

NUMBER 104.

DECEMBER 31, 1921.

OCCASIONAL PAPERS OF THE MUSEUM OF
ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN PUBLISHED BY THE UNIVERSITY

DESCRIPTION OF A NEW CISCO FROM THE
GREAT LAKES

BY WALTER KOELZ

Leucichthys kiyi, new species¹

In the course of an investigation of the coregonine fishes of the Great Lakes conducted by the writer for the United States Bureau of Fisheries, many individuals of an undescribed species belonging to the group currently known as *Leucichthys* or *Argyrosomus* were obtained from the nets of the commercial "chub" fishermen of Lake Michigan. The species is so distinct from its allies that it is recognized by the fishermen, a distinction which few of the other species of cisco share, and is termed by them "kiyi," "mooneye" or "waterbelly." The species attains less size than any of the

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other "chubs," with the exception of the bloater (*hoyi*). Extreme examples selected from hundreds of specimens in the field measure only 246 mm. The fish are thin, as well as small, and are consequently little esteemed by the fish-smokers. The kiyi occurs most abundantly in water deeper than 60 fathoms and is probably generally distributed at such depths throughout the upper Great Lakes.

The type is a female specimen, Catalog No. 84100, United States National Museum, 191 mm. in length to the base of the caudal, collected in Lake Michigan on August 23, 1920, 12 miles E x S of the mouth of the Sturgeon Bay Ship Channel, in about 60 fathoms of water. Paratypes, deposited in the Museum of Zoology, were obtained in Lake Michigan on March 20, 1919, 12 miles west of Grand Haven; on June 29, 1920, 5 miles N x E of Charlevoix; on August 12, 1920, 15 miles SE x S $\frac{1}{2}$ S of Manistique; on August 19, 1920, 20 miles E $\frac{1}{2}$ N of Rock Island; on August 23, 1920, 12 miles E x S of the mouth of the Sturgeon Bay Ship Channel; on August 24, 1920, 10 miles E x N of Algonac; on August 28, 1920, 9 miles NW of Manistee; on August 30, 1920, 12 miles and 17 miles W $\frac{1}{2}$ S of Ludington; on September 3, 1920, 22 miles NW x N $\frac{1}{2}$ N of Michigan City; on September 23, 1920, 27 miles ESE of Milwaukee; on September 25, 1920, 18 miles E $\frac{1}{2}$ S of Port Washington; on October 1, 1920, 11 miles SE of Sheboygan; on October 4, 1920, 9 miles north of Point Betsie; on October 11, 1920, 18 miles N x W $\frac{3}{4}$ W, and on November 19, 1920, 30 miles NNW of Michigan City. Other specimens were collected from Lake Superior off Grand Marais, on October 3, 1917; and from Lake Huron, on September 12 and 21, and October 17 and 20, 1917, in the center of the lake east of Alpena; on September 14 and 19, 1917, in the center of the lake northeast of Alpena; on September 18,

1917, 17½ miles N x E, on September 20, 1917, 14 miles NE x E, and on September 21, 1917, 17 miles NE x N ¼ N of Thunder Bay Island.

The body is fusiform, slightly more compressed than in other members of the genus, and as in *johannae* and *nigripinnis*, its only associates of the deeper waters, the depth is distinctly greatest in front of the dorsal fin. This dimension in the type specimen comprises 24% of the body length. At the occiput the dorsal profile rises in a smooth curve over half the distance to the dorsal and continues to the dorsal with only a slight upward trend. From the dorsal the contour slopes gently to the caudal peduncle. The ventral profile from the tip of the mandible to the ventral fins runs like the opposite dorsal contour, curving strongly downward and backward for two-thirds its extent, and extending to the ventrals over its remaining one-third in a line nearly parallel to the lateral lines. From the ventrals to the anal the contour converges distinctly toward the lateral line. The head is rather elongated, and is contained 4.0 [(3.7)3.8-4.1(4.3)]² times in the total length. Its dorsal profile runs in a faint but distinct convex curve to a point above the center of the orbit, and from thence to the occiput is often more or less concave in its course. The premaxillaries are directed forward and make an angle of about 50° with the horizontal axis of the head. The snout is always longer than the large eye, which is contained 3.9 [(3.6)3.8-4.1(4.3)] times in the head. The maxillary is pigmented and extends beyond the anterior edge of the pupil, but never to its center. The mandible usually projects beyond the upper jaw. The scales in the lateral line number 84 [(71)77-87(91)]; 84%

² The ratios given in brackets are based on measurements of 120 paratypes; the usual as well as the extreme range in variation is given, the latter in parentheses.

of all the specimens examined have 79 or more scales. The gillrakers on the first branchial arch number $15+25 [(11)13-15(17)+(21)23-26(27)=(34)36-41(42)]$. The pectorals are very long and are contained in the distance from their insertion to that of the ventrals 1.6 [(1.1)1.4-1.7(2.0)] times. The ventrals are likewise long and strong. Their length divided into the distance from their origin to the insertion of the anal equals 1.2 (1.0-1.2).

In life the general appearance of the fish is silvery, with a conspicuous purplish iridescence suffusing the sides. This purple cast is strongest in the area above the lateral line, becoming fainter on the back and paling gradually toward the colorless belly. The color lying below the superficial iridescence is on the back pale greenish, and on the sides above the lateral line a brighter green. Below the lateral line the color changes to bluish. The underlying color is obscured on the back by the dense pigmentation, which covers nearly uniformly the entire dorsal surface, and which also extends over the entire preorbital area, including all but the distal one-fourth of the maxillary. The dorsal surface of the head in front of the nostrils, likewise the tip of the mandible, are often a uniform black. Pigment occurs, too, on the sides, abundantly above, but only sparsely below, the lateral line. The cheeks and the iris also are purplish silvery. The dorsal and caudal fins are rather widely margined with black, most intensely on the median rays of the caudal. The dorsal margin of the pectorals is often lined with black and the membranes of the anal are frequently sparingly sprinkled with pigment. The ventrals are immaculate.