH 9.0) and 10 p. 100 separation gel was used to analyse plasma samples of *Zlotnicka* breed of pigs from Poland. The material consisted of samples from 3 sires, 29 dams and their 374 offsprings. Six different postalbumin (Po) phenotypes were observed. The analysis of family data showed that the Po types were controlled by three codominant autosomal alleles *PoA*, *PoB* and *PoC*. Each of the homozygote type showed a major band and 3 weak bands moving cathodic to the major band. In the heterozygote types, all fractions of the two homozygotes types were represented with half the staining intensity. It was, however, found difficult to distinguish between the *PoA* and *PoAB* types. Prealbumin (*Pa*), transferrin (*Tf*) and hemopexin (*Hpx*) could also be typed on the same gel. *TfB* and *TfC* could be differentiated only when the pH of the gel and electrode buffer was reduced to 7.5. The use of pH 9.0 buffers was however found to be a more convenient and rapid method for the simultaneous typing of samples for *Pa*, *Po*, *Hpx* and *Tf* on the same gel. Further studies are needed to identify the polymorphic Po protein described in the present report.

6. — *Divers*

CALCULATION OF SELECTION INDEXES THAT INCLUDES HIGHLY CORRELATED TRAITS

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In order to estimate breeding values for dairy bulls, the individual test day results in a lactation were combined, using selection index theory. The method can in theory allow lactations of varying length (varying numbers of tests) to be combined and also the economic weighting of individual test days to differ.

Some of the results of general interest from the aspect of selection index theory are presented here. These concern the influence of genetic correlations among individual test days and their heritability on accuracy of index, variation in selection index weights, and expected response. Accuracy of index was not affected when the genetic correlations among the test days were altered or when the phenotypic variances differed.

Individual *b*-values showed a wide variation and were especially affected by changes in the pattern of heritabilities for the individual test days.

The percentage distribution of expected genetic response on individual test days was not affected by the wide variation in *b*-values in some alternatives. Altering the phenotypic variation of single traits had the greatest effect on the percentage distribution. Finally, it was concluded that as selection index theory assumes error-free parameters, the choice of parameters in any given situation is of prime importance. The commonly used  $r_{TI}$ -value is not efficient for measuring the influence of variations in parameters.