Short Paper

Anomalously Undersized Otoliths from Walleye Pollock *Theragra chalcogramma*

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Age determination of walleye pollock *Theragra chalcogramma* (Pallas) has been made for stock assessment in Hokkaido by reading annuli of otoliths. Recently, abnormally small-sized otoliths (Fig. 1) were found in a walleye pollock from the Nemuro Strait in northern Japan. This paper describes morphological features of the otoliths.

Descriptions and Comments

The walleye pollock with a pair of undersized otoliths (sagittae) was collected with commercial longlines from the Nemuro Strait on December 9, 1990. The left and right otoliths of the fish were both 9.3 mm in maximum length, 3.7 and 3.8 mm in maximum width, and both 0.05 g in wet weight. Compared with other otoliths of 100 fish caught in the Nemuro Strait in the same fishing season, those otoliths were less than two thirds in length and less than one fourth in weight (Fig. 2).

The shapes of the otoliths were not distorted; the ratios of length to width of otoliths (left one, 2.51; right one, 2.45) were within the range of standard deviation from the mean ($N=202$, $\bar{x}=2.377$, $s=0.158$). Moreover, there were no aberrant crystallization on the surface of the otoliths, thus they most likely had normal aragonitic crystallization. The external morphologies of these otolith were normal except for their sizes.

The fish with these abnormal otoliths were female and 464 mm in standard length (SL). The body, gonad, and liver weights were 750, 38.5, and 54.6 g, respectively. The age was estimated to be 4+ based on the growth pattern observed in the otolith section. These measurements were within the range of normal ones.

According to Ishida¹⁾ and Kyushin *et al.*,²⁾ walleye pollock larger than 40 cm in SL, collected in waters around Hokkaido, have otoliths longer than 15 mm and heavier than 0.15 g at least. Also, we have had no records of undersized otoliths of walleye pollock in other countries as well.^{3,4)} Thus, the present finding constitutes the first record of undersized otoliths in walleye pollock.

Concerning the cause of otoliths, they are possibly results of metabolic disorders, or could be variations of normal otoliths. In any case, anomalously undersized otoliths are rare now. This lessens them affecting the reliable back-calculation of sizes of fishes eaten by

Fig. 1. Undersized otolith (right-hand side) and normal-sized otolith (left-hand side) of walleye pollock. The former from female of age 4+, 464 mm SL, 750 g BW. The latter from female of age 4+, 446 mm SL, 765 g BW.

Fig. 2. Scatter diagram of average otolith length against fish standard length for walleye pollock. The arrow indicates the undersized otoliths.

consumers and the identification of fish populations using relative otolith length to fish body length.

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