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A NEW SPECIES OF THE SCORPIONFISH
GENUS *HELICOLENUS* FROM THE
NORTH PACIFIC OCEAN¹

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ABSTRACT: *Helicolenus avius* is described as a new species in the fish family Scorpaenidae, subfamily Sebastinae. The type locality is the northwestern Pacific Ocean between Japan and Midway Island at the southern end of the Emperor Seamount Chain, 32°40'N., 172°17'E. to 35°05'N., 171°46'E., at a depth between 450 and 600 meters. A description and 2 figures are provided. Remarks on the genus *Helicolenus* are given.

INTRODUCTION

In the summer of 1970, around 21 and 22 August, the Japanese vessel *Daimi-Oriente Maru* of the Tokusui Company, Ltd., was conducting night-time trawling operations for *Beryx spendens* at the Emperor Seamount Chain between Japan and the Hawaiian Islands. At several stations a total of more than 250 kg. of specimens of a new scorpionfish of the genus *Helicolenus* was captured. The genus *Helicolenus* is virtually worldwide in distribution, containing temperate and tropi-

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cal offshore species. According to Matsubara (1943), the genus *Helicolenus*, along with *Sebastiscus*, *Hozukius*, and *Sebastes*, constitutes the subfamily Sebastinae. Recently, Eschmeyer and Hureau (1971) suggested that the genus *Sebastes* may be a terminal North Pacific-evolving offshoot characterized by a reduced rather than an incipient suborbital stay. They suggested that the genus *Sebastes* may have evolved from a tropical ancestor, particularly one with a complete suborbital stay and one sharing the characters found in the worldwide tropical and temperate genus *Helicolenus* and the Oriental genera *Sebastiscus* and *Hozukius*. The discovery of another species of the genus *Helicolenus* may help in understanding the evolution of the subfamily Sebastinae and the family Scorpaenidae.

The new species is quite distinct from the other species referable to the genus *Helicolenus*, particularly in having reduced head spination, smaller scales, longer gill rakers, better developed toothed protuberances (dentigerous knobs) on the anterior ends of the premaxillaries, and a forked caudal fin.

As a final introductory comment, we wish to mention that *Helicolenus dactylopterus* frequently is the main ingredient in French Bouillabaisse, or the Mediterranean fisherman's stew. Perhaps this new species has similar qualities. Although some specimens were discarded, 245.8 kg. of the present new species was frozen quickly on board the collecting vessel and kept at -20°C . Mr. Tsujisaki, who collected the specimens, has informed us that the fish kept at this temperature remain in good condition for sale for three months. Chemical analysis of flesh from one specimen measuring 21 cm. in standard length was made by Mr. Masa-aki Takeuchi (Tokai Regional Fisheries Research Laboratory) and showed the following: body weight 212.5 grams, edible part 27 percent, water of flesh 72.6 percent, crude protein 19.2 percent, crude fat 5.6 percent, crude ash 1.3 percent, and calories per 100 grams 126.2. Species of *Helicolenus* frequently are one of the dominant fishes in their habitat, and the new species may prove to be of commercial value.

METHODS

Methods of measuring follow Eschmeyer (1969) and are similar to methods used for other teleostean fishes with a few exceptions. Measurements originating from the anterior end of the upper jaw (head length, snout length, standard length, jaw length) are taken from the anterior end of the premaxillaries, including the dentigerous knobs; pectoral fin length is measured from the base of the first ray to the end of the longest ray, with the fin pointing back; caudal fin length is measured from the posterior end of the hypural plate to the most distal ray when the upper and lower caudal fin lobes are squeezed together. Terminology of head spines for the genus *Helicolenus* is the same as used by Matsubara (1943) and by Eschmeyer (1969).

Abbreviations of depositories of specimens are as follows: ABE—personal

collection of the senior author; BMNH—British Museum of Natural History; CAS—California Academy of Sciences; USNM—United States National Museum; ZIUT—Zoological Institute, Faculty of Science, University of Tokyo.

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Helicolenus avius Abe and Eschmeyer, new species.

(Figures 1–2.)

MATERIAL EXAMINED. All specimens were collected in the northwestern Pacific Ocean between Japan and Midway Island, at the southern end of Emperor Seamount Chain, between $32^{\circ}40'N.$, $172^{\circ}17'E.$, and $35^{\circ}05'N.$, $171^{\circ}46'E.$, at a depth between 450 and 600 meters (probably most from 475 m.), with a bottom trawl, vessel *Daini-Oriente Maru*, around August 21–22, 1970. *Holotype*: ZIUT 52457 (211 mm. S.L.). *Paratypes*: ABE 15256 (1, about 200 mm. T.L. [used for description of color in life only]); BMNH 1971 12.14.1 (1, 173 mm. S.L.); CAS 13614 (2, 172–200 mm. S.L.) and CAS 13615 (1, 178 mm. S.L., cleared and stained); USNM 206327 (2, 176–181 mm. S.L.).

DESCRIPTION. (Measurements and counts summarized in table 1; body shape and coloration in figures 1–2.) Dorsal fin with 12 spines and usually $13\frac{1}{2}$ ($13\frac{1}{2}$ – $14\frac{1}{2}$) soft rays. Anal fin with 3 spines and $6\frac{1}{2}$ soft rays. Pectoral fin with 18–20 rays, most frequently 19; 3rd through 11th or 12th rays branched in available specimens. Pelvic fin with 1 spine and 5 soft rays. Gill rakers total 31–34, 9 or 10 on the upper arch and 22–24 on the the lower arch, increasing in size toward angle of gill arch; longest raker about $\frac{1}{2}$ of orbit diameter. Vertebrae 25. Airbladder absent. Head spines mostly rudimentary or absent; preorbital (lachrymal) bone with two weak spinous points over maxillary, sometimes virtually absent; five preopercular spines present, second longest, all broad; supplemental preopercular spine absent; nasal spines present; opercular bone with two spines; preocular spine well developed; supraocular spine weak or absent; postocular and tympanic spines small, mostly covered by skin or developed as ridges only; upper posttemporal spine poorly developed or absent; supracleithral spine broad; nuchal spine sometimes present; other spines, including the parietal, sphen-

TABLE 1. *Counts and measurements for the type specimens of Helicolenus avius. (Measurements are in millimeters; see standard lengths in Material Examined section for depositories and catalog numbers.)*

Standard length	172	173	176	178	181	200	211
Dorsal rays	12+13½	12+13½	12+13½	12+13½	12+13½	12+14½	12+13½
Anal rays	3+6½	3+6½	3+6½	3+6½	3+6½	3+6½	3+6½
Pectoral rays	19, 19	19, 19	20, 20	20, 19	18, 18	19, 19	19, 19
Pelvic rays	1+5	1+5	1+5	1+5	1+5	1+5	1+5
Vertebrae			25	25			
Gill rakers	10+23	9+24	9+22	9+23	9+23	10+24	10+23
Head length	61.5	58.7	65.7	62.5	64.2	73.4	76.7
Body depth	48.8	49.1	53.4	50.3	50.7	56.9	57.4
Orbit diameter	18.0	17.3	17.9	18.5	17.8	22.3	22.0
Snout length	15.6	13.6	16.0	14.7	16.4	16.8	17.9
Interorbital width	9.2	9.1	9.5	9.2	10.8	11.9	12.2
Jaw length	30.0	29.6	28.3	30.1	30.8	34.7	35.5
Predorsal fin length	61.3	57.8	61.5	59.3	62.8	68.7	73.3
Length 3rd dorsal spine	17.5	18.9	20.2	—	—	22.8	21.1
Length 1st anal spine	8.0	6.9	6.3	7.8	8.0	8.9	8.7
Length 2nd anal spine	16.9	15.9	17.0	16.2	17.5	17.7	19.0
Length 3rd anal spine	17.2	16.2	18.1	15.6	18.5	18.2	18.6
Length pectoral fin	49.1	49.2	51.0	50.3	53.7	57.7	57.9
Length pelvic fin	31.4	29.0	31.0	28.7	31.2	33.0	32.7
Length caudal fin	39.8	42.3	43.2	42.0	44.2	46.9	51.5

otic, coronal, pterotic, lower posttemporal, and suborbital spine absent or present only as scarcely developed ridge. Scales on sides of body small, ctenoid; vertical scale rows from supracleithral spine to end of hypural about 100, difficult to count; pored lateral line scales about 50–55, plus 5 or more on the caudal fin; most of head with cycloid scales, including the maxillary, cheek, and interorbital area; snout unscaled; scales on belly, pectoral fin, and bases of vertical fins mostly cycloid. Premaxillary, dentary, vomer, and palatine toothed; longest teeth on the dentigerous knob of the premaxillary; all teeth short, conical, not arranged in definite rows.

Color pattern of preserved specimens as in figures 1–2. Most conspicuous feature the dark spots above and below the lateral line anteriorly and on the back and dorsal fin. Buccal cavity black posteriorly, pallid anteriorly. Peritoneum black. (Color in life, according to Mr. Tsujisaki, was unchanged when the frozen specimens were handed to the senior author. A color slide was made on 12 October, 1970, of one specimen (ABE cat. no. 15256) by the senior author soon after receipt of the specimens, and the following is taken from the slide. The coloration was also illustrated in Abe (1970)). Body mostly red above and white ventrally. Dorsal surface of body and dorsal fin mottled with dark brown spots on a red background; spots arranged as in figure 1 of a preserved specimen. Pectoral and caudal fins red with yellowish tips.



FIGURE 1. Lateral view of *Helicolenus avius*, CAS 13614, paratype, 172 mm. in standard length.

NAME. The specific name *avius* is the Latin word for "out of the way, remote or solitary." This name is in reference to the type locality, an isolated seamount. A Japanese name, "okikasago," meaning *Sebastes*-like or *Helicolenus hilgendorfi*-like fish, was given to this species (Abe, 1970).

DISTRIBUTION. This species is known only from the type locality. We expect that it might occur at other seamounts in the northwestern Pacific and particularly along the Hawaiian Island chain.

COMPARISON AND REMARKS. The subfamily Sebastinae has been defined by Matsubara (1943). Two of the four genera, *Sebastes* (including *Sebastodes*) and *Sebastes*, have an incomplete suborbital stay which does not attach to the preopercle. The other two genera of the subfamily, *Helicolenus* and *Hozukius*, have a complete suborbital stay. Species of *Helicolenus* lack an airbladder and have 25 vertebrae; while the single species of *Hozukius* has an airbladder and 26 vertebrae; the species show cranial differences also.

At most there are five or six closely related known valid species or subspecies belonging to the genus *Helicolenus*. *Helicolenus dactylopterus* (Delaroche, 1809) has a wide distribution in the Atlantic Ocean extending barely into the Indian Ocean in South Africa; synonyms include *H. maculatus* (Cuvier, 1829), *H. imperialis* (Cuvier, 1829), *H. maderensis* Goode and Bean, 1896, *H. thelmae* Fowler, 1937, *H. uruguayensis* Fowler, 1943, and as a subspecies *H. d. lahillei* Norman, 1937 (see Eschmeyer, 1969). *Helicolenus mouchezi* (Sauvage, 1875) is a senior synonym of *H. tristanensis* Sivertsen, 1945, and is known from the south Atlantic at Tristan da Cunha and in the southern Indian Ocean at Saint Paul and Amsterdam islands (see Eschmeyer and Hureau,

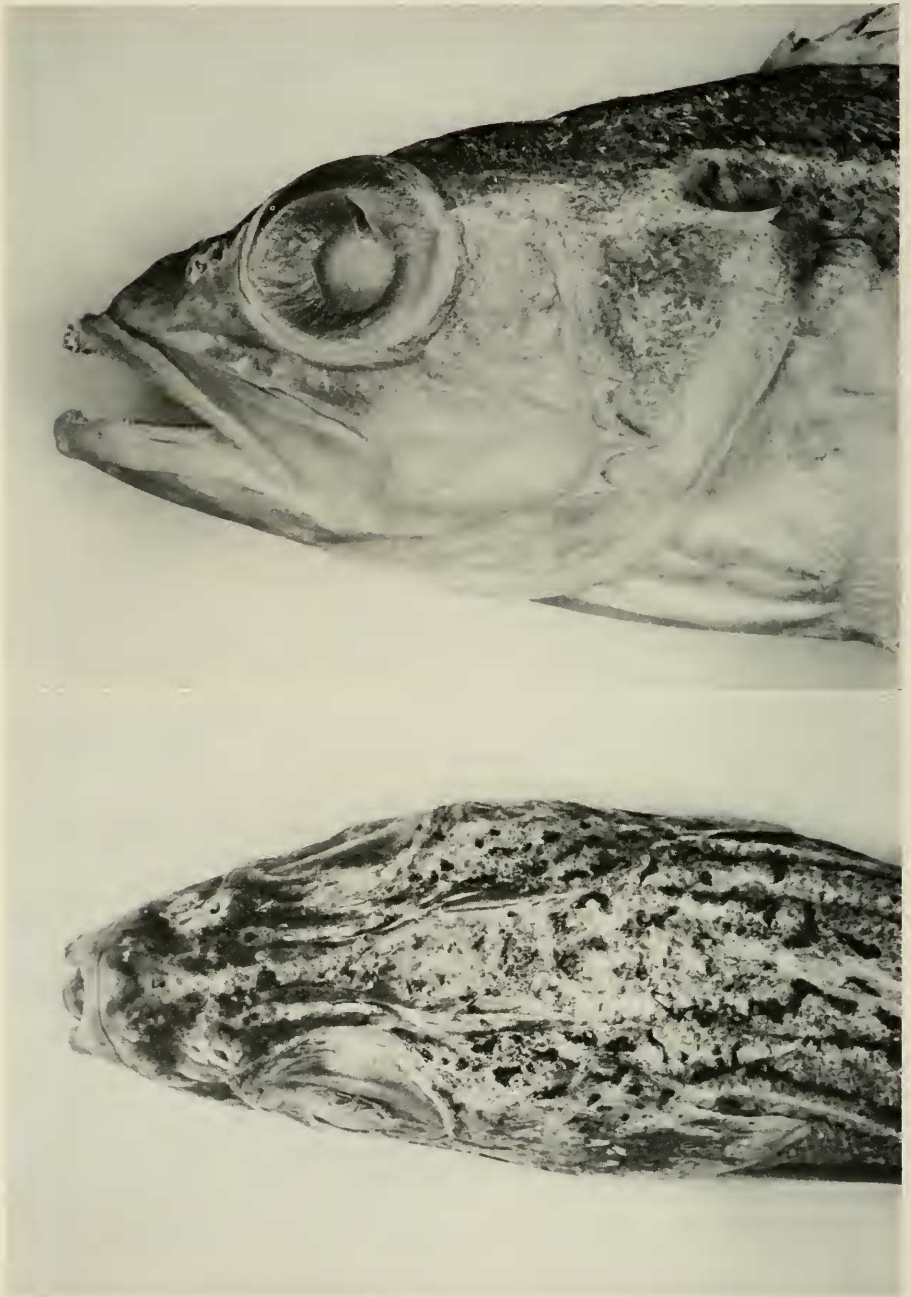


FIGURE 2. Lateral and dorsal views of the head of *Helicolenus avius*, CAS 13614, paratype, 172 mm. in standard length.

1971). The nominal Oriental species is *H. hilgendorfi* (Steindachner and Döderlein, 1884), although this species has been treated as *H. dactylopterus* by some authors. *Helicolenus lengerichi* Norman, 1937, is known from the southeastern Pacific. The Australian-New Zealand species is *H. papillosus* (Schneider, 1801) with the following as synonyms, *H. percoides* (Richardson, 1842), *H. cottoides* (Forster, 1849), *H. barathri* (Hector, 1875) and *H. maccullochi* (Phillipps, 1927) (see Whitley, 1968, p. 83). *Helicolenus microphthalmus* Norman, 1935, was shown to belong to the genus *Sebastiscus* (Wheeler and Eschmeyer, 1968), and *H. rufescens* Gilbert, 1905, from Hawaii belongs in the subfamily Scorpaeninae (Eschmeyer, 1969). *Helicolenus avius* agrees with these six species or subspecies in such features as counts of fin rays, general body shape, absence of an airbladder, condition of the suborbital stay, and 25 vertebrae. *Helicolenus avius* differs from the other species of *Helicolenus* in the following features. In *H. avius* the caudal fin is forked while the caudal fin in the others is "square-cut" or only slightly emarginate; the gill rakers are longer in *H. avius*; the tubed lateral-line scales number more than 50 in *H. avius* while they are fewer than 35 in the other species; the body scales are smaller in *H. avius*, about 100 vertical scale rows versus 80 or fewer; *H. avius* shows reduced spination, with some spines which are normally found in the other species either poorly developed in *H. avius*, present as slight ridges, or absent; and *H. avius*, has the protuberance or dentigerous knob at the end of each premaxillary bone much better developed.

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