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4 — *Genetic studies in salmonids*

## GENETIC VARIATION IN PRODUCTION TRAITS OF ATLANTIC SALMON

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A study of genetic variation in production traits of wild Atlantic salmon strains has been carried out at five fish farms along the Norwegian coast. Significant strain-fish farm interaction was found in the three year-classes. However, the interaction counted only for a small part (1.4-3.7 p. 100) of the total phenotypic variance. It is concluded that this interaction can be neglected in a selection program for farmed salmon.

Highly significant differences are found between strains in body weight and length. It is therefore of importance to base the selection program on the highest yielding strains.

For percentage of fish immature after two years in the sea the difference between strains is considerable, as it is for carcass traits such as dressing percentage and carcass quality score.

## RESULTS OF INTER-SPECIFIC CROSSES BETWEEN SALMONIDS

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A hybridization experiment with salmonids was carried out at the Fish Breeding Experimental Stations, Sunndalsøra and Averøy. Hybrids were produced between Atlantic salmon, sea trout, brown trout, rainbow trout and Arctic char. All crosses attempted, except those involving the rainbow trout, were relatively successful. Considerable difference in the hatching rates of the different hybrids were observed. All crosses with the Arctic char were heavier than the better pure bred specimens at 11 months. In all other crosses the hybrids were lighter than the purebred specimens. During the first year in sea cages salmon had the fastest growth and reached the same weight as the better crossbreed.

Chromosome number varied considerably within each species and within each group of hybrids. The chromosome number of hybrids was usually close to the average number of the parental species.

## GENETIC VARIATION IN TOLERANCE OF BROWN TROUT TO ACIDIC WATER

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Acid precipitation resulting from atmospheric pollution in industrial Europe has depressed the pH of natural waters in southern Norway to such an extent that brown trout populations are severely reduced. Attempts are being made to produce trout more tolerant to acidic water through selective breeding.

Research effort has concentrated on testing as many wild strains of fish as possible for tolerance to acidic water, in order to find the best populations on which to base a breeding programme. Highly significant differences in tolerance have been found between fish strains and between families within strains, and heritability estimates indicate that progress through selective breeding is possible. Survivors of the best strains from the tests are reared to maturity to provide a nucleus breeding stock, and selected fish are tested alongside controls for growth and survival in natural waters where low pH is a problem.