

Synopsis of the Indo-Pacific Pipefish Genus *Siokunichthys* (Syngnathidae), with Description of *S. nigrolineatus* n. sp.¹

C. E. DAWSON²

ABSTRACT: The urophorine (tail-pouch) pipefish genus *Siokunichthys* is re-diagnosed; diagnoses, descriptions, illustrations, key, and additional information are provided for the five species recognized. The type-species, *S. herrei* Herald (Red Sea and western Pacific) and *S. southwelli* (Duncker), from Sri Lanka and the Philippine Islands, have long slender snouts, but they differ in numbers of trunk rings (respectively, 12–14 versus 8) and in other meristic and morphological features. Two species, *S. bentuviai* Clark (Red Sea, Gulf of Aden) and *S. nigrolineatus* n.sp. (Moluccas and Philippines) have short snouts but differ in number of total rings (respectively, 61–65 versus 67–69), shape of the snout, and life coloration. The remaining species, *S. breviceps* Smith (Mozambique and western Pacific), is characterized by its intermediate snout length and by other proportional and meristic features. These marine fishes are small (to ca. 80 mm SL), some occur in surface waters (usually as subadults), and demersal adults are known to depths of 20 m. Two species (*S. bentuviai* and *S. nigrolineatus*) are apparently commensal with corals.

RECEIPT OF SEVERAL EXAMPLES of an undescribed species of *Siokunichthys* Herald (1953) prompted the present synopsis of this poorly known genus of Indo-Pacific urophorine (tail-pouch) pipefishes. As understood here, the genus includes five species of slender, wormlike, marine fishes which seldom exceed 80 mm SL. An additional species (*Ichthyocampus davaoensis* Herald, 1953) was provisionally referred to *Siokunichthys* by Smith (1963) and Dawson (1977), but subsequent study shows that this species, based on a single planktonic fish (33 mm SL), is probably best referred to the genus *Enchelyocampus* Dawson and Allen (1978).

I here describe a new species of *Siokunichthys*, rediagnose the genus, and provide diagnoses, brief descriptions, illustrations, and additional information for other recognized species. Some of these are apparently commensal with corals, and it seems likely that such relationships are strongly host-specific and that additional species of *Siokunichthys*

are to be expected in tropical Indo-Pacific waters.

MATERIALS AND METHODS

Measurements are in millimeters (mm) and some are reported as standard length (SL), head length (HL), or total length (TL). As used here, the term "venter" is synonymous with "ventral surface." Preserved specimens are largely tan to near-white and remarks on coloration are based on original descriptions or color transparencies. Collection depths are in meters (m); other methods are those of Dawson (1977). The study is based on most of the known museum specimens; abbreviations for repositories of materials examined are: AMNH—American Museum of Natural History, New York; AMS—Australian Museum, Sydney; BMNH—British Museum (Natural History), London; CAS—California Academy of Sciences, San Francisco; GCRL—Gulf Coast Research Laboratory Museum, Ocean Springs, Mississippi; HUJ—Hebrew University of Jerusalem; RUSI—J.L.B. Smith Institute of Ichthyology, Grahamstown, South

¹ Manuscript accepted 1 November 1982.

² Gulf Coast Research Laboratory Museum, Ocean Springs, Mississippi 39564.

Africa; SAM—South Australian Museum, Adelaide; USNM—National Museum of Natural History, Smithsonian Institution, Washington, D.C.; and ZMUC—Zoologisk Museum, University of Copenhagen.

Siokunichthys Herald

Siokunichthys Herald, 1953:254 (type-species: *Siokunichthys herrei* Herald 1953, by original designation).

DIAGNOSIS: Superior trunk and tail ridges confluent, superior ridges not arched dorsad on subdorsal rings (except in *S. southwelli*), inferior trunk and tail ridges discontinuous near anal ring, lateral trunk ridge confluent with inferior tail ridge. Median dorsal snout ridge low, usually inconspicuous, ends above nares or on anterior part of interorbital; supraorbital ridges vestigial to a little elevated, sometimes continued forward to parallel posterior part of median snout ridge; other median dorsal head ridges usually vestigial or obsolete; opercle without longitudinal ridge or striae (except in *S. southwelli*); pectoral-fin base not protruding laterad, without ridges; principal body ridges indistinct, the margins entire, barely indented between rings; scutella inconspicuous, without longitudinal ridges; dorsum of body convex anteriad, angled a little upward about dorsal-fin base, becoming flat caudad; venter of trunk somewhat V-shaped, without a prominent median ridge. Without spines, denticulations, dermal flaps, odontoid processes in jaws (Dawson and Fritzsche 1975), or bony platelets in gill membranes (Dawson 1978). Brood pouch under tail, pouch plates absent, membranous pouch-folds present, pouch-closure (in *S. bentuviai* and *S. nigrolineatus*) the semi- or overlapping type of Herald (1959). Head length ca. 11–18

in SL, snout length ca. 2–5 in HL, rings 8–14 + 49–60, dorsal-fin rays 13–33, dorsal-fin origin between rear margin of 1st tail ring and anterior margin of 7th, the fin-base often a little elevated; pectoral-fin rays 8–13, the fin rounded; anal fin absent; caudal-fin rays typically 10, the fin relatively long and rounded.

COMPARISONS: Among genera of pipefishes with confluent superior trunk and tail ridges, subadults and adults of only *Siokunichthys* and *Urocampus* Günther share the combination of confluent lateral trunk and tail ridges, presence of pectoral fins, and dorsal-fin origin on the tail. *Siokunichthys* lacks the anal fin and dermal flaps (present in *Urocampus*), has a relatively long caudal fin (fin small or vestigial in *Urocampus*), and (except in *S. southwelli*) lacks the opercular ridge typical of *Urocampus*.

REMARKS: Compared to congeners, *Siokunichthys southwelli* has atypically low numbers of rings, dorsal-fin rays, and total subdorsal rings. Additionally, this species has a low ridge on the opercle and low but distinct frontal and nuchal ridges (ridges absent or vestigial in congeners). In these features *S. southwelli* is most similar to species of *Urocampus*, but referral to *Siokunichthys* is based on the absence of anal fin (present in *Urocampus*). Presence or absence of anal fin is a highly stable generic character in pipefishes and, pending study of additional material, present treatment seems most appropriate.

Planktonic subadults of *Siokunichthys* are known from surface collections in harbors and other inshore (possibly estuarine) habitats. Demersal adults appear to be restricted to marine waters, and two species (*S. bentuviai* and *S. nigrolineatus*) appear to be commensal with corals.

KEY TO THE SPECIES OF *Siokunichthys*

1. a. Trunk rings 10–14, dorsal-fin rays 24–33..... 2
1. b. Trunk rings 8, dorsal-fin rays 13–14..... *southwelli*
2. a. Snout short, its length averages 3.6–4.2 in HL; snout depth averages 1.1–1.2 in snout length..... 3
2. b. Snout longer, its length averages 2.4–3.0 in HL; snout depth averages 2.2–3.5 in snout length..... 4

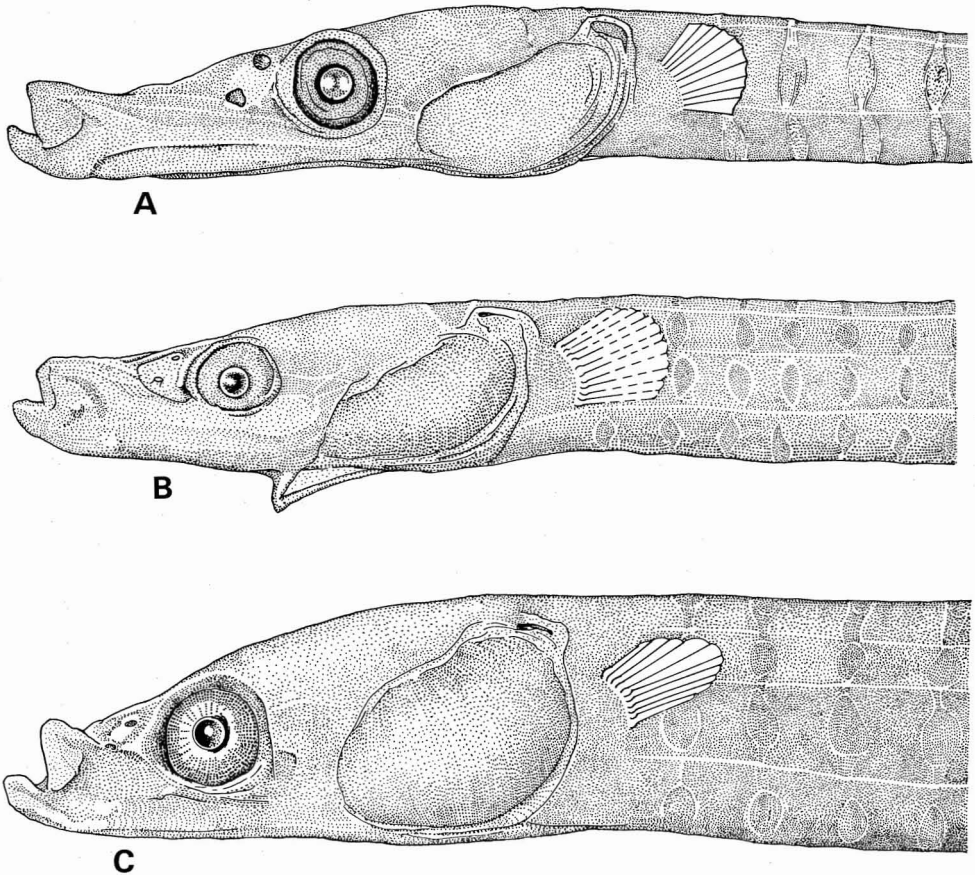


FIGURE 1. Lateral aspect of head and anterior trunk rings in species of *Siokunichthys*. A, *S. herrei*. AMS I.20390-011 (70 mm SL, female or immature male). B, *S. breviceps*. GCRL 15692 (70 mm SL, female or immature male, paratype). C, *S. bentuviai*. GCRL 13873 (57.5 mm SL, brooding male, paratype).

3. a. Trunk rings 10–12, total rings 61–65, dorsal-fin origin on 2.75–5.0 tail rings, dorsolateral profile of snout concave. *bentuviai*
 3. b. Trunk rings 14, total rings 67–69, dorsal-fin origin on 1.0–1.5 tail rings, dorsolateral profile of snout essentially straight. *nigrolineatus*
 4. a. Snout long and slender, its length averages 2.4 in HL; its depth averages 3.5 in snout length. *herrei*
 4. b. Snout shorter and deeper, its length averages 3.0 in HL, its depth averages 2.2 in snout length. *breviceps*

Siokunichthys herrei Herald

Figures 1, 2

Siokunichthys elongatus Herre, 1953:212
 (*nomen nudum*, as unpublished ms name
 of E. S. Herald).

Siokunichthys herrei Herre, 1953:212
 (*nomen nudum*, as unpublished ms name
 of E. S. Herald).

Siokunichthys herrei Herald, 1953:254, fig.
 38 (orig. descr.; Philippines, Mindanao
 Island, Siokun Bay).

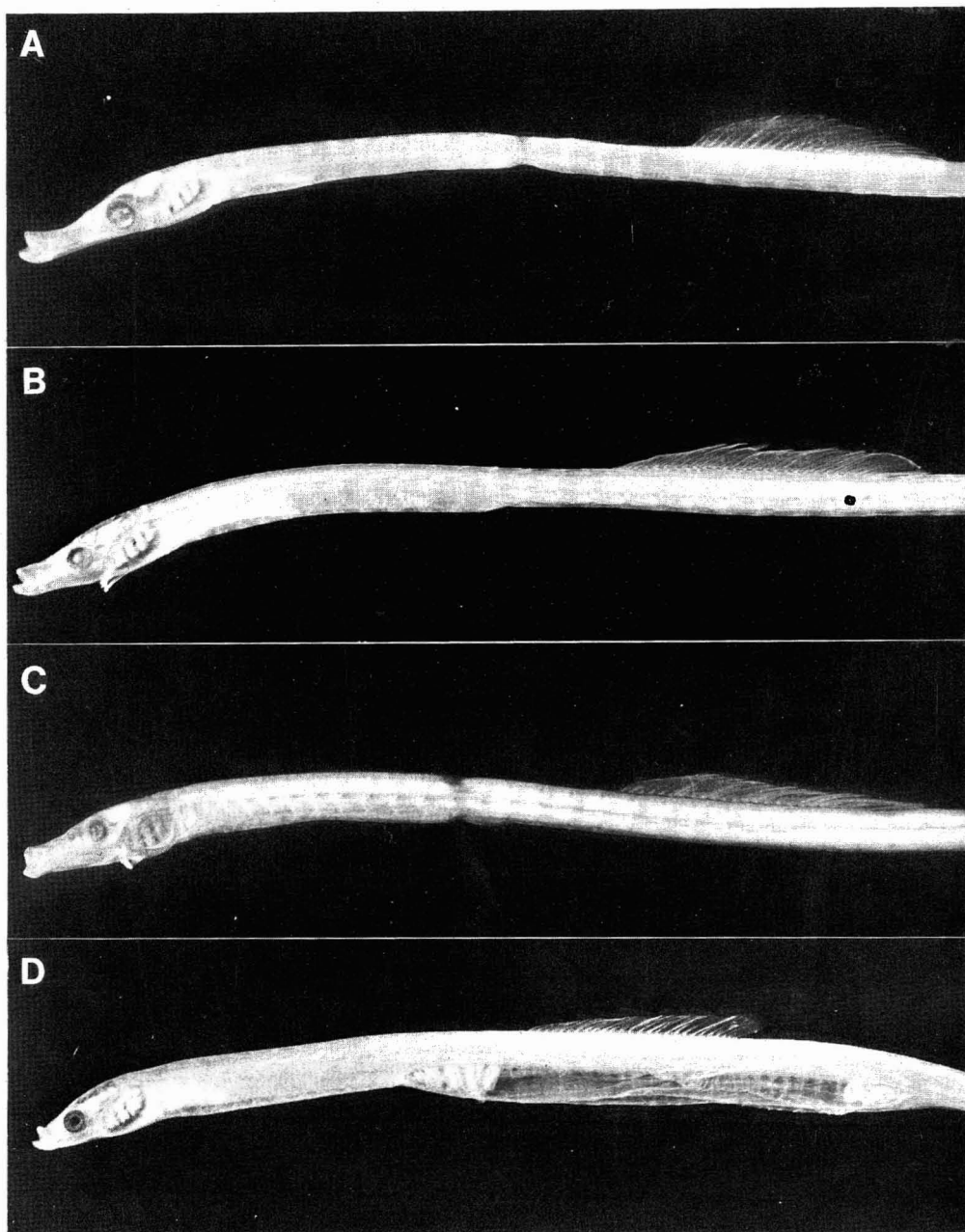


FIGURE 2. Anterior part of body of species of *Siokunichthys*. A, *S. herrei* Herald. CAS 5910 (69.5 mm SL, female or immature male, paratype), Fiji. B, C, *S. breviceps* Smith. B, GCRL 15962 (70 mm SL, female or immature male, paratype), Pinda, Mozambique. C, USNM 112298 (70.5 mm SL, female or immature male, paratype of *S. herrei*), Panay Island, Philippines. D, *S. bentuviai* Clark. GCRL 13873 (57.5 mm SL, brooding male, paratype), Dahlak Archipelago, Red Sea. Indentations on trunk of CAS 5910 and USNM 112298 are artifacts of preservation.

TABLE 1
FREQUENCY DISTRIBUTIONS OF TRUNK, TAIL, AND TOTAL RINGS IN SPECIES OF *Siokunichthys*

NUMBER OF RINGS	<i>S. bentuviai</i>	<i>S. breviceps</i>	<i>S. herrei</i>	<i>S. nigrolineatus</i>	<i>S. southwelli</i>
<i>Trunk rings</i>					
8					2
9					
10	3				
11	20				
12	8	4	2		
13		10	25		
14		3	4*	6*	
<i>Tail rings</i>					
49					1
50	2				1
51	9				
52	13				
53	7			2*	
54				3	
55			3	1	
56		3	12*		
57		6	13		
58		3	3		
59		2			
60		3			
<i>Total rings</i>					
57					1
58					1
59					
60					
61	2				
62	8				
63	11				
64	9				
65	1				
66					
67			1	2*	
68			3	3	
69		4	8	1	
70		5	15*		
71		2	4		
72		4			
73		2			

*Holotype.

DIAGNOSIS: Trunk rings modally 13, tail rings 55–58, HL averages 13.4 in SL, snout length averages 2.4 in HL, dorsal-fin origin typically on more than 2.5 tail rings.

DESCRIPTION: Rings 12–14 + 55–58, dorsal-fin rays 27–31, dorsal-fin origin on 2.75–4.0 tail rings, total subdorsal rings 6.75–8.5, pectoral-fin rays 10–13 (see Tables 1–4 for additional counts). Pro-

portional data, based on 13 specimens 65.5–73.5 (\bar{x} = 69.9) mm SL, follow: HL in SL 12.1–14.2 (13.4), snout length in HL 2.2–2.6 (2.4), snout depth in snout length 2.7–4.6 (3.5), length of dorsal-fin base in HL 0.6–0.7 (0.7), anal ring depth in HL 3.4–6.8 (5.2), trunk depth in HL 3.6–5.5 (4.3), pectoral-fin length in HL 5.6–8.8 (7.3). Snout length 2–3 times longer than eye diameter, snout depth clearly less than snout length, dorsal margin

TABLE 2

FREQUENCY DISTRIBUTIONS OF DORSAL- AND PECTORAL-FIN RAYS IN SPECIES OF *Siokunichthys*

NUMBER OF RAYS	<i>S. bentuviai</i>	<i>S. breviceps</i>	<i>S. herrei</i>	<i>S. nigrolineatus</i>	<i>S. southwelli</i>
<i>Dorsal-fin rays</i>					
13					1
14					1
—					
24	3				
25	11				
26	10				
27	4	5	1		
28	2	1	9		
29		4	12		
30		4	6	2	
31		2	2*	3*	
32		2		1	
33		1			
<i>Pectoral-fin rays</i>					
10			4	2*	
11	14	4	19	7	
12	10	18	12	3	
13	3	7	5		

*Holotype.

TABLE 3

FREQUENCY DISTRIBUTIONS OF POINT OF DORSAL-FIN ORIGIN IN SPECIES OF *Siokunichthys*

POINT OF DORSAL-FIN ORIGIN ON TAIL RINGS	<i>S. bentuviai</i>	<i>S. breviceps</i>	<i>S. herrei</i>	<i>S. nigrolineatus</i>	<i>S. southwelli</i>
1.0				3	
1.25				1	
1.5				2*	
1.75					
2.0					
2.25					
2.5		3			
2.75	1	2	4		
3.0	2	1	9		
3.25	6	1	4*		
3.5	1	6	8		
3.75	4	1	4		
4.0	10		2		
4.25	6	1			
4.5	1	2			
4.75					
5.0	1				
—					
7.0					2

*Holotype.

TABLE 4
FREQUENCY DISTRIBUTIONS OF TOTAL SUBDORSAL RINGS IN SPECIES OF *Siokunichthys*

TOTAL SUBDORSAL RINGS	<i>S. bentuviai</i>	<i>S. breviceps</i>	<i>S. herrei</i>	<i>S. nigrolineatus</i>	<i>S. southwelli</i>
3.25					1
3.5					1
—					
6.25	1				
6.5	3				
6.75	11		1		
7.0	12	2	2		
7.25	2	2	3*		
7.5	1	4	15	1	
7.75	2	1	5	2	
8.0		4	2	3*	
8.25		2	2		
8.5		1	2		
8.75					
9.0		1			

*Holotype.

of upper jaw typically failing to reach horizontal through dorsal rim of orbit.

COLORATION: Herald (1953) noted that life coloration differed little from the uniform light tan of preserved specimens.

COMPARISONS: *Siokunichthys herrei* and *S. southwelli* share the long and slender configuration of the snout, but *S. herrei* has more trunk rings and dorsal-fin rays (respectively, 12–14 and 27–31 versus 8 and 13–14 in *S. southwelli*). Compared to other congeners, *S. herrei* is perhaps most similar to *S. breviceps*. However, the snout is longer and more slender in *S. herrei*, the dorsolateral profile of the snout is typically more concave than that of *S. breviceps* (compare Figure 1, top and middle), and *S. herrei* tends to have fewer tail rings (67–71 versus 69–73 in *S. breviceps*).

REMARKS: Herre (1953:5) noted that E. S. Herald "rearranged the family Syngnathidae" for his list of Philippine fishes, but it is uncertain whether Herald personally contributed to the list of pipefishes included therein. It is evident that Herre had access to or information concerning Herald's manuscript treating the pipefishes of the Marshall and Mariana islands, since he included four of Herald's manuscript names in his Philippine report

(Herre 1953). Of these, three (*Ichthyocampus davaoensis*, *Siokunichthys*, and *S. herrei*) were described by Herald (1953), but the fourth (*S. elongatus*) was not mentioned. Since these publications by Herre and Herald are both dated 1953, it is of some interest to establish priority. Although the U.S. Government Printing Office advises (in litt.) that there are no extant records regarding precise dates of publication, available evidence indicates that Herre's report was printed first. The CAS library copy of the Philippine checklist is marked "Received on 3 Nov. 1953," and a copy of USNM Bull. 202 (including Herald's descriptions) in the library of the USNM Div. of Fishes is stamped "Issued Dec. 15, 1953."

In view of the foregoing and Herre's (1953) notations that the "types" of both manuscript species of *Siokunichthys* included specimens from Siokun Bay (type locality of *S. herrei*), it appears that Herald originally considered his material to include two species or that he was undecided as to the most appropriate specific name. In any event, Herald's (1953) description of *S. herrei* was based on the holotype and one paratype (subsequently exchanged with RUSI) taken together in Siokun Bay; two paratypes (USNM 112298, published in error as

112297) from Panay Island; and seven paratypes from Suva, Fiji. I found six of the Fiji specimens to be conspecific with the holotype (one exchanged with SAM not seen), whereas those from Panay are representatives of *S. breviceps* Smith. I have not seen the paratype sent to RUSI (formerly USNM 112297), but it evidently has the long snout characteristic of *S. herrei*. I believe that Herald originally planned to employ the name *elongatus* for the long-snouted fish and *herrei* for the species subsequently described as *S. breviceps*. It remains unclear why one long-snouted fish from Siokun Bay was included in the manuscript "types" of *S. herrei* (Herre 1953) or why Herald (1953) subsequently included all of the material in his description of *S. herrei*.

Clark (1966) identified three specimens (now 57.5–59 mm SL) from Eilat, Gulf of Aqaba, as *S. herrei*. These fish (omitted from diagnosis and tables) generally agree with western Pacific specimens of *S. herrei*, but they have fewer tail rings (52–53 versus 55–58). This difference may merely represent clinal variation, but study of additional Red Sea material may show these fish to represent an undescribed taxon. Study material includes one other specimen (USNM 236541), which is provisionally referred to *S. herrei*. This 43-mm Philippine fish (omitted from tables) agrees with specimens of *S. herrei* in most features, but it differs in having the dorsal-fin origin on 1.5 rather than on 2.75–4.0 tail rings.

Brooding males are unknown but pouch-folds are developing under the anterior 6–8 tail rings in two immature fish (69.5–75 mm SL).

DISTRIBUTION: The holotype was taken at the surface with dip-net and night-light over a depth of 36.6 m. All other material appears to have been taken with dip-net or in surface plankton samples. This species is presently recorded from the northern Red Sea, and from Indonesia, the Philippines, Solomon Islands, and Fiji in the western Pacific Ocean.

MATERIAL EXAMINED: 36 specimens, 43–76 mm SL, including holotype and 6 paratypes.

HOLOTYPE: USNM 112296 (73.0 mm SL,

female or immature male), Philippines, Mindanao Island, Siokun Bay, 07°43'24" N, 122°04'42" E, 18 Feb. 1948, E. S. Herald.

PARATYPES: CAS 5910 (5, 68.5–73.5), USNM 164345, formerly CAS 5910 (1, 72.5), Fiji Islands, Suva, 20 Apr. 1933, Crocker Expdn.

OTHER MATERIAL: Red Sea, Eilat: HUI F.9248 (2, 57.5), HUI F.9259 (1, 59). Pacific Ocean, Celebes, Manado: AMNH 17547 (1, 70), AMNH 17588 (3, 70–76). Philippines: USNM 139070 (1, 73.5), USNM 139102 (17, 59–75), USNM 139105 (1, 71.5), USNM 236541 (1, 43). Solomon Islands, Guadalcanal Island: GCRL 18908 (1, 68). Fiji Islands: AMS I.20390-011 (1, 69).

Siokunichthys breviceps Smith

Figures 1, 2

Siokunichthys breviceps Smith, 1963:525, pl. 80, figs. j–m (orig. descr.; Pinda, Mozambique).

DIAGNOSIS: Trunk rings modally 13, tail rings 56–60, HL averages 14.5 in SL, snout length averages 3.0 in HL, dorsal-fin origin on 2.5 or more tail rings.

DESCRIPTION: Rings 12–14 + 56–60, dorsal-fin rays 27–33, dorsal-fin origin on 2.5–4.5 tail rings, total subdorsal rings 7.0–9.0, pectoral-fin rays 11–13 (see Tables 1–4 for additional counts). Proportional data, based on 14 specimens 66–80 (\bar{x} = 71.3) mm SL, follow: HL in SL 12.4–17.6 (14.5), snout length in HL 2.3–4.0 (3.0), snout depth in snout length 1.2–3.4 (2.2), length of dorsal-fin base in HL 0.5–0.8 (0.6), anal ring depth in HL 2.4–5.9 (4.6), trunk depth in HL 2.2–4.5 (3.4), pectoral-fin length in HL 5.0–6.9 (5.7). Snout length clearly longer than eye diameter, snout depth clearly less than snout length, dorsal margin of upper jaw not reaching horizontal through dorsal rim of orbit, usually with some trace of a low frontal ridge.

COLORATION: Smith (1963) described the type material as "uniform light cream" but this probably referred to preserved rather than fresh specimens.

COMPARISONS: This species differs from *S. bentuviai* in having a lower average snout length in HL ratio (3.0 versus 4.2) and in having more total rings (69–73 versus 61–65 in *S. bentuviai*). *Siokunichthys breviceps* has a shorter and deeper snout than *S. herrei* (compare Figure 1, top and middle) and lacks the vertical gape and very deep snout of *S. nigrolineatus* (snout depth in snout length averages 2.2 versus 1.1 in *S. nigrolineatus*).

REMARKS: Smith (1963) described the caudal fin as having 9 rays but all undamaged specimens examined here, including four paratypes, have 10 caudal-fin rays. Brood-pouch folds are partly developed under the 8 anterior tail rings in a 54 mm SL fish and extend below 11–17 rings in 4 other males (70–80 mm SL); type of pouch-closure unknown. I find no significant differences between material from Mozambique and western Pacific localities, and all specimens appear to be conspecific. However, comparative study of life coloration and habitats may show that more than one taxon is included here. This species has been taken with *S. herrei* in surface night-light collections in the Philippines.

DISTRIBUTION: Smith based his description on five fish collected from coral rubble, and there are other examples reported from a “coral head” and from surface dip-net and night-light samples. Two fish were taken in 0–2.4 m and one surface sample was over a depth of 21.9 m. *Siokunichthys breviceps* is known from Mozambique in the western Indian Ocean, and from Indonesia, the Philippines, and the Great Barrier Reef (Australia) in the western Pacific Ocean.

MATERIAL EXAMINED: 17 specimens, 54–80 mm SL, including four paratypes.

PARATYPES: Mozambique, Pinda: GCRL 15962 (1, 70), RUSI 932 (2, 66–70.5), USNM 197703 (1, 71).

OTHER MATERIAL: Indonesia, Ambon: USNM 209734 (1, 70). Kei Islands: ZMUC P.39470–71 (2, 54–55.5). Philippines, Luzon Island: USNM 139079 (3, 72–74), USNM 236540 (1, 69.5). Apo Island: GCRL 18907 (1, 80). Ticao Island: USNM 139099 (2, 68–70.5).

Panay Island: USNM 112298 (2, 68.5–70.5), paratypes of *S. herrei*. Australia, Queensland, Lizard Island: AMS I.19108–103 (1, 75.5).

Siokunichthys bentuviai Clark

Figures 1, 2

Siokunichthys bentuviai Clark, 1966: 4, figs. 1–2 (orig. descr.; Dahlak Archipelago, Red Sea).

Siokunichthys bentuviae. Ben-Tuvia, 1976: 18 (emendation).

DIAGNOSIS: Trunk rings modally 11, tail rings 50–53, HL averages 15.8 in SL, snout length averages 4.2 in HL, dorsal-fin origin on more than 2.5 tail rings.

DESCRIPTION: Rings 10–12 + 50–53, dorsal-fin rays 24–28, dorsal-fin origin on 2.75–5.0 tail rings, total subdorsal rings 6.25–7.75, pectoral-fin rays 11–13 (see Tables 1–4 for additional counts). Proportional data, based on 10 specimens 52.0–56.5 (\bar{x} = 54.4) mm SL, follow: HL in SL 14.9–16.7 (15.8), snout length in HL 3.7–5.0 (4.2), snout depth in snout length 1.0–1.3 (1.2), length of dorsal-fin base in HL 0.6–0.7 (0.6), anal ring depth in HL 2.8–4.5 (3.5), trunk depth in HL 2.2–2.8 (2.5), pectoral-fin length in HL 4.7–5.5 (5.0). Snout length little longer than eye diameter, snout depth about equal to snout length, dorsal margin of upper jaw not reaching horizontal through dorsal rim of orbit.

COLORATION: Clark (1966) described fresh specimens as having green “stripes” on the head and the two anterior trunk rings, pale pink “stripes” on 3rd–8th trunk rings, tiny red spots anterior to nares, and the eye with a yellow and pink horizontal stripe through pupil and a green iris.

COMPARISONS: This species is perhaps most similar to *S. nigrolineatus* in that both have a relatively short and deep snout. In *S. bentuviai* the dorsolateral profile is angled anteroventrad (essentially straight in *S. nigrolineatus*) and there are fewer tail rings (61–65 versus 67–69 in *S. nigrolineatus*). The combination of short snout and modally 11 trunk rings distinguishes *S. bentuviai* from other congeners.

REMARKS: Although Clark (1966) described markings on head and trunk rings as stripes, her accompanying illustration (Clark, fig. 2) shows a series of more or less vertical bars rather than horizontal stripes.

Clark (1966) reported development of the brood pouch in males as small as 51 mm SL and noted that pouch-closure was the overlapping type of Herald (1959). Among present material, the brood pouch is developed below the anterior 10–19 tail rings in 14 males (52.5–60.0 mm SL). Pouch-closure could not be determined in most specimens, but one fish (USNM 197763) has Herald's semi-type closure.

DISTRIBUTION: Clark (1966) collected this species over coral and sand bottom and among branches of a soft coral (*Zenia* sp.). Available data indicate that all specimens are from depths of 0–9.1 m. *Siokunichthys bentuviai* is known from El Tur, Sinai Peninsula, and the Dahlak Archipelago (Ethiopia) in the Red Sea, and from the vicinity of Musha Island, near Djibouti, in the Gulf of Aden.

MATERIAL EXAMINED: 32 specimens, 52–61 mm SL, including 17 paratypes.

PARATYPES: Red Sea, Dahlak Archipelago: CAS 23805 (1, 56), GCRL 13873, formerly HUF F.9247 (2, 54.5–55.5), HUF F.9247 (10, 52.5–59), USNM 197763 (4, 52.5–57.5).

OTHER MATERIAL: Red Sea, El Tur: HUF F.6020 (2, 55.5–57), USNM 220988 (2, 60–61). Dahlak Arch.: HUF F.9424 (2, 53–55), HUF F.9425 (5, 52–54.5), USNM 220987 (1, 53). Gulf of Aden, Musha Island: GCRL 18135 (3, 53.5–56.5).

Siokunichthys nigrolineatus new species

Figures 3–5

DIAGNOSIS: Trunk rings 14, tail rings 53–55, HL averages 15.5 in SL, snout length averages 3.6 in HL, dorsal-fin origin on fewer than 2.0 tail rings.

DESCRIPTION: Rings 14 + 53–55, dorsal-fin rays 30–32, dorsal-fin origin on 1.0–1.5 tail rings, total subdorsal rings 7.5–8.0, pectoral-fin rays 10–12 (see Tables 1–4 for additional

counts). Measurements (mm) of brooding male holotype: SL 63.0, HL 4.2, snout length 1.2, snout depth 1.1, length of dorsal-fin base 7.1, anal ring depth 1.4, trunk depth 1.6, pectoral-fin length 0.6, length of pectoral-fin base 0.4, caudal-fin length 1.4. Proportional data, based on four specimens 63.0–74.0 (\bar{x} = 68.9) mm SL, follow: HL in SL 15.0–16.1 (15.5), snout length in HL 3.5–3.8 (3.6), snout depth in snout length 1.1, length of dorsal-fin base in HL 0.5–0.6 (0.6), anal ring depth in HL 2.6–3.5 (3.0), trunk depth in HL 1.8–2.6 (2.2), pectoral-fin length in HL 6.6–7.5 (7.2). Lower jaw deep in lateral aspect, strongly concave or scoop-like interiorly; gape strongly inclined to or somewhat past vertical through angle of articulation; dorsal margin of upper jaw high, reaches to or a little above a horizontal through dorsal rim of orbit.

COLORATION: Photographs show living and freshly collected specimens to have a black diagonal stripe on side of head (Figure 5) and micromelanophores shading the postorbital area; head and body otherwise near white.

ETYMOLOGY: Named *nigrolineatus* in reference to the black stripe on the head of living specimens.

COMPARISONS: The combination of scoop-like lower jaw, nearly vertical gape, and short snout with an essentially straight dorsolateral profile distinguishes *S. nigrolineatus* from congeners. In addition, the dorsal fin originates further forward than that of most other specimens of *Siokunichthys* (on 1.0–1.5 versus 2.5–7.0 tail rings in all but one other examined specimen), and the dark lateral stripe on the head of fresh specimens is not recorded for congeners.

REMARKS: The brood pouch of the holotype extends below 16 tail rings, pouch-closure is the semi-type of Herald (1959), and brood-pouch eggs (maximum diameter ca. 0.9 mm) are deposited in a single layer of two transverse rows through 14 pouch-rings. The brood pouch extends below 19 and 20 tail rings in two male paratypes, and one of these (BMNH 1982.6.17.60) contained 82 pouch larvae (ca. 7.0 mm TL).

All specimens now lack the black stripe on

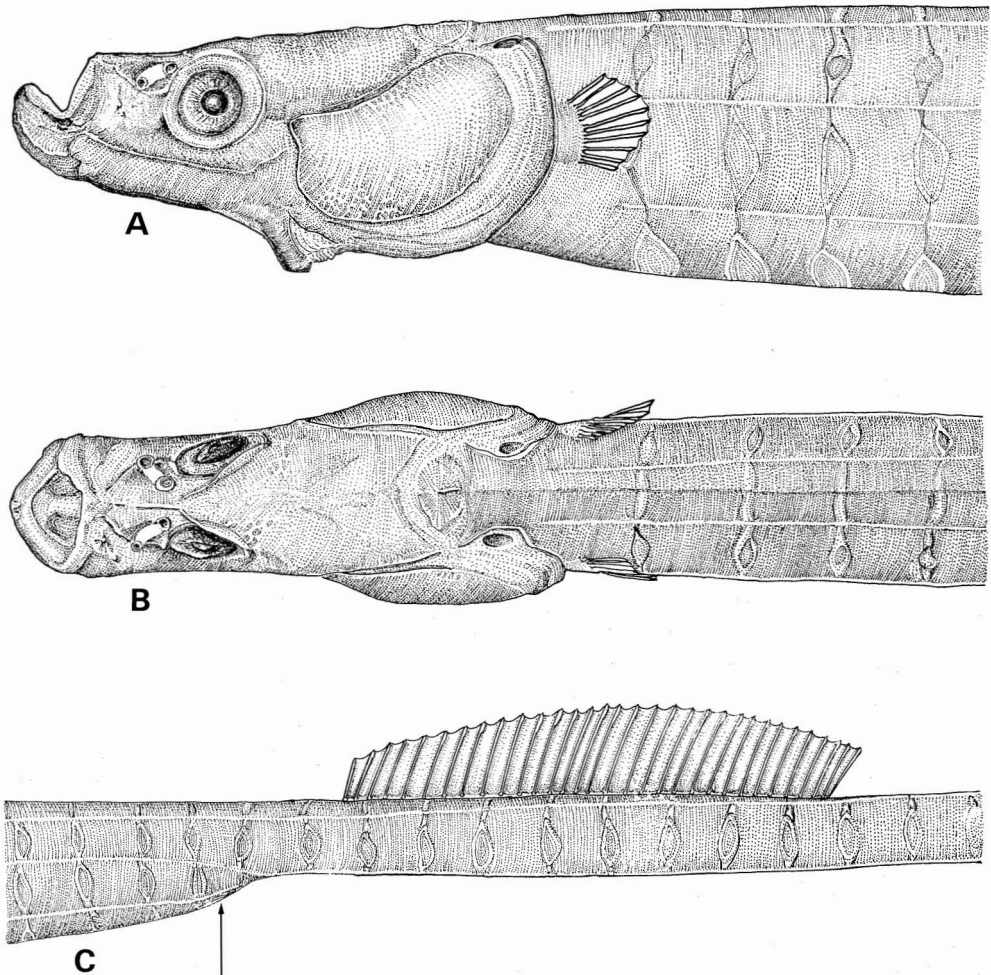


FIGURE 3. *Siokunichthys nigrolineatus*. Lateral and dorsal aspects of head and anterior trunk rings, together with section of body illustrating ridge configuration, dorsal fin, and location of anal ring (arrow). From 74 mm SL adult female paratype (USNM 236539).

the head and are near-white in preservative.

The holotype and one paratype (BMNH 1982.6.17.60) were collected from a solitary coral (*Fungia echinata*), and another paratype (GCRL 19192) was taken from among several specimens seen on a solitary sedentary coelenterate (possibly *Fungia* sp.). An illustrated report on this presumably commensal occurrence of *S. nigrolineatus* is being prepared by R. S. V. Pullin and D. Phillips.

All specimens are from SCUBA assisted collections in 13.1–20 m and thereby represent

the deepest known occurrence of any species of *Siokunichthys*. It should be noted, however, that the absence of brooding males in collections suggests that breeding populations of *S. herrei* may occupy deeper, infrequently sampled, habitats.

DISTRIBUTION: Known from Indonesia and the Philippines.

MATERIAL EXAMINED: Six specimens, 62–74 mm SL, including holotype and four paratypes.

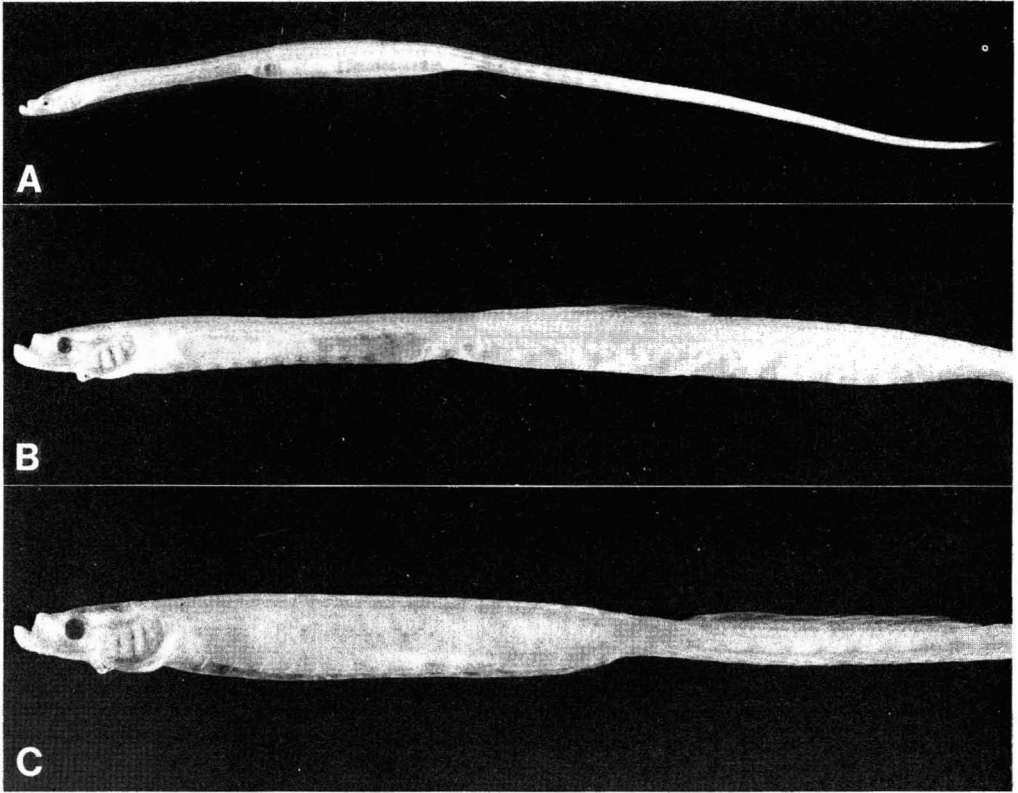


FIGURE 4. *Siokunichthys nigrolineatus* n.sp. A, BMNH 1982.6.17.59 (63 mm SL, brooding male, holotype), Molucca Islands. B, GCRL 18829 (67.5 mm SL, male, paratype), Philippines. C, USNM 236539 (74 mm SL, adult female, paratype), Philippines.

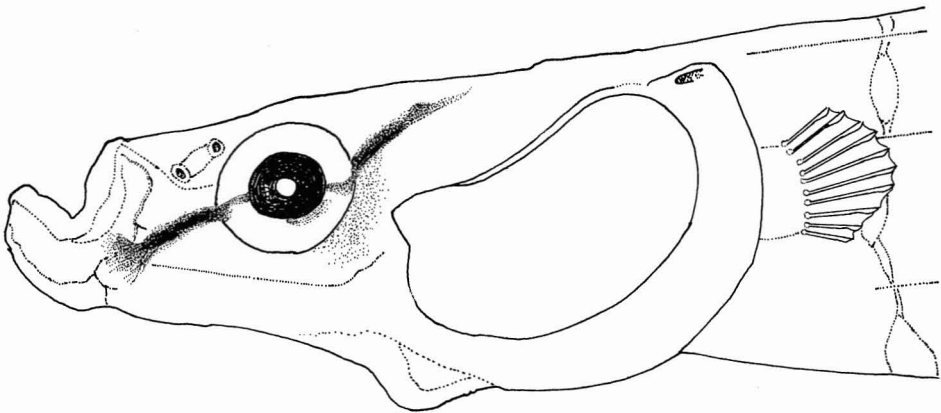


FIGURE 5. *Siokunichthys nigrolineatus*. Delineation of dark markings present on head of living specimens (from color transparency of holotype).

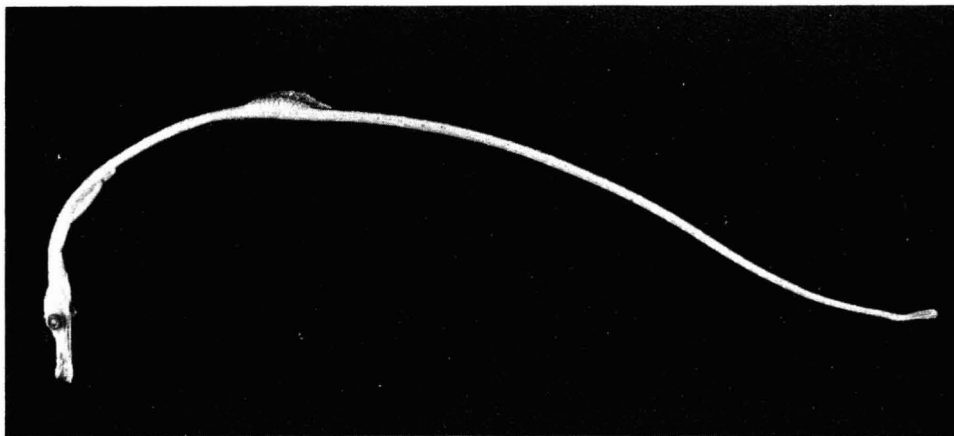


FIGURE 6. *Siokunichthys southwelli* (Duncker). USNM 220990 (40 mm SL, female or immature male), Philippines.

HOLOTYPE: BMNH 1982.6.17.59 (63 mm SL, brooding male), Indonesia, Moluccas, Belang-belang Island, NW of Obi Major, 20 m, 6 Nov. 1980, N. V. C. Polunin.

PARATYPES: Indonesia, Moluccas: BMNH 1982.6.17.60 (71, brooding male), taken with holotype. Philippines, Luzon Island: GCRL 19192 (65.5, female), Batangas Province, Anilao, 20 m, 31 Jan. 1981, R. S. V. Pullin and D. Phillips. Negros Island: GCRL 18829 (67.5, male) and USNM 236539 (74, female), Oriental Province, Bonbonon Bay, 300 m SW of harbor entrance, 09°03' N, 123°07'12" E, 13.1 m, 28 Apr. 1979, J. Libbey and party.

OTHER MATERIAL: An immature male (62 mm), collected with GCRL 19192, has been deposited in the personal collection of R. S. V. Pullin.

Siokunichthys southwelli (Duncker)

Figure 6

Urocampus southwelli Duncker, 1910:30, figs. b, c (orig. descr.; Marichchukkaddi Bay, Ceylon).

Siokunichthys southwelli. Dawson, 1980: 832 (n. comb.).

DIAGNOSIS: Trunk rings 8, dorsal-fin rays 13–14, dorsal-fin origin on 7th tail ring.

DESCRIPTION: Rings 8 + 49–50, dorsal-fin rays 13–14, dorsal-fin origin on anterior mar-

gin of 7th tail ring, total subdorsal rings 3.25–3.5 (Tables 1–4). Head length ca. 11.4 in SL, snout length ca. 1.9 in HL, snout depth ca. 3–4 in snout length. Median dorsal snout ridge low, terminates, behind, near vertical through nares, the distal portion paralleled bilaterally, for a short distance, by anterior continuations of supraorbital ridges; frontal and nuchal ridges distinct but not clearly elevated; upper third of opercle with a low longitudinal ridge, the lower part of opercle with some faint radiating striae; scutella minute; superior tail ridge arched a little dorsad on subdorsal rings; dorsum of tail angled upward toward the slightly elevated dorsal-fin base (description based on two fish, 40–43 mm SL).

COMPARISONS: In addition to characters in key and diagnosis, this species differs from congeners in a number of morphological features. The complete opercular ridge is not found in congeners, the frontal and nuchal ridges are more conspicuous and the scutella are much smaller and less distinct in *S. southwelli*. Furthermore, the superior tail ridges are somewhat arched on the subdorsal rings of *S. southwelli*, whereas they are essentially straight in congeners.

REMARKS: Duncker's (1910) description was based on two specimens, a female and a brooding male (respectively, 40 and 45 mm TL), taken in a "tow-net" in a depth of 4.2 m.

The syntypes were deposited in the Colombo Museum and are evidently lost or destroyed (De Silva 1956). Duncker described the subdorsal tail rings as "somewhat elevated," the color as "uniformly yellowish brown," the opercle as "keeled in anterior two-thirds of its length," and noted that the "body edges" were very indistinct. He also gave counts of 8 + 49–50 rings, 14 dorsal-fin rays, 8–10 pectoral-fin rays, 10 caudal-fin rays, 5 subdorsal rings, 8 brood-pouch rings (without pouch plates), and noted the absence of both anal fin and "cutaneous folds" (dermal flaps). Subsequently, Duncker (1915) tentatively referred the species to the synonymy of *Urocampus carinirostris* Castelnau because of close agreement in a number of meristic features.

The two immature male or female specimens reported here agree with Duncker's (1910) description and figures in all essential features and are considered to be conspecific with *U. southwelli*. The principal difference rests with the present values of 3.25–3.5 subdorsal rings, but this may reflect individual variation as well as discrepancies in Duncker's counts. Although subdorsal rings were described as 5 for both syntypes, Duncker's figures indicate about 4.5 subdorsal rings in the male and 3.5–4 in the female. I have been unable to obtain an accurate count of pectoral-fin rays in present material, but several attempts indicate that these number 8–10.

The absence of an anal fin and presence of a relatively large caudal fin dictates removal of this species from the genus *Urocampus* Günther, wherein the caudal fin is poorly developed (in juveniles and adults) and the anal fin is typically present. Although this species differs significantly from congeners in meristic values and in some morphological features, I believe that *southwelli* is best referred to the genus *Siokunichthys*. Greater development of the opercular, frontal, and nuchal ridges may reflect adaptation to a planktonic life, and absence of this pipefish from other Indo-Pacific collections suggests that *S. southwelli* may be a pelagic species.

DISTRIBUTION: Known only from plankton or night-light collections from Sri Lanka (Ceylon) and the Philippines.

MATERIAL EXAMINED: Philippines: USNM 220990 (2, 40–43), Mindoro Island, Mansalay, 3 June 1908, Albatross.

ACKNOWLEDGMENTS

I thank the curators and assistants of the referenced institutions for loans of specimens and other courtesies. Exchange or gift specimens were received from A. Ben-Tuvia (HUJ), L. W. Knapp (Smithsonian Oceanographic Sorting Center), R. S. V. Pullin (Manila, P. I.), J. M. Rose (Djibouti) and M. M. Smith (RUSI). Color photographs of fresh or living specimens were kindly provided by N. V. C. Polunin (Cambridge Univ.), R. S. V. Pullin and D. Phillips (Hong Kong). Drawings are by Nancy Gordon and Yasue Matthews.

LITERATURE CITED

- BEN-TUVIA, A. 1976. Fish collections from the eastern Mediterranean, the Red Sea and inland waters of Israel. Hebrew Univ. Jerusalem. 31 pp.
- CLARK, E. 1966. Pipefishes of the genus *Siokunichthys* Herald in the Red Sea with description of a new species. Bull. Sea Fish. Res. Sta. Haifa 41:3–6.
- DAWSON, C. E. 1977. Synopsis of the syngnathine pipefishes usually referred to the genus *Ichthyocampus* Kaup, with description of new genera and species. Bull. Mar. Sci. 27(4):595–650.
- . 1978. Review of the Indo-Pacific pipefish genus *Bhanotia*, with description of *B. nuda* n. sp. Proc. Biol. Soc. Wash. 91(2):392–407.
- . 1980. The Indo-Pacific pipefish genus *Urocampus* (Syngnathidae). Proc. Biol. Soc. Wash. 93(3):830–844.
- DAWSON, C. E., and G. R. ALLEN. 1978. Synopsis of the "finless" pipefish genera (*Penetopteryx*, *Apterygocampus* and *Enchelyocampus* gen. nov.). Rec. West. Aust. Mus. 6(4):391–411.
- DAWSON, C. E., and R. A. FRITZSCHE. 1975. Odontoid processes in pipefish jaws. Nature 257:390.

- DE SILVA, P. H. D. H. 1956. The order Thoracostei off Ceylon, with a list of the specimens in the Colombo Museum. Spol. Zeylan. 28:35-45.
- DUNCKER, G. 1910. On some syngnathids ("pipe fish") from Ceylon. Spol. Zeylan. 7(25):25-34.
- . 1915. Revision der Syngnathidae. Erster Teil. Mitt. Naturh. Mus. Hamburg 32:9-120.
- HERALD, E. S. 1953. Family Syngnathidae: Pipefishes. Pages 231-278 in L. P. Schultz et al., Fishes of the Marshall and Marianas Islands. Bull. U.S. Nat. Mus. 202(1).
- . 1959. From pipefish to seahorse—a study of phylogenetic relationships. Proc. Calif. Acad. Sci. 29(13):465-473.
- HERRE, A. W. 1953. Check list of Philippine fishes. Res. Rep. U. S. Fish and Wildl. Serv. 20:1-970.
- SMITH, J. L. B. 1963. Fishes of the family Syngnathidae from the Red Sea and the western Indian Ocean. Ichthyol. Bull. Rhodes Univ. 27:515-543.