

The impact of trophic changes over 45 years on the Eurasian perch,



The change in catches and mean size of one-year-old perch (*Perca fluviatilis*) in Lake Geneva was studied between 1957 and 2005, and related to trophic changes and average temperature. The status of Lake Geneva, assessed on the basis of total phosphorus concentrations, switched from being oligotrophic before 1960 to eutrophic, with total phosphorus concentration reaching nearly 90 $\mu\text{g L}^{-1}$ in 1976-1979. In response to management measures, the trophic status then returned to mesotrophy in the early 2000s. Zooplankton is the main food consumed by young perch, and quantities present (annual biovolumes of zooplankton) were recorded throughout the study period. The lake water temperature was also recorded. Data obtained from perch catches and perch spawns enabled eleven strong cohorts of perch to be identified. Strong cohorts dominated the stock for three years, until they were massively caught by fishermen. Yields have fluctuated widely, increasing rapidly until 1975, and subsequently decreasing, with an exceptional decline between 1976 and 1981. During the period 1977-1981, unfavourable climatic conditions in spring were probably the main cause of this fall in perch yields. For the other periods, perch yields and the mean size of one-year-old perch were significantly correlated with trophic parameters, total phosphorus concentration and zooplankton biovolume. Correlations are higher if only strong cohorts are taken into account. As a result of the re-oligotrophication process, perch growth has been progressively reduced, age at first maturity delayed and strong cohorts become less frequent; the mean size of 0+ individuals in strong cohorts is significantly smaller than in the other cohorts, suggesting a population density effect in the context of a limited supply of zooplankton. During the study period, trophic changes in Lake Geneva have had more impact on perch growth and yield than has temperature, since no significant correlation could be detected between water temperature and perch growth.

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