

Ninth Flatfish Biology Conference, December 1-2, 2004, Westbrook, CT.

The Winter Flounder Gender Bender: What Are We Culturing?

Elizabeth A. Fairchild, W. Hunting Howell, Nathan Rennels, and James Sulikowski

University of New Hampshire
Department of Zoology
Durham, New Hampshire 03824

Studies have shown that sexual differentiation, and therefore male:female sex ratio, in some flatfish species can be influenced by juvenile incubation temperature. This also may be true for winter flounder, whose juveniles are quite eurythermal, but sexual differentiation and the sex ratio of cultured winter flounder have never been investigated. This is significant for both aquaculture and stock enhancement programs. In aquaculture, it may be desirable to culture female genotypes for production of larger fish. In stock enhancement, the sex ratio of fish used for releases can affect the wild population by altering the sex ratio and population dynamics of the wild population.

Because the sex ratio of cultured winter flounder, and the factors that may influence it, are completely unknown, we studied the sexual differentiation and cultured fish sex ratio as part of a larger study evaluating the effectiveness of a winter flounder stock enhancement program. To accomplish this, we sampled 385 fish from the general culture population at approximately 10mm total length (TL) intervals, starting shortly after metamorphosis and continuing through the first year. On each sampling occasion, we randomly collected 30 fish. Tissues were fixed and stored in modified Davidson's solution for at least 48 hrs. Prior to histological processing, the samples were washed in freshwater and stored in 70% alcohol. Histological processing involved embedding the tissues, sectioning (6 microns), and staining with hematoxylin and eosin. Slides were examined to view structures and cells associated with gonadal tissue. By examining the size series of fish collected, we were able to determine the size and age when sexual differentiation is visible histologically, as well as the sex ratio of the cultured population. Results of these studies will be discussed.

Analysis of this study continues, and initial findings suggest that the sex of winter flounder as small as 40 mm TL can be determined histologically.