

Stable isotope analysis of food webs in wetland areas of Lake Balaton, Hungary

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With 5 figures and 2 tables

Abstract: Stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotopes were used to analyze the source and transformation of organic matter in the food web of the Kis-Balaton Water Protection System (KBWPS). The extent of the isotopic shift between trophic levels deviated significantly from typical values of 1‰ for carbon and 3.5‰ for nitrogen. The $\delta^{13}\text{C}$ enrichment factor in food chain benthos > cyprinid prey fish > predatory fish (pike-perch, pike) was over 2‰ in the KBWPS. Variability in $\delta^{13}\text{C}$ in the KBWPS reservoir would be dampened because of the high ratio of dissolved inorganic carbon and also it may reflect inputs of terrestrial organic carbon through the main inflow. The trophic fractionation of ^{15}N appears to be more pronounced in fish than in invertebrates. The isotopic shift in the food web of the reservoir proved to be lower than 3.5‰ and was 2.9‰. Our isotope evidence indicated that there might be strong competition for food resources between bream and prussian carp on the one hand and between common carp and roach on the other. Pike-perch and pike depended on omnivores such as bream and prussian carp as food.

Introduction

Understanding of material flows is a fundamental component of ecosystem research and use of stable isotopes of carbon and nitrogen (SICN) is one way to assess trophic relationships in limnetic food webs (FRY 1991, GU et al. 1994, MITCHELL et al. 1995). When diets and trophic interactions are also involved in the study, SICN can provide useful insights into the feeding relationships of organisms within a given food web (GU et al. 1994, DOUCETT et al. 1996).

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