

**Alepocephalid Fishes of the Genera  
*Herwigia* and *Bathylaco*, with the  
First Pacific Record of *H. krefftii***

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A peculiar alepocephaloid fish was captured in 1973 by Otis Barton off the west coast of the island of Hawaii in a midwater trawl of his own design. The almost perfectly intact specimen was mailed to the California Academy of Sciences for identification but the fish was badly damaged in transit. Enough salient features remained, nevertheless, to enable identification of the specimen as *Herwigia krefftii* (Nielsen and Larsen, 1970), a species previously known only from the Atlantic Ocean.

*Herwigia krefftii* was described (as *Bathylaco krefftii*) from two Atlantic specimens. The holotype was taken off Uruguay and the paratype came from the Canary Islands. Nielsen (1972) subsequently reported 14 additional specimens from five Atlantic localities between 14°05'N and 27°14'S and 2°56'E and 23°12'W. These additional captures suggested a wide distribution for the species over most of the warmwater regions of the Atlantic Ocean. The new record of the species from Hawaii indicates an even broader distribution, perhaps overlapping that of its wide-ranging relative, *Bathylaco nigricans* Goode and Bean, 1896, which has been taken in the warmwater regions of the Atlantic and Indian Oceans, and in the eastern Pacific (Nielsen and Larsen, 1968; Fitch and Lavenberg, 1968).

The alepocephaloid family Bathylaconidae is considered by most authors to comprise *Herwigia krefftii*, *Bathylaco nigricans*, and *B. macrophthalmus* Nielsen and Larsen (known only from the holotype collected in the Pacific from off the Gulf of Panama). Parr (1948) and others have suggested that the 35-mm type, and only known specimen, of *Macromastax gymnos* Beebe, 1933, is a juvenile *B. nigricans*. Bathylaconids are meso- to bathypelagic fishes, with knowledge of the family based primarily upon the broadly distributed *B. nigricans*.

Literature concerning the Bathylaconidae is

extensive for a taxon that has been, until recently, poorly represented in museum collections. Controversy still exists regarding the taxonomic status of the group, although its position as a relatively generalized entity within the suborder Alepocephaloidei is generally accepted (cf. Gosline, 1960, 1969, 1971; Greenwood and Rosen, 1971). The purposes of this paper are to report 1) the first capture of *H. krefftii* in the Pacific, 2) additional captures of *B. nigricans*, and 3) to add other features contrasting *Herwigia* and *Bathylaco*.

**Material examined**

(Institutional abbreviations are noted in the Acknowledgments.)

*Herwigia krefftii*

CAS 29741 (1 spec., 234 mm SL) off Kealakekua Bay, Kona District, Hawaii, 0–760 m, 10–m<sup>2</sup> open Barton midwater trawl, Feb. 1973. —ISH 2668 d-e/71 (2, 159 & 208 mm) off Cape Verde Is., 14°05'N, 23°12'W, 0–1900 m, herring trawl, Walther Herwig sta. 494–71, 16 March 1971.

*Bathylaco nigricans*

All specimens from off Baja California, Mexico. SIO 64–15 (1, 86 mm), 24°44.3'–29.2'N, 113°26.1'–19.8'W. — SIO 64–16 (1, 61 mm), 24°38.9'–39.8'N, 113°02.5'–30.0'W. — SIO 65–223 (2, 37 & 57 mm), 24°16.7'–35.3'N, 113°07.9'–30.0'W. — SIO 65–243 (1, 26 mm), 21°46.3'–22°08.8'N, 107°59.5'–108°22.0'W. — SIO 67–52 (2, 22 & 33 mm), 30°37.3'–55.0'N, 117°04.4'W. — SIO 70–237 (1, 193 mm), 31°05'N, 19°03'W. — SIO 73–160 (1, 53 mm), 30°02.9'–29°49.0'N, 144°59.4'–57.8'W.

**Comparisons**

Nielsen and Larsen (1970) and Nielsen (1972) have given detailed descriptions of *Herwigia krefftii*. We compared our Hawaiian specimen (Fig. 1) with two of the Atlantic specimens reported by Nielsen (1972). No significant differences were found, although the Hawaiian specimen had a series of minute, papillae-like teeth on the lower jaw unlike the edentate lower jaw of Atlantic specimens. Meristic and morphometric data from the three specimens are given in Table 1.

Several specimens of *Bathylaco nigricans*

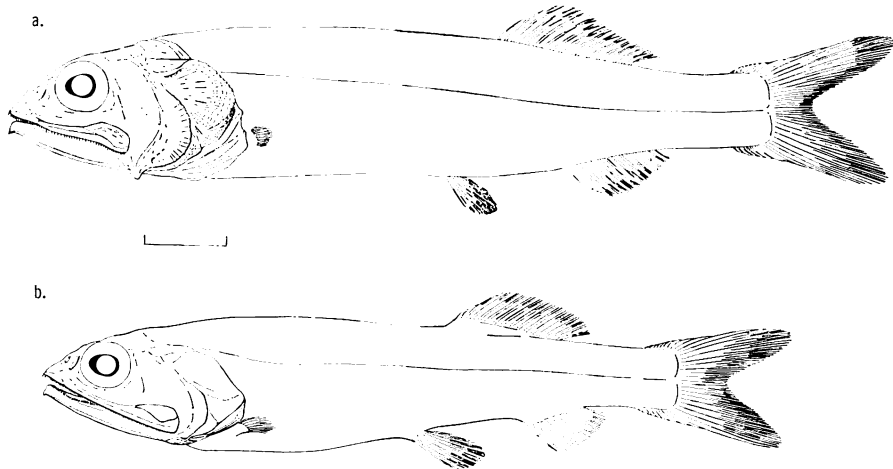


Fig. 1. Outline drawings of: a. *Herwigia krefftii* (CAS 29741), 234 mm SL, from off Hawaii, fins and body shape slightly reconstructed; and b. *Bathylaco nigricans* (SIO 70-237), 193 mm SL, from eastern Pacific, fins reconstructed. Scale represents 25 mm.

Table 1. Meristic and morphometric data for *Herwigia krefftii*. Measurements in millimeters. Proportions, in thousandths of standard length, in parentheses.

	(Hawaii) CAS 29741	(Cape Verde Islands) ISH 268 d-e/71	
Standard length	234	208	159
Sex	♂	♀	♀
Head length	67 (286)	63 (303)	51 (321)
Body depth at dorsal origin	42 (179)	27 (130)	23 (145)
Snout length	17 ( 73)	15 ( 72)	11 ( 69)
Upper jaw length	41 (175)	39 (187)	32 (201)
Lower jaw length	41 (175)	41 (197)	35 (220)
Orbit diameter (horizontal)*	15 ( 64)	16 ( 77)	15 ( 94)
Interorbital width	19 ( 81)	15 ( 72)	12 ( 75)
Prepelvic length	131 (560)	123 (591)	93 (585)
Preal anal length	173 (739)	158 (760)	119 (748)
Predorsal length	148 (632)	131 (630)	103 (648)
Length dorsal fin	40 (171)	35 (168)	28 (176)
Length anal fin	28 (120)	24 (115)	18 (113)
Distance from snout to posterior tip of stomach	92 (393)	82 (394)	67 (421)
Depth caudal peduncle	22 ( 95)	16 ( 77)	13 ( 82)
<b>Counts:</b>			
Dorsal fin rays	17	17	16
Anal fin rays	13 or 14	14	13
Pelvic fin rays (left/rt)	8/8	7/7	7/7
Pectoral fin rays (left/rt)	—/18	—	—
Gillrakers-Arch I	7+1+17	6+1+15	7+1+17
Gillrakers-Arch II	8+1+18	6+1+17	8+1+19
Branchiostegals (left/rt)	7/7	7/7	8/7
Pyloric caeca	7	7	7
Pseudobranch lamellae	13	10	13

\* Bony width, measured over anterior margin of orbits

were examined to compare and contrast generic features. In addition to the characters listed by Nielsen (1972: Table 1) contrasting the genera *Herwigia* and *Bathylaco*, we found the following to be of diagnostic importance:

- 1) The jaws of *Bathylaco* are much longer, the upper jaw extending about an eye's (corneal) diameter beyond the posterior margin of the orbit. The upper jaw of *Herwigia* extends beyond the orbit margin by about half an eye's diameter.
- 2) The longitudinal ridge on the maxilla is poorly developed in *Bathylaco* whereas it is well developed in *Herwigia*.
- 3) The upper posterior margin and the ridge of the preoperculum are very oblique in *Bathylaco*, but much less so in *Herwigia*.
- 4) The pectoral fin is lower on the body in *Bathylaco* than in *Herwigia*. In the former, the upper margin of the pectoral-fin base lies about one-fourth of the way up the side of the trunk, while in the latter it lies about one-third of the way up.

Our specimens of *Bathylaco* for the most part agree with published descriptions of *B. nigricans*. Slight differences are seen, however, in the profiles of the snout and the lower jaw. The snout in our specimens is distinctly pointed (Fig. 1b), whereas it appears somewhat rounded in figures by Parr (1948: fig. 1), Berry and Perkins (1966: fig. 19), and Nielsen and Larsen (1968: fig. 3; 1970: fig. 2). The difference is probably a result of the loss or erroneous placement of the small, loosely attached premaxillary in their specimens. Maul's (1959: fig. 1) diagrammatic illustration shows a pointed snout, but the shape of the premaxillary differs from that of our specimens. The broad profile of the symphysis of the lower jaw, with a pointed retrorse knob ventrally, is characteristic in our specimens of *B. nigricans* and similar to the condition illustrated by Parr (1948: fig. 1). In contrast, Nielsen and Larsen (1968: fig. 3) have illustrated a specimen with a tapering lower-jaw profile which lacks a ventral knob. We cannot account for this discrepancy.

One of our specimens (SIO 70-237) had slightly higher gill-raker and scale-row counts than those reported by Nielsen and Larsen (1968: Tabs. 1, 3; 1970: 225). In our specimen the total counts on the first and second arches were 18 and 19, respectively, and there were about 54

scale rows in the lateral line, 7 below the origin of the dorsal fin, 6~7 above the origin of the anal fin, and 13~14 in a transverse series below the origin of the first dorsal. Nielsen and Larsen gave 11~17 and 12~18 as the numbers of gill rakers on the first and second arches, respectively. They gave 45~48 as the number of scales in the lateral line, and 11~12 in transverse series, in four of their specimens of *B. nigricans*. Nielsen and Larsen (1968; 1970) and Nielsen (1972) have shown that specimens of *Bathylaco* exhibit considerable variation in their meristic and morphometric characters. Perhaps the differences in gill raker and scale counts in SIO 70-237 is attributable to variation. It is possible that when additional well-preserved material becomes available, it will be necessary to recognize more than the two recognized species. Nielsen and Larsen (1970) and Nielsen (1972) found one of their *Bathylaco* specimens (ISH 2104/68) to fall outside the total variation of the two species, but they chose not to describe it as new.

#### Status of the Bathylaconidae

The taxonomic status of the Bathylaconidae has fluctuated considerably. The changing opinions since Goode and Bean (1896) first described *Bathylaco nigricans* as a representative of the family Synodontidae have been summarized in detail by Nielsen and Larsen (1968). Parr (1948) was the first to recognize the close relationship of *Bathylaco* and *Macromastax* to the Alepocephalidae. He considered them possible intermediates between the orders "Isospondyli and Iniomi" and placed them in a new family, the Bathylaconidae, suggesting that "a new order, which might be called the Bathylaconi, would be more appropriate." Bertin and Arambourg (1958: 2259) followed Parr in considering the supposedly platelike expansion of the upper branchiostegal rays to be unique, and formalized the subordinal ranking of the Bathylaconoidei. The branchiostegal rays in our specimens, however, are far from being platelike. They are somewhat sabershaped, not any broader than those of most alepocephaloids and, in fact, much narrower than those of some searsiids such as *Perspersia kopua*, for which Parr (1960: 49) gives the following description: "The structure of the gill-cover skeleton represents an

extreme, with the upper two branchiostegals forming part of the fixed skeletal cover, and with the upper branchiostegal so expanded as to almost equal the operculum in area." Relative to the entire operculum, the exposed surfaces of the upper branchiostegals in *Herwigia* and *Bathylaco* occupy a very small area. Bigelow (1964), McAllister (1968), and Greenwood et al. (1966) also recognized the suborder Bathylaconoidei. The last authors placed the suborder in their Division III, superorder Protacanthopterygii, order Salmoniformes, whereas Nielsen and Larsen (1968) considered the group as belonging in the division Alepocephaliformes, order Isospondyli, suborder Clupeoidea. Nielsen and Larsen (1968) gave a diagnosis for the family Bathylaconidae but suggested that "when the family Alepocephalidae has become better known it might turn out that the genus *Bathylaco* can be placed in this family." Greenwood and Rosen (1971), after studying various anatomical features of alepocephaloids, stated that they had "uncovered no phyletic evidence to separate the bathylaconids from the alepocephalids." We concur with Greenwood and Rosen (1971).

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太平洋から初記録のセキトリイワシ科 *Herwigia kreffti*, および *Herwigia* 属と *Bathylaco* 属について

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これまで大西洋からのみ報告されていた、セキトリイワシ科の *Herwigia kreffti* がハワイ沖で採集された。また東部太平洋でとれた近縁の *Bathylaco nigricans* の標本について報告する。*Herwigia* と *Bathylaco* との差異は顎の長さ、主上顎骨の構造、前鰓蓋骨の形、胸鰭の位置にみられる。