

## NOTES ON SOME SIBOGA EXPEDITION PIPEFISHES PREVIOUSLY REFERRED TO THE GENUS *SYNGNATHUS*

by

C. E. DAWSON

*Gulf Coast Research Laboratory Museum, Ocean Springs, Mississippi 39564, U.S.A.*

### ABSTRACT

*Syngnathus maxweberi* Whitley, 1933 (= *S. punctatus* Weber, 1913, preocc.) is referred to the genus *Cosmocampus*. Two lots of pipefishes from the "Siboga" collections, referred to *Syngnathus* sp. by Weber, 1913, are described and provisionally identified as incompletely metamorphosed planktonic specimens of *Penetopteryx taeniocephalus* Lunel, 1891 (Sta. 136) and *Enchelyocampus* sp. (Sta. 252). Representative specimens of these, as well as the first known male of *E. brauni* Dawson & Allen, 1978, are illustrated.

### INTRODUCTION

A number of pipefishes (Syngnathidae) reported by Weber (1913) have been discussed by Dawson (1977a, 1977b, 1978a, 1978b, 1979a) and Dawson & Allen (1978), but other material from the "Siboga" Expedition merits separate treatment at this time. This includes the species described as *Syngnathus punctatus* Weber, 1913, and specimens which Weber (1913) reported as "*Syngnathus* sp. juv."

Weber & De Beaufort (1922) essentially copied the original description of *S. punctatus*, Whitley (1933) introduced the specific name *maxweberi* as a replacement for the preoccupied *punctatus* and Herald (1953) reported on a specimen of this species from Bikini. There appear to be no other references to the species currently known as *S. maxweberi* and the specimens referred to *Syngnathus* sp. by Weber (1913) have not been mentioned in subsequent literature. One of the latter (Siboga Sta. 40) now lacks parts of the head and tail and is unidentifiable but the others are worthy of discussion. I here redescribe the poorly known *S. maxweberi*, refer this species to the genus *Cosmocampus* Dawson and provisionally identify specimens in two lots originally referred to *Syngnathus* sp.

### METHODS AND MATERIALS

Methods for counts and measurements follow Dawson (1977a); SL = standard length, HL = head length, capture depth is reported in meters (m).

Abbreviations for repositories of examined materials follow: AMS = Australian Museum, Sydney; BPBM = Bernice P. Bishop Museum, Honolulu; GCRL = Gulf Coast Research Laboratory Museum, Ocean Springs, Mississippi; QM = Queensland Museum, Brisbane; USNM = National Museum of Natural History, Washington, D.C.; ZMA = Zoologisch Museum, Amsterdam.

### ***Cosmocampus maxweberi* (Whitley, 1933).**

Fig. 1.

*Syngnathus punctatus* (not of Rafinesque, 1810) Weber, 1913: 113, fig. 39 [original description, Sumbawa I. (Indonesia)].

*Syngnathus (Parasyngnathus) maxweberi* Whitley, 1933: 66 (replacement name for *punctatus*, preoccupied).

*Syngnathus maxweberi*; Herald, 1953: 278 (Bikini lagoon).

**Material examined.** — Holotype: ZMA 112.623 (76.0 mm SL, female), INDONESIA, Sumbawa I., Saleh Bay, anchorage E. of Dangar Besar, Siboga Sta. 313, 14-16 Feb. 1900, M. Weber.

Other material: RED SEA, Gulf of Aqaba — USNM 215312 (1, 49). INDONESIA, Saparua I. — GCRL 13826 (2, 67.5-70.5), USNM 209960 (9, 40.5-75.5). PAPUA-NEW GUINEA, Mandang — USNM 215315 (1, 78); Hermit Is. — USNM 219595 (1, 62). AUSTRALIA, N. Queensland — AMS I. 20770-006 (1, 40.5), QM I. 16663 (1, 59.5). MARSHALL IS., Bikini Atoll — USNM 140242 (1, 78.5). SAMOA IS., Tutuila I. — BPBM 17483 (1, 57).

**Diagnosis.** — Trunk rings usually 15; total rings 44-47; snout long and slender, its length averages 1.8 in HL; pectoral-fin rays modally 16; trunk often banded or blotched with dark brown on venter and lower half of sides.

**Description.** — Rings 14-15 (usually 15) + 29-32 = 44-47; dorsal-fin rays 23-27; sub-

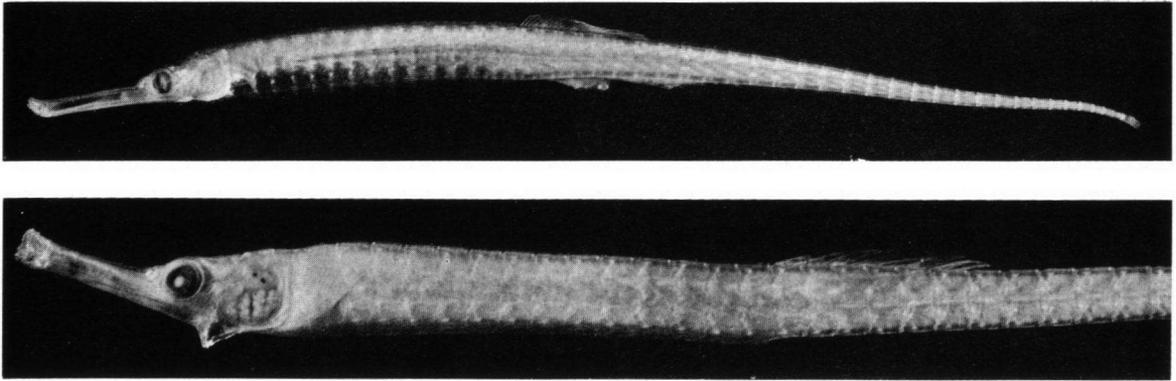


Fig. 1. *Cosmocampus maxweberi* (Whitley, 1933). Top: GCRL 13826 (67.5 mm SL, male). Bottom: ZMA 112.623 (76 mm SL, female, holotype).

dorsal rings  $1.5-0.25 + 4.25-5.5 = 5.25-6.0$ ; pectoral-fin rays 16-18 (16 in 76% of 33 counts); anal-fin rays 4; caudal-fin rays typically 10. Proportional data based on 12 specimens 40.5-78.0 ( $\bar{x} = 61.0$ ) mm SL follow: HL in SL 5.3-6.8 (5.7), snout length in HL 1.6-1.9 (1.8), snout depth in snout length 5.4-7.9 (6.9), length of dorsal-fin base in HL 1.4-2.0 (1.8), anal ring depth in HL 3.6-5.4 (4.6), trunk depth in HL 3.3-3.9 (3.6), pectoral-fin length in HL 6.5-7.9 (7.3), length of pectoral-fin base in pectoral-fin length 1.1-1.3 (1.2).

Superior trunk and tail ridges discontinuous near rear of dorsal-fin base; lateral trunk and tail ridges discontinuous, the trunk ridge not typically deflected ventrad near anal ring; inferior trunk and tail ridges continuous. Median dorsal snout ridge mainly low, often a little elevated above the nares, terminates behind on anterior half of inter-orbital, not confluent with the supraorbital ridges; lateral snout ridge short, located dorsolaterally near middle of snout, infrequently vestigial or absent; supraopercular ridge present; opercle with a complete or incomplete median ridge, additionally ornamented with a fine network of radiating striae; other head ridges distinct but not elevated strongly; pectoral-fin base protrudes somewhat laterad, the superior and inferior ridges usually distinct; dorsal-fin base not elevated; venter of trunk V-shaped, the median ridge not keel-like; dorsum of trunk essentially flat; dorsum of tail somewhat depressed between the superior ridges; principal body ridges not elevated strongly, clearly indented between trunk rings but indentations

reduced between tail rings; distal third or more of tail with posterior angles of rings produced to short spine-like points which parallel the principal ridges; scutella without longitudinal keels, the remaining surfaces of rings ornamented with minute irregular ridges; head without spines or prominent denticulations; principal head and body ridges occasionally entire, often finely denticulate under  $\times 30$  magnification; eye usually with 1-4 minute simple dermal flaps; brood-pouch plates vestigial or absent; pouch closure is the overlapping type of Herald (1959).

**Coloration.** — Ground color light tan; markings brown, somewhat variable and seemingly best developed or more persistent in adult males. A well-marked fish (fig. 1) retains some light brown shading on the sides and dorsum of the head and on the upper half of the sides and the dorsum of the trunk; lower half of sides and venter of trunk are crossed by diffuse dark brown bars which begin on the pectoral ring and gradually become less distinct toward the anal ring; bars usually begin just above the lateral trunk ridge and each may include a vertical row of 1-3 small pale spots between the lateral and inferior trunk ridges; anterior half or more of tail is shaded lightly with brown, whereas the distal portion is essentially pale; pectoral fins retain some light brown shading, the dorsal fin is hyaline. The dark trunk bars are faint or absent in some specimens but a more or less prominent dark blotch usually persists on the lower part of the pectoral-fin base. One fish (USNM 215315) has a dark blotch on

the anteroventral part of the opercle, and the dorsum of the trunk and the anterior half of the tail retain traces of about eight diffuse pale bars.

**Discussion.** — Weber (1913) reported 23 dorsal-fin rays and 15 + 30 rings in the holotype, whereas I count 24 dorsal-fin rays and 29 tail rings; the caudal fin has only 9 rays and is evidently regenerated. Furthermore, the opercular ridge is angled slightly dorsad and crosses only about half of the opercle, the snout is angled somewhat dorsad and the specimen is now completely faded (fig. 1). In other material, the snout is not angled dorsad and the opercular ridge is most commonly straight and crosses two thirds or more of the opercle.

Among the examined material, five males (62.0-75.5 mm SL) have the brood pouch developed below the anterior 10-12 tail rings. Eggs are mainly lost but the largest specimen retains remnants of four transverse rows of membranous egg-compartments on the dorsum of the pouch.

Although originally described in the genus *Syngnathus* Linnaeus and later referred by Whitley (1933) to the subgenus *Parasyngnathus* of Dunker (1915), this species differs from these taxa in a number of morphological features. The lateral snout ridge and dermal flaps of *maxweberi* are absent in both *Syngnathus* sensu stricto and *Parasyngnathus*. Furthermore, *Syngnathus* lacks the supraopercular ridge and pouch closure is the inverted type (ridge present, closure overlapping in *maxweberi*). Although relationships are presently unclear, these differences are a sufficient basis for removal of this species from both *Syn-*

*gnathus* and *Parasyngnathus*. Pending completion of a review of Indo-Pacific pipefishes presently referred to the catch-all genus *Syngnathus*, I refer *maxweberi* to the genus *Cosmocampus* which was recently proposed (Dawson, 1979b) for the accommodation of several western Atlantic species. Compared with its congeners, *C. maxweberi* has higher counts of pectoral-fin rays (16-18 against 11-15) and the pouch plates are much reduced but there is close agreement in other examined characters.

**Distribution.** — Although uncommon in collections, *C. maxweberi* is presently known from the northern Red Sea to the central Pacific Ocean. As noted by Herald (1953), the species is evidently most common beyond the intertidal zone. The holotype was reported from a depth of 36 m and other material is from SCUBA collections in 1.0-36 m; only one specimen was taken in less than 3.7 m. All material is evidently from reef or coral bottom and one rotenone collection from an isolated coral head in 3.7-9.1 m included 11 specimens.

***Penetopteryx taeniocephalus* Lunel, 1891.**

Fig. 2.

*Syngnathus* spec. juv.; Weber, 1913: 113.

A small specimen, taken in a surface plankton collection at Ternate Anchorage (Siboga Sta. 136) and referred with some reservations to the genus *Syngnathus* by Weber (1913), appears to be an incompletely metamorphosed representative of this species.

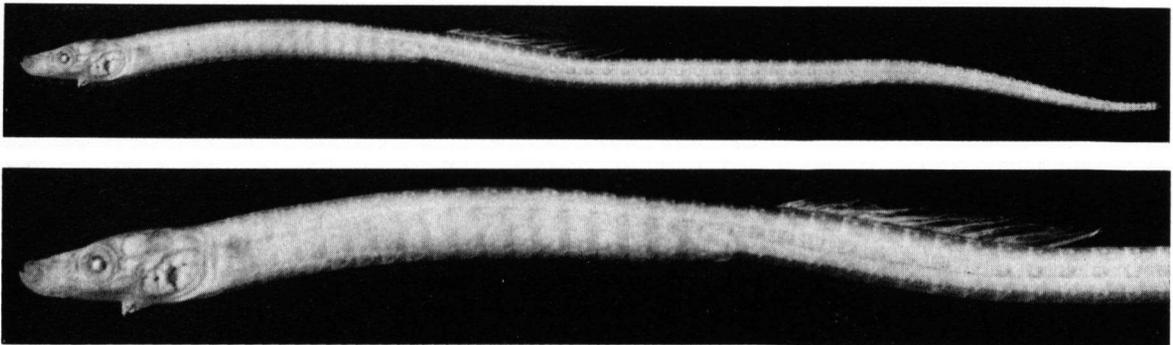


Fig. 2. *Penetopteryx taeniocephalus* Lunel, 1891. ZMA 116.048 (50.5 mm SL, incompletely metamorphosed planktonic specimen).

Pertinent counts and measurements (mm) of this 50.5 mm SL fish (ZMA 116.048) follow: rings 19 + 42, dorsal-fin rays 30, pectoral-fin rays 11 in each fin, caudal-fin rays 10, anal fin absent, dorsal-fin origin near middle of 2nd tail ring, total subdorsal rings 9.0, HL 4.6, snout length 1.4, snout depth 0.9, length of dorsal-fin base 6.8, anal ring depth 1.2, trunk depth 1.2, pectoral-fin length 1.0, length of pectoral-fin base 0.4. Median dorsal snout ridge terminates near vertical from anterior margin of superior naris, not confluent with supraorbital ridges; opercle finely striate but without a well-defined longitudinal ridge; head elsewhere without prominent ridges; dorsum of body and venter of tail slightly convex; venter of trunk V-shaped but without a prominent median keel; body surfaces ornamented with minute irregular ridges; without spines, denticulations or dermal flaps; principal ridge configuration is that of the genus; no color pattern persists.

This specimen agrees with *P. taeniocephalus* in ring count, number of caudal-fin rays and in comparable proportional characters. It differs mainly in the presence of dorsal and pectoral fins and in the shape of the snout. Dorsal and pectoral fins are typically absent in subadults and adults of this species but pectoral fins and a 30-rayed dorsal fin, originating on the 1st-2nd tail ring, are present in pouch larvae (Dawson & Allen, 1978). In subadult and adult *P. taeniocephalus* the snout is usually angled a little dorsad and its dorsal margin is concave in lateral profile. The snout is not angled dorsad in the present fish (fig. 2) and the dorsal margin is slightly concave rather than convex. This apparent difference in

snout morphology may reflect an individual anomaly. However, the snout may undergo modification when planktonic stages of *P. taeniocephalus* lose the pectoral and dorsal fins and adopt the cryptic habits of subadults and adults.

There is a superficial similarity to species of *Siokunichthys* Herald but representatives of that genus have 8-14 rather than 19 trunk rings and body surfaces are essentially smooth rather than finely sculptured. There is some possibility that this fish represents an undescribed species but available evidence indicates that it is a specimen of *Penetopteryx taeniocephalus*. Dawson & Allen (1978) discussed similar, incompletely metamorphosed, planktonic specimens of the western Atlantic *P. nanus* (Rosén).

### *Enchelyocampus* sp. Fig. 3.

*Syngnathus* spec. juv.; Weber, 1913: 114.

Weber (1913) considered five small pipefishes from a plankton collection at Taam I. (Siboga Sta. 252) to be undeveloped and unidentifiable and listed them in the genus *Syngnathus*. These fish appear to be incompletely metamorphosed but they are clearly not referable to the genus *Syngnathus*.

The specimens are characterized as follows: rings 16 + 43-44; dorsal-fin rays 22-25; pectoral-fin rays 9 or 10, poorly developed; caudal-fin rays 10; anal fin absent; dorsal-fin origin between middle and rear margin of 2nd tail ring; total subdorsal rings 7.25-8.5; snout short, its length a little greater than eye diameter; mouth large,

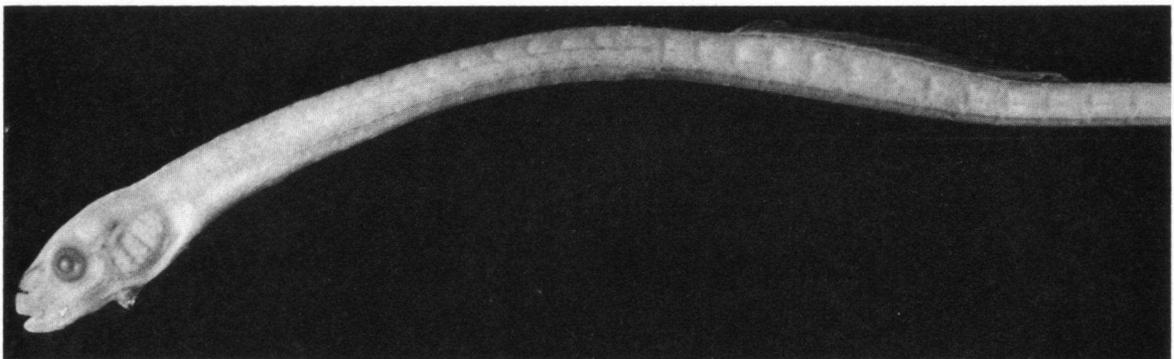


Fig. 3. *Enchelyocampus* sp. GCRL 16273 (37 mm SL, incompletely metamorphosed planktonic specimen).

clearly inferior, the upper jaw with a broad fleshy lip; median dorsal snout ridge curves a little ventrad near tip, narrow and essentially spine-like in dorsal aspect, falls short of middle of upper lip; other head ridges absent; superior and inferior trunk ridges confluent with their respective tail ridges; lateral trunk ridge ends, without deflection, on anal ring; body ridges and scutella inconspicuous; dorsum of body a little convex; dorsal-fin base not elevated; without dermal flaps; color now light tan, without persistent markings. One specimen lacks part of the tail but the others now measure 33-38.5 mm SL; four are cataloged as ZMA 116.049, one as GCRL 16273.

There are 21 recognized genera of pipefishes which are in part characterized by continuous superior trunk and tail ridges. Among these, only *Enchelyocampus* Dawson & Allen shares the presence of caudal fin, absence of anal fin, the large inferior mouth and lateral ridge configuration found in the present material. The type-species (*E. brauni* Dawson & Allen), known from three adults (41-54 mm SL) from Australia and the Palau Is., differs from the present material in the absence of dorsal and pectoral fins and in having a shorter total preorbital length. The only

known adult male (fig. 4) retains about 20 eggs in the subcaudal brood pouch but pouch larvae are unknown. Dawson & Allen (1978) have shown that pouch and/or planktonic young of the so-called "finless" genera *Penetopteryx* Lunel and *Apterygocampus* Weber have well-developed dorsal and pectoral fins, although these fins are lost in cryptic subadults and adults. In view of the close correspondence in all characters except for the presence of dorsal and pectoral fins, the present planktonic specimens are here considered to be incompletely metamorphosed *Enchelyocampus*. Although agreeing with adult *E. brauni* in ring count, the somewhat greater preorbital length suggests that they may represent an undescribed species, and identification as *Enchelyocampus* sp. appears most appropriate at this time.

#### ACKNOWLEDGMENTS

I thank J. R. Paxton and D. F. Hoese (AMS), J. E. Randall (BPBM), R. J. McKay (QM), E. A. Lachner and associates (USNM) and H. Nijssen (ZMA) for permission to examine specimens in their care and for other assistance and courtesies.



Fig. 4. *Enchelyocampus brauni* Dawson & Allen, 1978. AMS I. 20774-004 (41 mm SL, brooding male), Queensland Australia.

## REFERENCES

- DAWSON, C. E., 1977a. Synopsis of syngnathine pipefishes usually referred to the genus *Ichthyocampus* Kaup, with description of new genera and species. *Bull. mar. Sci.*, **27**: 595-650.
- , 1977b. The pipefish name *Syngnathus corrugatus* Weber, a junior synonym of *Bhanotia fasciolata* (Duméril). *Copeia*, **1977**: 786-788.
- , 1978a. Review of the Indo-Pacific pipefish genus *Hippichthys* (Syngnathidae). *Proc. biol. Soc. Wash.*, **91**: 132-157.
- , 1978b. Review of the Indo-Pacific pipefish genus *Bhanotia*, with description of *B. nuda* n. sp. *Proc. biol. Soc. Wash.*, **91**: 392-407.
- , 1979a. The Indo-Pacific pipefish genera *Notiocampus* gen. nov. and *Nannocampus* Günther. *Proc. biol. Soc. Wash.*, **92**: 482-493.
- , 1979b. Notes on western Atlantic pipefishes with description of *Syngnathus caribbaeus* n. sp. and *Cosmocampus* n. gen. *Proc. biol. Soc. Wash.*, **92**: 671-676.
- DAWSON, C. E. & G. R. ALLEN, 1978. Synopsis of the 'finless' pipefish genera (*Penetopteryx*, *Apterygocampus* and *Enchelyocampus*, gen. nov.). *Rec. West. Aust. Mus.*, **6**: 391-411.
- DUNCKER, G., 1915. Revision der Syngnathidae. *Mitt. naturh. Mus. Hamb.*, **32**: 9-120.
- HERALD, E. S., 1953. Family Syngnathidae: Pipefishes. In: L. P. SCHULTZ et al., *Fishes of the Marshall and Marianas Islands*. *Bull. U.S. natn. Mus.*, **202**: 231-278.
- , 1959. From pipefish to seahorse — a study in phylogenetic relationships. *Proc. Calif. Acad. Sci.*, (4) **29**: 465-473.
- WEBER, M., 1913. Die Fische der Siboga-Expedition. *Siboga Exped., Monogr.* **57** (= livr. 65): i-xii, 1-710, pls. I-XII.
- WEBER, M. & L. F. DE BEAUFORT, 1922. The fishes of the Indo-Australian Archipelago, **4**: i-xiii, 1-410 (E. J. Brill, Leiden).
- WHITLEY, G. P., 1933. Studies in ichthyology, 7. *Rec. Aust. Mus.*, **19**: 60-111.

Received: 25 January 1980