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NOTE ON THE YOUNG OF THE SABLE FISH

Anoplopoma fimbria

by

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NOTE ON THE YOUNG OF THE SABLEFISH, *ANOPLOPOMA FIMBRIA*.[1]—During an oceanographic cruise of the "E. W. Scripps" in May, 1939, off the coast of Oregon, four small, post-larval specimens of *Anoplopoma fimbria* were taken at the surface of the sea with a dip net at two of the hydrographic stations off Cascade Head, Oregon; and others were observed while cruising between these stations, and at a third station farther offshore and to the south. The first two stations were at Lat. 44°–54′ N., Long. 126°–20′ W., and Lat. 44°–46′ N., Long. 128°–22′ W., respectively, the former (F. 31), being about 100 miles offshore and the second (F. 33), 185 miles offshore. The water temperature at the surface was 13.75° Centigrade at F. 31 and 11.84° at F. 33. These stations were occupied on the 23rd and the 25th of May, 1939.

The four specimens obtained were from 21 mm. to 35 mm. in standard length and differed most strikingly from adult *Anoplopoma* in coloration and in the relative size of the pectoral fins. In the smaller examples the tip of the pectoral extends back as far as the insertion of the soft dorsal and is one-third the standard length of the fish, as may be seen from Table 1, in which are recorded measurements of three adult specimens for comparison.

TABLE 1.—COMPARISON OF PECTORAL LENGTH WITH STANDARD LENGTH

Standard length	Pectoral length	Ratio SL/PL	Locality of Capture
418 mm.	77 mm.	5.4	Off Southern California, 158 fathoms
224 mm.	36 mm.	6.2	Marshfield, Oregon
65 mm.	14 mm.	4.6	Monterey Bay
35 mm.	11 mm.	3.2	St. F. 33 Cascade Head, Oregon
29 mm.	9 mm.	3.2	St. F. 31 Cascade Head, Oregon
22 mm.	7.3 mm.	3.0	St. F. 33 Cascade Head, Oregon
21 mm.	7 mm.	3.0	St. F. 33 Cascade Head, Oregon

In life, the dorsal surface of the young fish is blue to blue-green, blending into bright silvery on the ventral surface. The pectoral fins are colorless, the distal half largely black; the other fins are also colorless. Gilbert (1915), in describing a specimen 75 mm. long from Monterey Bay, mentions that the anterior dorsal rays and the caudal are largely black. This is not true of these smaller specimens. In preservative the dorsal surface is pigmented, the myotomes are marked by dark chromatophores, and the upper part of the eyeball is also spotted with dark chromatophores. The eye is blue-green in color, much as it is in life. The ventral surface in the midsection between the ventral fins and the anal is spotted with pigment; elsewhere, aside from a few spots, it is immaculate. The head is shaped much like that of an adult fish; but, of course, the eye is proportionally much larger. Also, the mouth is inclined upwardly from the longitudinal axis of the fish instead of being almost parallel with it as it is in the adult. As a result, in

[1] Contribution No. 4 from Fish Commission of Oregon.

specimens of less than 25 mm., the angular projects slightly at the junction with the interopercle, while the angle formed by this junction is much more acute than in a fish 35 mm. long, a condition which obtains in many species of fishes. The body is slender, shaped much like that of the adult fish.

All examples observed were close enough to the surface to break water occasionally while swimming. Gilbert (1915, Proc. U. S. Nat. Mus., 48: 305, 380) notes that the 75 mm. specimen from Monterey Bay examined by him was taken at the surface also. These young fish seemed to be very abundant at the station where they were taken, but due to their excellent protective coloration, could be seen only while moving, and it was necessary for the observer to keep his attention fixed on a specimen once spotted, for even a momentary lapse would lose it. When the young *Anoplopoma* attempted to swim as rapidly as possible, the large pectorals were folded close to the body. Though they were often extended while the fish was swimming slowly, they were apparently not used directly in swimming. They may help keep the fish at the surface of the sea. With growth there is a great reduction in the relative size of the pectoral fins, as shown by Table 1, and perhaps the transition from large to small pectorals marks the transition from habitat at the surface to one below the surface.

Fig. 1. Young *Anoplopoma fimbria*

It may be noted that adult *Anoplopoma fimbria* are often taken on the bottom in fairly shallow water—usually less than 100 fathoms, and commonly 20 or 30 fathoms. The existence of the young at such distance offshore, in depths of 1540 fathoms, is therefore remarkable. Aside from the single specimen examined by Gilbert from Monterey Bay, there are no records of the young of *Anoplopoma* occurring in waters where the adults may be taken. Furthermore, Gilbert's specimen was twice as long as those taken off Cascade Head and occurred in a region not far from deep water. During the present cruise of the "E. W. Scripps" an excellent opportunity was afforded to observe whether or not young *Anoplopoma* occurred at any of the northern inshore stations. None were noted.

It is possible that those observed from the "E. W. Scripps" had drifted offshore from a normal nursery ground nearer the coast. The direction of surface water transport would be away from the land during periods of prevailing northwesterly winds, and as may be seen from Table 2, the prevailing winds as observed from coastal stations, both north and south of Cascade Head, were northwesterly or northerly for the spring of 1939.

TABLE 2.—PREVAILING WIND DIRECTION 1938–1939[2]

	December	January	February	March	April	May
Newport	E	SE	SE	N	N	N
Astoria	SW	SW	SW	NW	NW	NW

[2] Data relative to prevailing winds supplied through the courtesy of the Portland, Oregon Weather Bureau Office.

Should the prevailing winds offshore not blow from the same quarter as those inshore, then the adults may have spawned farther offshore than the place where the young were observed; furthermore, the abundance of these small fish at the offshore stations, when considered in the light of their apparent absence inshore at all times, gives some weight to the possibility that they were taken in a normal situation. If such be true, then these fish could be expected both to survive and to reappear later in places where the adults normally occur.

Where there is an offshore wind drift, there is usually an inshore counter current at a depth between 100 and 200 meters, as shown by Sverdrup (1937–38, Journ. Marine Research, 1, No. 2) for similar conditions off Port San Luis. Hence; even with a strong seaward drift, it would be possible for the young to find their way shoreward in the comparatively shallow depth of 200 meters or less; but in this case such conditions of drift would have to extend seaward for 100 to 200 miles. Of course, the precise role played by off- and onshore drifts and their fluctuations in the life history of *Anoplopoma*, depends upon the time and place of spawning, whether or not the nursery grounds are offshore, and whether the young observed offshore from the "E. W. Scripps" were in a normal situation and could be expected to survive. The capture of these youthful fish with their large pectoral fins—in all probability an adaptation for living at the surface—at such distances offshore, hints at an unusual and very interesting life history, the details of which will only be revealed with clarity by much more additional information.—VERNON E. BROCK, *Fish Commission of Oregon, Portland, Oregon.*[3]

[3] I wish to thank Mr. O. E. Sette of the U. S. Bureau of Fisheries and the Scripps Institution of Oceanography for the privilege of making this voyage on the "E. W. Scripps" and for permission to publish on the small *Anoplopoma* that were taken.