Identifying spawning ecotypes in Baltic Sea flounder using otolith microchemistry.

Authors: M. A. Samson¹, K. E. Limburg¹, D. Ustups², A.-B. Florin³, A. Nissling⁴, D. Zilniecē²

¹Department of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY 13210, USA

²Fish Resources Research Department, Institute of Food Safety, Animal Health and Environment “BIOR”, Daugavgrivas 8, Riga, LV-1048, Latvia

³Institute of Coastal Research, Department of Aquatic Resources, Swedish University of Agricultural Sciences, Skolgatan 6, 74242 Öregrund, Sweden

⁴Ar Research Station, Department of Ecology and Genetics, Uppsala University, 62167 Visby, Sweden

Abstract

The European flounder (Platichthys flesus) is one of the most common flatfish species in the Baltic Sea and is of great economic importance to the fishing industry in the Baltic region. It is euryhaline and is able to migrate into less saline waters than most other flatfishes in the Baltic Sea. European flounder exhibits high plasticity in the use of coastal, estuarine and freshwater habitats throughout its life history. In the Baltic Sea, flounder mix to feed in the shallow waters during summer-autumn, but migrate either to the coast or to the deep waters for spawning. These different spawning strategies have resulted in the evolution of two distinct ecotypes that differ in their egg characteristics and spawning habitats. Flounder that spawn in the coastal areas in the central and northern part of the Baltic Sea produce small, dense demersal eggs, whereas flounder that spawn in the deep basins in the southern and central part of the sea produce larger pelagic eggs that are neutrally buoyant. Alternative habitat use tactics of the two ecotypes throughout their life history may be reflected in the chemistry of their sagittal otoliths. In the present study, otolith samples were taken from coastal nurseries along the Latvian and Swedish coast and from various offshore areas in the central Baltic Sea. The results of otolith chemical analyses of trace elements (strontium, barium, magnesium, etc.) using LA-ICPMS are presented. Differences between the two ecotypes in micro-elemental signatures will be discussed as they reflect differences in spawning habits.

Keywords: otoliths, microchemistry, flounder, ecotypes, Baltic Sea

Contact author: Melvin A. Samson
SUNY College of Environmental Science and Forestry
1 Forestry Drive
Syracuse, New York State, USA
masamson@syr.edu