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SYNOPSIS OF THE 'FINLESS' PIPEFISH GENERA (*PENETOPTERYX*, *APTERYGOCAMPUS* AND *ENCHELYOCAMPUS*, GEN. NOV.)

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ABSTRACT

Three genera of presumably cryptic pipefishes which, as adults, lack all fins except caudal are diagnosed and compared. *Penetopteryx* Lunel and *Apterygocampus* Weber (removed from the synonymy of *Penetopteryx*) have lateral trunk ridge deflected ventrad near anal ring, whereas lateral ridge ends without deflection in *Enchelyocampus* gen. nov. *Penetopteryx*, including *P. taeniocephalus* (Indo-Pacific) and *P. nanus* (Western Atlantic), is characterized by 17-19 trunk rings and separate bilateral brood-pouch folds which meet or nearly meet on ventral midline. The monotypic *Apterygocampus* (*A. epinnulatus*: Indonesia) has 11 trunk rings and brood-pouch is a closed sac-like structure with anteromesial pore, similar to the brood-pouch configuration of seahorses (Hippocampinae). *Enchelyocampus*, also monotypic (*E. brauni* sp. nov.: Western Australia, Palau), lacks the tubiform snout and terminal mouth common to all other syngnathids and has a spine-like preorbital projection with distinctly separate and inferior mouth. Brood-pouch larvae of *Penetopteryx* and *Apterygocampus* have well developed dorsal, pectoral and caudal fins; mature males and larvae are presently unknown in *Enchelyocampus*. Evidence is presented to suggest that *Mannarichthys pawneei* (Herald) is a protracted planktonic stage of *Penetopteryx nanus*. A key is provided and all species are illustrated.

INTRODUCTION

Recent collection of an unusual pipefish (Syngnathidae), lacking dorsal, pectoral and anal fins, prompted examination of other nominal 'finless'

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species in order to determine its identity and relationships. We soon found that these forms are poorly represented in collections, that descriptions are in part inaccurate, that they have been seldom treated in literature and that one genus (*Apterygocampus* Weber) has been incorrectly synonymized with *Penetopteryx* Lunel.

Absence of fins (except caudal) implies reduced swimming efficiency and available collection data indicate that these are cryptic species which live (as adults) in protected niches within coral or coral rubble. Although occupying similar habitats and exhibiting similar reduction in fins, we find that these 'finless' genera represent convergence in three phyletic lines and that larvae of two (*Penetopteryx* and *Apterygocampus*) have both dorsal and pectoral fins.

We here provide a synopsis of the 'finless' pipefishes and include therein the description of a new genus and species from Western Australia and Palau. Pertinent types have been studied, available museum material has been examined and all species are illustrated. Many unanswered questions remain but present treatment should facilitate future studies on pipefishes which lack dorsal, pectoral and anal fins in adults.

METHODS AND MATERIALS

Counts of trunk rings begin with first complete ring behind gill opening; except where noted, other methods follow Dawson (1977a); SL = standard length; HL = head length.

Abbreviations for repositories of examined materials are: AMNH — American Museum of Natural History, New York; AMS — Australian Museum, Sydney; CAS — California Academy of Sciences, San Francisco; CAS-SU — former Stanford University material now housed at CAS; GCRL — Gulf Coast Research Laboratory Museum; LUZM — Zoological Museum, Lunds Universitets Zoologiska Institute, Lund; MNHN — Muséum National d'Histoire Naturelle, Paris; SIO — Scripps Institution of Oceanography, La Jolla; USNM — National Museum of Natural History, Smithsonian Institution, Washington; WAM — Western Australian Museum; ZMA — Zoölogisch Museum, Universiteit van Amsterdam.

KEY TO SUBADULT AND ADULT PIPEFISHES LACKING DORSAL, PECTORAL AND ANAL FINS

1. Mouth terminal on short but distinct snout; lateral trunk ridge deflected near anal ring 2

   Mouth inferior, located below pointed tip of projecting preorbital; lateral trunk ridge not deflected, ends midlaterally near anal ring ... ... *Enchelyocampus brauni* gen. and sp. nov.

2. Trunk rings 17-19; brood pouch with bilateral fleshy folds which meet or nearly meet on midline of egg-filled pouch 3

   Trunk rings 11; brood pouch a closed sac with restricted pore-like opening anteriad, without separate bilateral folds ... *Apterygocampus epinnulatus*

3. Rings total 59-61; head with broad dark bars, body plain or with irregular rows of brown or black spots; Indo-Pacific ... ... *Penetopteryx taeniocephalus*

   Rings total 48-51; head or both head and body ringed with numerous subvertical narrow brown bands; Western Atlantic ... ... *Penetopteryx nanus*

PENETOPTERYX LUNEL

Penetopteryx Lunel, 1881: 275 (type-species by original designation: *Penetopteryx taeniocephalus* Lunel, 1881).

Diagnosis

Superior trunk and tail ridges continuous (**Fig. 1**), inferior trunk and tail ridges interrupted at anal ring, lateral trunk ridge deflected near anal ring and confluent with inferior tail ridge. Mouth terminal on snout; snout angled dorsad, somewhat concave in lateral profile; low median dorsal ridge on posterior half or third of snout, not bounded laterad by anterior continuations of supraorbital ridge; snout narrow in front, breadth less than half of eye diameter. Opercle without median longitudinal ridge; median dorsal head ridges obsolete; head not covered with fleshy integument; venter of trunk somewhat V-shaped, without median keel; all body ridges low and

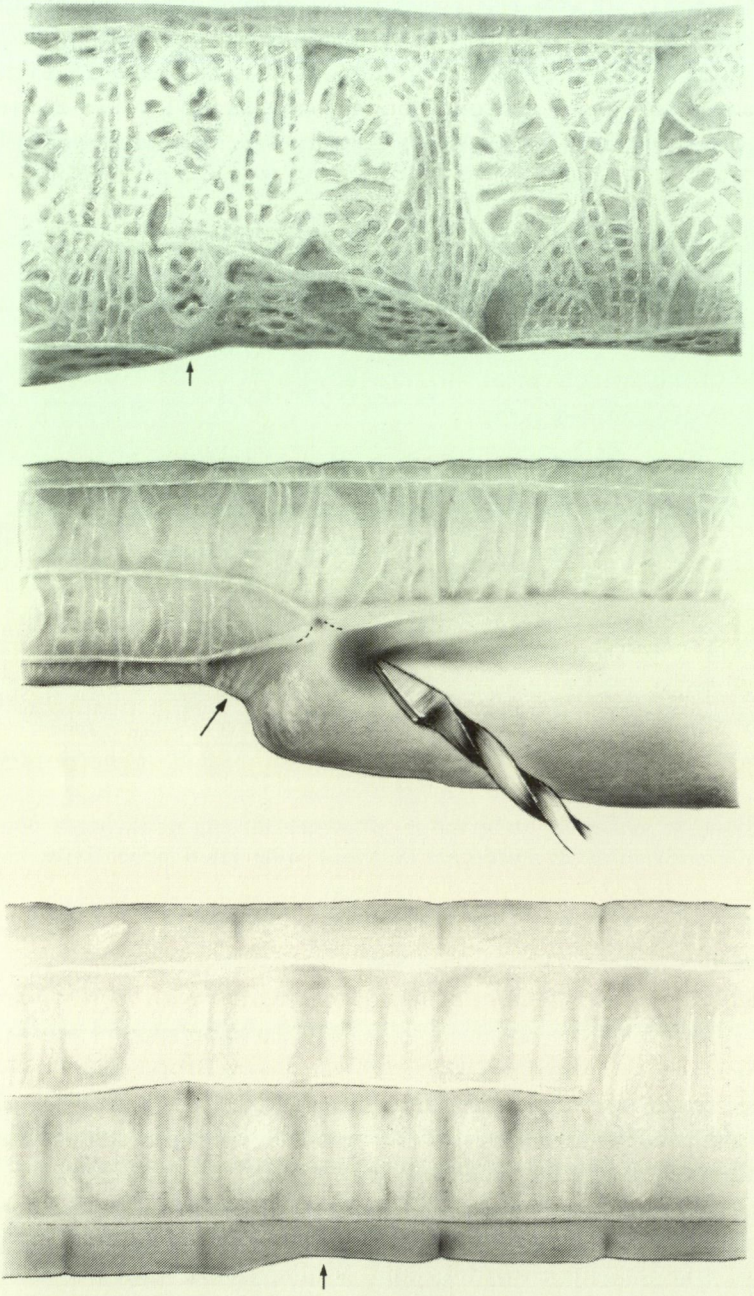

Fig. 1: Section of body illustrating configuration of principal body ridges, general surface ornamentation and anal ring location (arrow) in *Penetopteryx taeniocephalus* (top), *Apterygocampus* (middle) and *Enchelyocampus* (bottom).

indistinct, slightly indented between rings; scutella large, width equals half or more of ring length, ornamented with minute irregular ridges. Caudal-fin rays 10, other fins absent. Brood pouch developed below 12-17 tail rings; pouch plates little enlarged. Brood-pouch eggs in single layer of 2-3 transverse rows, protected by fleshy folds which meet or nearly meet on ventral midline of egg-filled pouch (**Fig. 2**); eggs not included within a continuous gelatinous matrix. Nares 2-pored bilaterally; head and body without spines, serrations or dermal flaps.

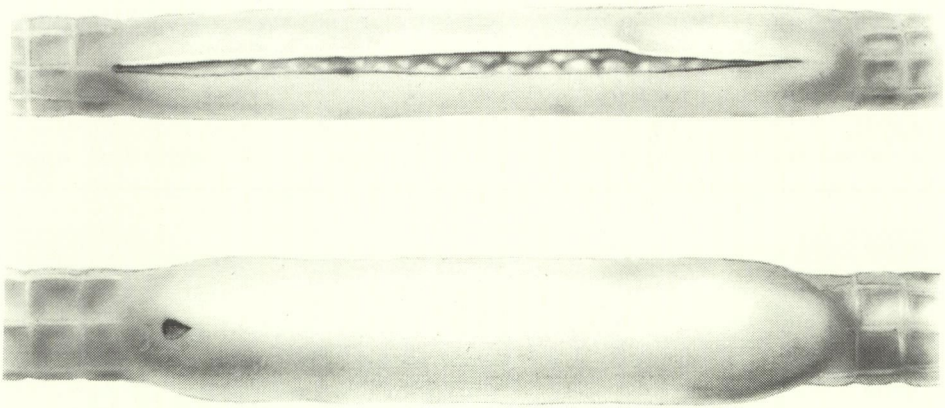

Fig. 2: Ventral aspect of body and brood pouch illustrating the open pouch and separate pouch folds of *Penetopteryx* (top) and closed pouch with restricted anterior pore of *Apterygocampus* (bottom).

Comparisons

Among genera treated here, *Penetopteryx* agrees with *Apterygocampus* in terminal location of mouth on a prolonged tubular snout (mouth inferior, tubiform snout lacking in *Enchelyocampus*). Brood-pouch closure of *Penetopteryx* differs strikingly from the closed sac-like pouch of *Apterygocampus* and clearly indicates separate lineage for these genera. For further discussion, see Remarks under *Apterygocampus.*

Remarks

Although lacking in subadults and adults, dorsal and pectoral fins are present in pouch-larvae. These fins are evidently lost during metamorphosis from a free-swimming planktonic stage to the apparently cryptic subadult or adult form.

As presently understood, *Penetopteryx* includes one Indo-Pacific and one western Atlantic marine species. These are small fishes which probably do not exceed 80 mm SL; both species have been taken in coral rubble at depths of 2.5 metres or less.

PENETOPTERYX TAENIOCEPHALUS LUNEL

(Fig. 3)

Penetopteryx taeniocephalus Lunel, 1881: 275 (original description, Mauritius).

Penetopteryx fowleri Whitley, 1933: 65 (original description, New Hebrides).

Diagnosis

Rings 18-19 + 41-43 = 59-61; head with 4-6 irregular broad brown bars and broad pale interspaces, body plain or with rows of small dark spots. Larvae with about 30 dorsal-fin rays and dorsal-fin origin on tail.

Description

Measurements (mm) of 60.0 mm SL male syntype (MNHN 90-49) follow: HL 5.0, snout length 1.3, snout depth 1.0, diameter of orbit 1.2, trunk depth 2.5, anal ring depth 1.8. Proportional data based on 9 specimens 52.0-64.5 mm SL are: HL in SL 10.6-13.1 ($\overline{X}$ = 12.1), snout length in HL 3.6-4.1 (3.8), snout depth in snout length 1.2-1.4 (1.3), trunk depth in HL 1.6-2.4 (2.0), anal ring depth in HL 1.8-3.3 (2.6). Opercle crossed by 25 or more low radiating striae in adults, other head surfaces largely ornamented by minute irregular ridges.

Ground colour in alcohol brownish, markings dark brown to nearly black. Males with about 5 broad irregular dark bars ringing head; dark bars separated by rather broad pale bars or blotches, the last infringing on 1st trunk ring; each of anterior 3-6 trunk rings with 1-4 small blackish spots surrounded by pale reticulations on either side of ventral midline, these rings elsewhere without conspicuous markings; sides of 3rd-6th through 11th-14th rings usually with 3 dark spots on each ring, one above and two below lateral ridge; two irregular rows of similar spots usually present above lateral ridge on 14th-16th through 18th rings; 2-3 irregular rows of spots continued on anterior $^1/_2$-$^2/_3$ of tail, distal portion plain. Females with similar bars on head but last dark bar on opercle diffuse, and opercle marked with subvertical row of 4-7 small blackish spots; remainder of body usually without conspicuous markings, occasionally with irregular diffuse brownish spots.

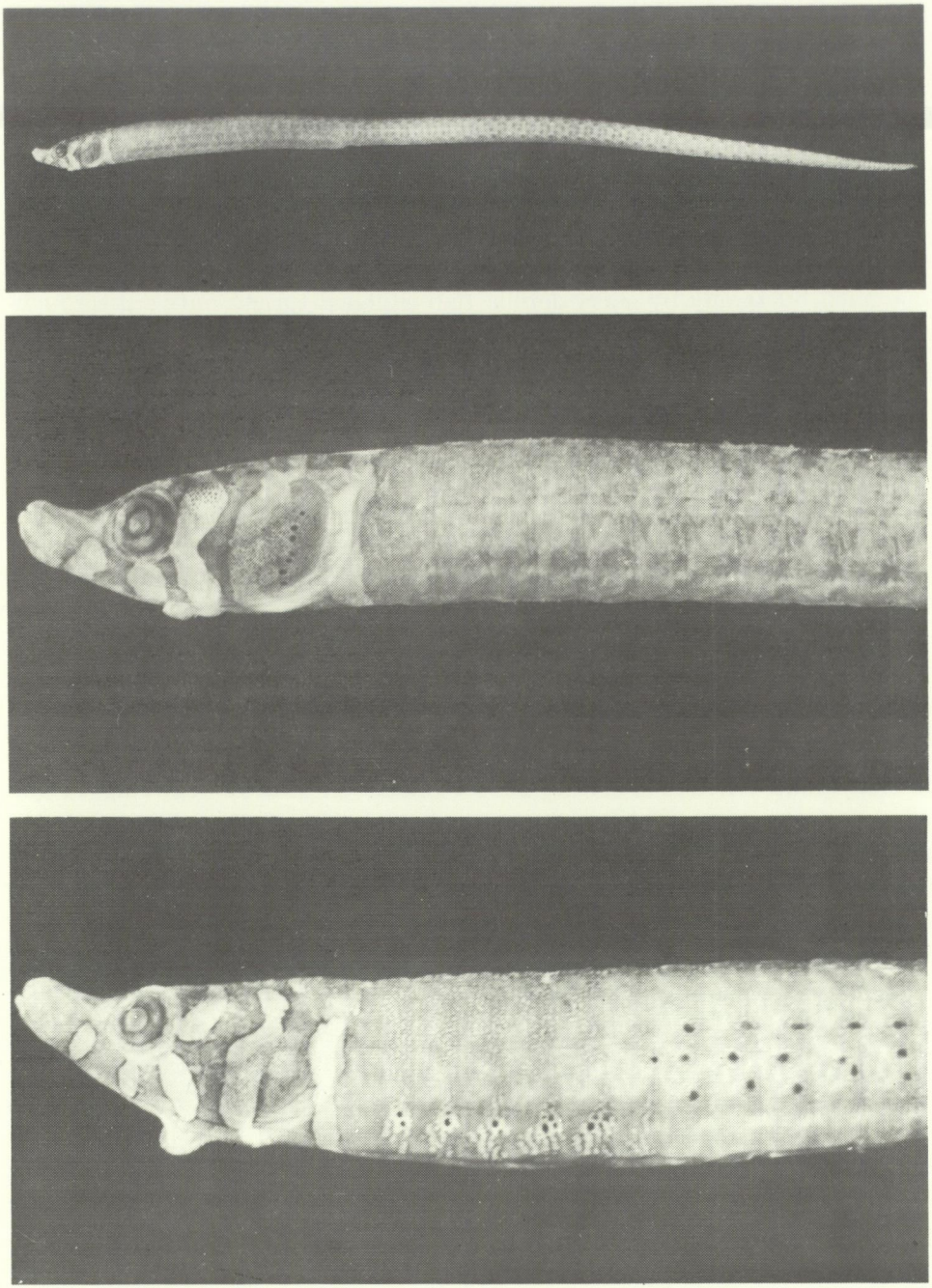

Fig. 3: *Penetopteryx taeniocephalus.* Top and middle: MNHN 1965-626 (59.5 mm SL, female). Bottom: MNHN 1965-625 (64.0 mm SL, male).

Comparisons

Penetopteryx taeniocephalus differs from its only known congener by characters in key and diagnoses.

Remarks

Ten examined egg-bearing males with brood pouch developed beneath 12-14 tail rings; pouch plates little enlarged but angled somewhat laterad; brood-pouch folds usually fail to meet on midline of egg-filled pouch; folds margined bilaterally by short dermal flap which is turned outward throughout length of pouch; type of pouch closure uncertain and outfolded margins do not agree with any configuration reported by Herald (1959). Brood-pouch eggs usually in two longitudinal rows but an incomplete 3rd present in one specimen examined; eggs separated by low membranous partitions lining dorsum of pouch and upper portions of pouch folds; a 64 mm SL male had 47 eggs in 14 ring pouch.

Several examined pouch-larvae with well developed dorsal, pectoral and caudal fins; one larva (*ca* 4.9 mm SL) with 30 dorsal-fin rays and dorsal-fin origin on 1st or 2nd tail ring; examined larvae without brownish bars but sprinkled with microchromatophores. A 56.5 mm SL male (CAS-SU 68329) retains a vestigial dorsal fin beginning on 1st-2nd tail ring; fin-rays are obsolete or poorly ossified and impossible to count.

Whitley (1933) described the holotype and only known specimen of *P. fowleri* (AMS IA.781) as having 20 + 44 rings. We find 19 + 41 rings in this specimen and this count, together with characteristic residual colour pattern and other features, shows *P. fowleri* to be conspecific with *P. taeniocephalus*. The Line Islands specimen mentioned by Herald (1961) is a 72.5 mm SL female (CAS 24854) which agrees with other material in ring count (18 + 41) and persistent colouration. Among examined materials we find no evidence of clinal variation in meristic features or colouration.

Available data show *P. taeniocephalus* to have been collected among 'gravel' and coral rubble at depths of 0.1-1.5 m. The species is known from Madagascar, Mauritius, the Philippines, New Hebrides and Christmas Is.

Material examined

Thirty-four subadults or adults (including one syntype) and several pouch-larvae, *ca.* 4.9-72.5 mm SL.

Syntype

MNHN 90-49 (60.0 mm SL, male), Mauritius.

Other material

Madagascar: CAS 24024; GCRL 15710; MNHN 1965-625, 1965-626; SIO 66-587. Philippines: CAS-SU 68329; GCRL 15711. New Hebrides: AMS IA.781 (*ca.* 62 mm SL, damaged male, holotype of *P. fowleri*). Line Islands, Christmas Is.: CAS 24854.

PENETOPTERYX NANUS (ROSÉN)

(Fig. 4)

Nannocampus nanus Rosén, 1911: 50 (original description; Andros Is., Bahamas).

Penetopteryx nanus Herald, 1942: 131 (new combination, compiled in key).

Diagnosis

Rings 17-18 + 31-33 = 48-51; head or both head and body circled with with numerous narrow brown bands and narrow pale interspaces. Larvae with about 28 dorsal-fin rays and dorsal-fin origin on trunk.

Description

Measurements (mm) of 31.7 mm SL female syntype (largest known specimen) follow: HL 2.6, snout length 0.8, snout depth 0.6, diameter of orbit 0.5, trunk depth 1.4, anal ring depth 1.2. Opercle without radiating striae, a few minute rounded diagonal ridges on suborbital, head surfaces otherwise without ornamentation.

Ground colour in alcohol tan. Female syntypes ringed with continuous series of narrow brown bars and subequal pale interspaces, about 15 dark bars on head and 5-7 on each ring. Two males (*ca.* 22 mm SL) with similar pattern of alternating bars on head; body of one essentially plain; dorsum of other with 11 pale blotches (1-2 rings wide) spaced 2-5 rings apart, blotches continued a short distance ventrad on trunk whereas some completely encircle tail; the latter specimen also marked with 9-10 irregular, vertically oriented, narrow pale blotches more or less equally spaced along upper portion of brood-pouch folds.

Comparisons

See key and diagnoses.

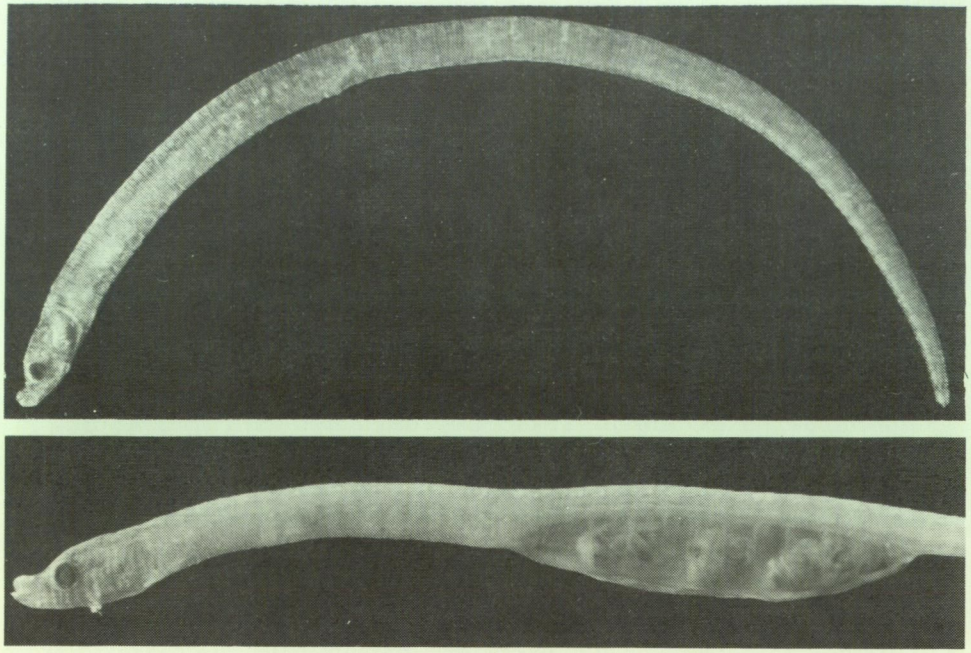

Fig. 4: *Penetopteryx nanus.* Top: LUZM uncat. (31.7 mm SL, female, syntype). Middle: AMNH 26032 (22.1 mm SL, male). Bottom: GCRL 15709 (*ca.* 3.8 mm SL, pouch-larva), section of body showing dorsal-fin rays and pterygiophores.

Remarks

The only examined egg-bearing male (22.1 mm SL) had about 20 membranous egg compartments in two longitudinal rows beneath 17 tail rings and about 10 larvae remained in pouch; margins of pouch folds meet on midline of partially filled pouch but type of closure is indeterminate; pouch folds of a male without eggs (21.6 mm SL) are rolled inward bilaterally through much of pouch length.

Several examined pouch-larvae have well developed dorsal, pectoral and caudal fins and there is a low finfold on venter of tail (**Fig. 4**); one larva (*ca.* 3.8 mm SL) had 28 dorsal-fin rays, dorsal-fin origin on penultimate trunk ring and there appeared to be about 11 subdorsal rings. Pouch-larvae marked on dorsum with about 10 rather broad brownish bars separated by subequal pale interspaces.

Presence of dorsal and pectoral fins in larval *Penetopteryx nanus* suggests a solution to one of the current enigmas among western Atlantic pipefishes. Herald (1950) described *Ichthyocampus pawneei* (provisionally referred to *Mannarichthys* by Dawson, 1977b) from an immature fish taken in a surface dipnet or plankton collection. To date, there are 5 known specimens of *pawneei*, all small (18-22 mm SL), all from separate surface nightlight or plankton collections (evidently over depths of 12-75 m) and all are from inshore Bahamian localities. The species is characterized by the presence of dorsal, pectoral and caudal fins, absence of anal fin, 18 + 31-32 rings, continuous superior trunk and tail ridges, interrupted inferior ridges, lateral trunk ridge confluent with inferior tail ridge and presence of vestigial opercular ridge. Morphology of head and body essentially replicates that of *Penetopteryx nanus* and, except for the presence of opercular ridge and dorsal and pectoral fins, *pawneei* agrees closely with adult *nanus* in treated characters. The opercular ridge is a variable feature in some pipefishes; it may be present in juveniles and obsolete in adults or it may occur only in late juveniles and adults. Dorsal-fin rays are 26-28 and subdorsal rings are 1.0-1.5 + 9.25-10.0 = 10.75-11.0 in *pawneei*, and these counts agree with those of the examined larva of *nanus*. Persistence of larval or postlarval characters in planktonic young or adults of benthic organisms is well known and has been recorded for the pipefish genus *Corythoichthys* (Dawson 1977a). Agreement in meristic features, ridge configuration and gross morphology, together with apparent absence of adult *pawneei* and sympatric Bahamian distribution, provides strong evidence that the 'finned' *pawneei* represents a protracted planktonic form of the 'finless' *Penetopteryx nanus*.

Although a substantial case can be presented for synonymizing *Mannarichthys pawneei* with *Penetopteryx nanus*, we retain their separate status pending further study.

Rosén (1911) collected the five syntypes from 'among dead corallines along the beach'. The other two known collections were with rotenone in depths of 0.6 to 2.4 m in the vicinity of coral rubble, coral and coralline algae.

Material examined

Four adults and several pouch-larvae, *ca.* 3.8-31.7 mm SL, including two female syntypes; all from the Bahamas.

Syntypes

LUZM uncat. (31.7 mm SL) and USNM 113615 (23.0), Andros Is., Mastic Point, 16 January 1909.

Other material

Ragged Islands: AMNH 26032 (Hog Cay), AMNH 35969 (Nurse Cay), GCRL 15709 (3 pouch-larvae from AMNH 26032).

APTERYGOCAMPUS WEBER

Apterygocampus Weber, 1913: 115 (type-species by original designation: *Apterygocampus epinnulatus* Weber, 1913).

Diagnosis

Superior trunk and tail ridges continuous (**Fig. 1**); inferior trunk and tail ridges not clearly interrupted at anal ring; lateral trunk ridge deflected near anal ring, reaches to but not clearly confluent with inferior ridge. Mouth terminal on snout; snout not angled dorsad and but slightly concave in lateral profile; short, moderately elevated, ridge on middle third of snout flanked postero-laterad by raised anterior continuations of supraorbital ridges; snout broad in front, breadth about equal to eye diameter. Opercle without median longitudinal ridge; median dorsal head ridges obsolete; head without thick fleshy integument; venter of trunk somewhat V-shaped, without median keel; all body ridges low and indistinct, slightly indented between rings; scutella moderate, width equals about half of ring length, faintly ornamented with indistinct ridges. Caudal-fin rays 10, other fins absent. Brood pouch developed below 11 tail rings; pouch plates somewhat enlarged; pouch developed as a closed sac, formed by continuous dermal

envelope without trace of median suture, with mesial slit-like pore anteriad (**Fig. 2**). Nares 2-pored bilaterally; head and body without spines, serrations or dermal flaps.

Comparisons

Characters in key and diagnosis distinguish *Apterygocampus* from other syngnathid genera lacking dorsal, pectoral and anal fins in adults.

Remarks

Brood-pouch larvae with well developed dorsal, pectoral and caudal fins.

Without examining specimens, Duncker (1915) synonymized *Apterygocampus* with *Penetopteryx* despite described differences in configuration of principal body ridges and brood pouch. Although seldom treated in subsequent literature, other authors (Weber and de Beaufort 1922) have followed Duncker and pertinent types have never been examined critically.

Inferior trunk and tail ridges are not clearly interrupted in the holotype of *Apterygocampus epinnulatus* and lateral trunk ridge deflects rather abruptly to meet or nearly meet the continuous inferior ridge (**Fig. 1**).

The sealed or sac-like brood pouch of *Apterygocampus* is atypical of pipefishes and has previously been thought to occur only in the Hippocampinae (seahorses). These forms have prehensile tail without caudal fin; dorsal, pectoral and anal fins are present; head is at an angle to principal body axis; lateral tail ridge is present (*Hippocampus*) or absent (*Acentronura*) and pouch plates are present (*Acentronura*) or absent (*Hippocampus*). Herald (1959) proposed a phylogeny for urophorine (tail-pouch) syngnathids based on configuration of principal body ridges and type of brood-pouch closure. He noted that ridge pattern of *Penetopteryx* agreed with those of *Acentronura* and *Ichthyocampus filum* (referred to *Lissocampus* by Dawson 1977) and suggested that *Acentronura* may have been derived from an *Ichthyocampus*-like ancestor.

Herald was most certainly unaware of the sealed pouch of *Apterygocampus* and that ridge pattern is here most similar to that of *Ichthyocampus* (type-species: *Syngnathus carce* Hamilton Buchanan). We do not comment on the validity of Herald's phylogeny, but ridge configuration of *Apterygocampus* does not argue against his suggested *Ichthyocampus-Acentronura* lineage. The closed brood pouch clearly crosses subfamilial lines between the Syngnathinae and Hippocampinae, but general morphology and majority of examined characters indicate that *Apterygocampus* is best retained in the Syngnathinae (pipefishes).

Apparently a monotypic marine Indo-Pacific genus.

APTERYGOCAMPUS EPINNULATUS WEBER

(Fig. 5)

Apterygocampus epinnulatus Weber, 1913: 116 (original description; Indonesia).

Penetopteryx epinnulatus Duncker, 1915: 102 (new combination).

Diagnosis

Diagnostic characters are those of the genus.

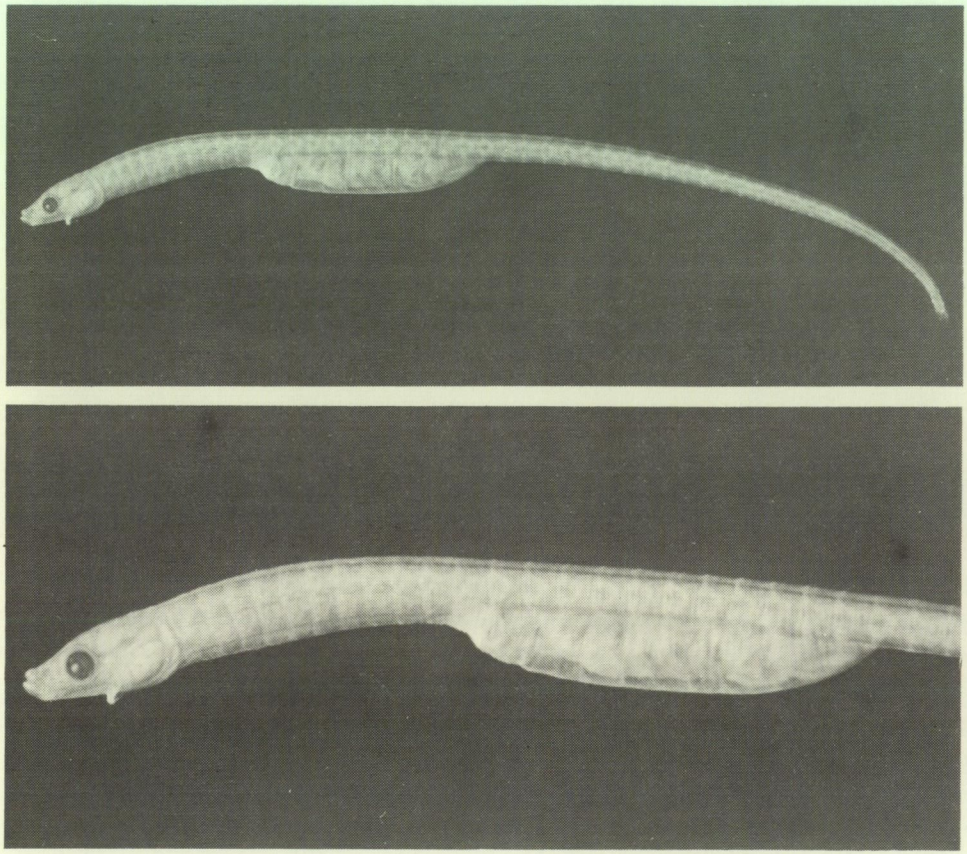

Fig. 5: *Apterygocampus epinnulatus.* ZMA 112.621 (27.4 mm SL, male, holotype).

Description

Rings 11 + 38. Measurements of 27.4 mm SL male holotype follow: HL 2.4, snout length 0.7, snout depth 0.6, trunk depth 1.2, anal ring depth

1.1. Opercle minutely pitted between low radiating striae, head elsewhere largely ornamented with minute irregular ridges.

Except for persistent brown pigmentation of eyes, the holotype is now a very light tan without conspicuous markings. Weber (1913) reported colour in alcohol as yellowish with a white spot on every 2nd ring and with bands of spots between eyes, on opercle and below eyes.

Comparisons

This species has no known congeners. From other adult pipefishes lacking dorsal, pectoral and anal fins, it is best distinguished by characters in key.

Remarks

Brood-pouch plates somewhat enlarged and angled laterad; about 20 rather well developed larvae visible through the translucent pouch integument. Three pouch-larvae, removed through a midlateral incision in side of pouch, all have well developed dorsal, pectoral and caudal fins. One larva, *ca.* 5.5 mm SL, had 18 dorsal-fin rays, dorsal-fin origin on 5th tail ring and 6.5 subdorsal rings.

The holotype and only known adult was collected on a 'reef', presumably in shallow water.

Material examined:

Holotype

ZMA 112.621 (27.4 mm SL, mature male), Indonesia, Gisser (= Gesser) Island, off Ceram, reef, Siboga Expdn Sta. 172, 26-28 August 1899, M. Weber coll.

Other material

GCRL 15724 (3, pouch-larvae, *ca.* 5.0-5.5 mm SL), removed from holotype.

ENCHELYOCAMPUS GEN. NOV.

Type-species: *Enchelyocampus brauni* sp. nov.

Diagnosis

Superior and inferior trunk ridges continuous with their respective tail ridges (**Fig. 1**); lateral trunk ridge terminates midlaterally, without deflection,

near anal ring. Mouth inferior, not terminal on projecting tubular snout as in other syngnathids; snout separate, superior, represented by a hook-like preorbital projection which narrows to a bony point in front (**Figs 6** and **7**). Gape large, its breadth about $^1/_3$ greater than eye diameter; upper lip a broadly rounded fleshy fold, lower lip much thinner and with a shallow median emargination; suborbital crossed by a prominent rounded fleshy protuberance extending from angle of gape to slightly beyond rear margin of eye. Superior portion of orbital ridge rather distinct, other head ridges obsolete or concealed beneath fleshy integument covering remainder of head; greatest head breadth near angle of gape, slightly more than breadth at opercle. Gill opening a simple pore located dorso-laterad above posterior angle of opercle, its diameter about $^1/_4$ that of eye. Venter of trunk V-shaped, without median keel; venter of tail and dorsum of body somewhat convex; body ridges rather distinct, elevated slightly above surface of body and indented faintly between rings; scutella inconspicuous, poorly defined at X60 magnification, evidently occupy less than half of ring length; ring surfaces elsewhere ornamented with a few low subvertical ridges. Caudal fin present; other fins absent. Brood pouch presumably subcaudal. Nares 2-pored bilaterally, located on preorbital on level of horizontal through upper third of eye. Except for pointed preorbital, head and body devoid of spines, serrations and dermal flaps.

Etymology

Enchelyocampus, derived from the Greek *enchelys* (eel) and *kampos* (sea-animal), in allusion to the eel-like appearance and swimming behaviour of the type-specimen.

Comparisons

The absence of tubiform snout with terminal mouth immediately distinguishes *Enchelyocampus* from other syngnathid fishes. Whereas snout may be very short in some forms (e.g. *Apterygocampus* and certain species of *Micrognathus*), the mouth is never inferior nor is it provided with fleshy lips as in *Enchelyocampus*. The principal body ridge configuration of *Enchelyocampus* replicates a pattern common to several pipefish genera (see Dawson 1977a), but differs from the deflected lateral ridge configurations found in *Penetopteryx* and *Apterygocampus*. Although sharing loss of dorsal, pectoral and anal fins with these genera, *Enchelyocampus* clearly represents a different phyletic lineage of presently unknown relationships.

ENCHELYOCAMPUS BRAUNI SP. NOV.

(Figs 6 and 7)

Diagnosis

Diagnostic features are those of the genus.

Description

Rings 16 + 45-46. Measurements (mm) of 54 mm SL holotype are followed by those of 51.5 mm paratype in parentheses: HL 3.6 (3.2), snout length (to tip of preorbital spine) 0.6 (0.5), diameter of pigmented eye 0.5 (0.5), maximum head breadth 2.2 (1.3), trunk depth 2.2 (2.0), anal ring depth 1.7 (1.2). Holotype with ventral surface of preorbital projection V-shaped distally and somewhat concave or depressed; head surfaces without distinct sculpturing or other ornamentation; lateral trunk ridge ends without deflection near posterior margin of 1st tail ring; tail rings 45.

The holotype is near white in alcohol, without markings except for eye which is black. A colour photograph of holotype before preservation permits the following colour notes: ground colour brownish, darker anteriad shading to near tan on distal part of tail; buccal region and preorbital white; eye with black pupil surrounded by red; middle of opercle with a more or less oval, dusky brown blotch; remainder of head and body sprinkled with minute white dots, 13-14 in irregular vertical series on anterior trunk rings, dots fewer and less distinct caudad; principal trunk ridges lined faintly with pale.

Etymology

Named after the collector, Mr J. Braun, who recognized the fish as unusual and brought the living holotype to the Western Australian Museum.

Comparisons

See this section under generic diagnosis.

Remarks

Although caudal fin is well developed (*ca.* 0.8 mm long) in the holotype, it has been distorted in preservation and fin-ray count cannot be made without damaging or destroying the fin; there is no evidence of regeneration or other anomalous development. The paratype (preserved in isopropyl alcohol) is somewhat dehydrated, partially cleared and without conspicuous markings; caudal fin-rays 10. As seen through the translucent integument, the preorbital is a deflected V-shaped process, the apex formed by the

exposed preorbital spine, each arm margined with 8-9 serrations and with bony preorbital somewhat depressed between; integument crossing dorsum of head with several rows of short, narrow, plate-like dermal thickenings or ossifications.

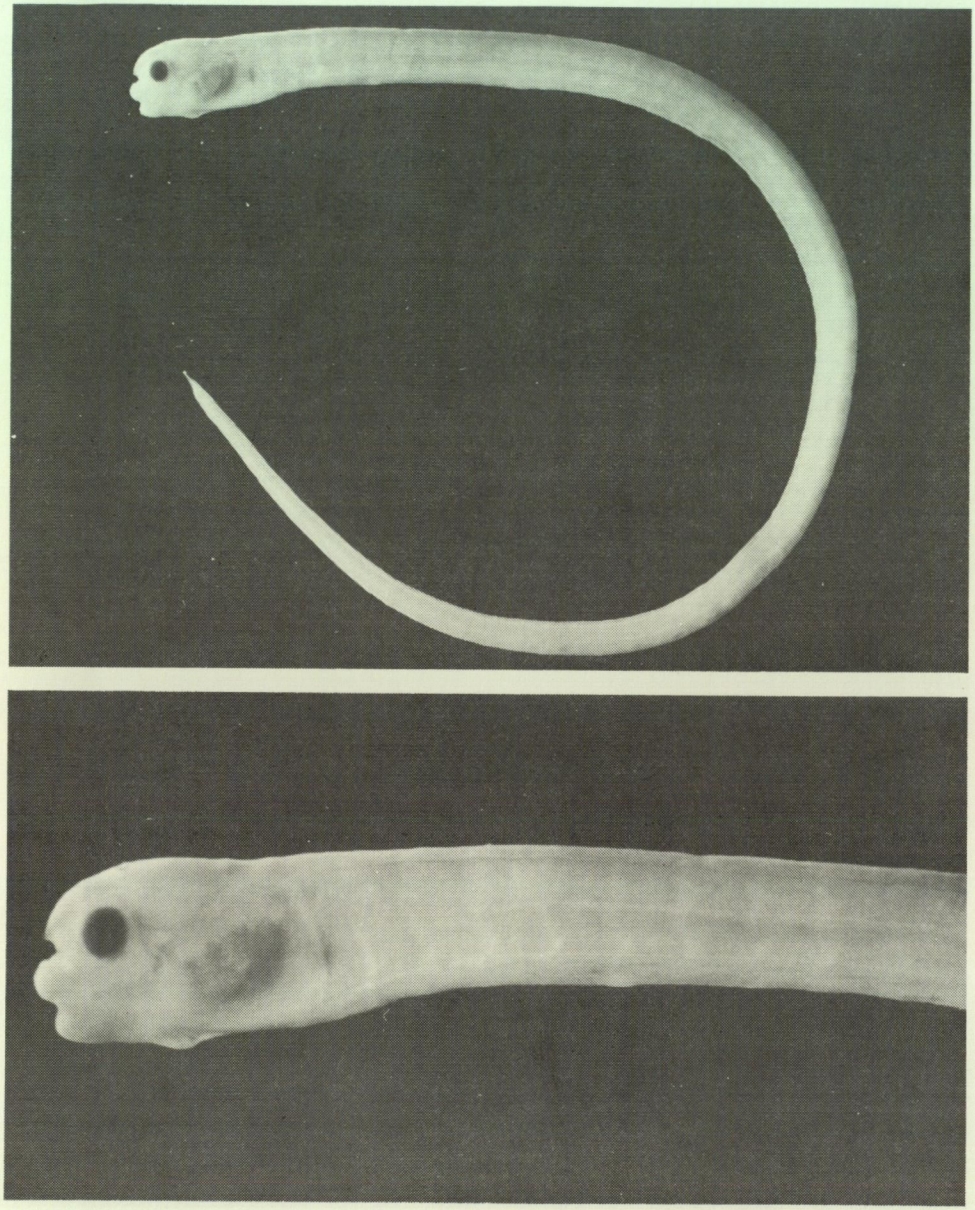

Fig. 6: *Enchelyocampus brauni*. WAM P.25800-001 (54 mm SL, holotype).

Fig. 7: *Enchelyocampus brauni*. WAM P.25800-001 (holotype). Lateral and dorsal aspects of head and anterior trunk rings.

Neither holotype nor paratype shows evidence of brood-pouch development and both specimens are assumed to be subadult or adult females. The holotype exhibited an undulating swimming motion and was initially thought to be an eel; it was found to be a syngnathid only on close examination after preservation.

Material examined

Holotype

WAM P.25800-001 (54 mm SL, immature or female), Western Australia, North West Cape, off Tantabiddi Creek (21°55'S, 113°56'E), outer reef, among dendrophyllid coral, 10 m, 5 Nov. 1976, J. Braun coll.

Paratype

CAS 17789 (51.5 mm SL, immature or female), Palau Is., Iwayama Bay, E side of mouth of Kaki-suido, from submarine cave, 0.6-4.6 m, 'found among protruding calicles of *Galaxea musicalis*', 22 Oct. 1955 (GVF Sta. 220A), R.R. Harry and party.

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