

Two New Species and Two New Records of Aploactinid Fishes (Pisces: Scorpaeniformes) from Australia

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ABSTRACT. Two new species of aploactinids are described from coastal waters of subtropical eastern Australia. *Pseudopataecus taenianotus*, new genus and species, is described from seven specimens trawled inside the Capricorn-Bunker Group, Queensland. It is readily distinguished from other aploactinids by the markedly compressed head and body, large number of dorsal and anal-fin ray elements, frontal bone with laterally-bowed ridges forming a shallow fleshy depression, and distinctly anterior insertion of the first dorsal spine. *Cocotropus microps*, new species, is described from three specimens collected from inshore waters of southern Queensland and northern New South Wales. It has the lowest dorsal- and anal-fin ray counts of the genus, dorsal fin forming three elevated sections, and coloration including at least several small pale irregular spots or larger blotches.

Two aploactinid species are recorded in Australian waters for the first time. *Acanthosphex leurynnis* Jordan & Seale, 1905, previously known from Hong Kong, Gulf of Thailand, southeast India, Indonesia and eastern Papua New Guinea, is reported from the Cumberland Group in tropical eastern Australia, Arafura Sea, Northern Territory, and near Perth, Western Australia. *Xenaploactis cautes* Poss & Eschmeyer, 1980, previously known only from the Andaman Sea and Gulf of Thailand, is reported from off Dampier, northwestern Australia and Gulf of Carpentaria, Queensland.

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With the addition of the two new taxa described here, the Aploactinidae (velvetfishes) now contains 42 species belonging to 18 genera (Table 1), 11 of which are monotypic (Poss & Eschmeyer, 1978, 1979, 1980; Poss, 1982, 1986, 1999; Poss & Springer, 1983; Washington *et al.*, 1984; Poss & Allen, 1987; Poss & Johnson, 1991; Eschmeyer, 1998; Imamura & Shinohara, 2003). The family is restricted to the western Pacific and Indian oceans, and most species occur solely in the Australian and Indo-Malaysian regions. Including the two species recorded here for the first time, 20 species in 14 genera are now known from Australian waters. Most species appear to live among vegetation, or rocky, shelly, coral rubble, or coralline algae substrata. Velvetfishes are most commonly collected from among prawn trawl bycatch.

Collections from scallop trawling inside the Capricorn-Bunker Group of subtropical eastern Australia have yielded a distinctive new genus and species of aploactinid fish. It appears to be highly restricted in distribution, with no other specimens collected throughout the Australian region, despite numerous trawl surveys covering similar depth ranges and habitat.

A new species of the genus *Cocotropus* is also described, expanding the largest genus of velvetfishes to 10 species: *C. echinatus* (Cantor, 1849) from Malaysia, *C. dermacanthus* (Bleeker, 1852) from Indonesia and the Seychelles, *C. roseus* Day, 1875 from the Coromandel coast of India and the Maldives, *C. altipinnis* Waite, 1903 from Lord Howe and Kermadec Islands, *C. monacanthus* (Gilchrist, 1906)

Table 1. Selected meristic and morphological features of the family Aploactinidae (meristics after Washington *et al.*, 1984, supplemented and revised).

genus	spp	dorsal spines	dorsal rays	dorsal total	anal spines	anal rays	pectoral rays	pelvic rays	vertebrae	pungent spines	dorsal fin insertion ^a	gill opening ^b	isthmus extension	squamation ^c	interorbital ridges ^d
<i>Acanthosphex</i>	1	11–15	7–9	19–22	1–2	6–8	9–10	I+2	24–26	Y	pO	R	N	S	M, Para
<i>Adventor</i>	1	13	7–9	21–23	1	8–10	12–14	I+2	27–28	N	P	NR	Y	dV	S, sl Div
<i>Aploactis</i>	1	12–15	11–15	24–28	1–3	10–12	11–14	I+2	28–30	N	pO	NR	Y	dV	S, sl Div
<i>Aploactisoma</i>	1	13–15	12–16	26–29	1	9–13	10–11	I+2	30–33	N	aO	NR	Y	dV	S, st Conv
<i>Bathyaploactis</i>	2	14–15	7–9	21–23	3–4	5–9	10–12	I+2	25–28	Y	pO	R	N	S	W, sl Conv
<i>Cocotropus</i>	11+	12–15	7–11	19–25	1–2	5–9	10–14	I+3	24–28	N	a-mO	NR	Y	s-dV	M, Para
<i>Erisphex</i>	4?	10–13	9–16	21–27	1–2	9–15	11–15	I+2	27–31	Y	O	NR	Y	S	W, p one ridg
<i>Eschmeyer</i>	1	8	13	21	3	8	19–20	I+3	24	Y	P	NR	Y	S	W, sl Conv
<i>Kanekonia</i>	3+	11–13	7–10	20–22	1–2	7–9	13–16	I+2	25–26	N	pO-P	NR	Y	s-dV	W-S, varies
<i>Matsubarichthys</i>	1	6	6	12	2	4	15	I+1	21	N	P	R	N	S	W, ill-defined
<i>Neaploactis</i>	1	12	9–10	21–22	1–2	7–9	12	I+3	26	N	mO	NR	Y	dV	S, Para
<i>Paraploactis</i>	7?	13–15	8–11	22–25	1–2	7–10	13–15	I+3	26–28	N	m-pO	NR	Y	dV	S, st Div
<i>Peristrominus</i>	1	12–13	10–11	22–24	0–2	7–10	14–15	I+3	26–27	N	P	NR	Y	S	S, Div
<i>Prosoproctus</i>	1	12	8	20	2	7	13	I+3	26	N	O	NR	Y	sV	W, Para
<i>Pseudopataecus</i>	1	13–15	14–15	28–29	1	11–13	11	I+3	30	N	A	NR	Y	dV	M, bowed
<i>Ptarmus</i>	2	13–16	7–10	21–23	2	4–7	9–10	I+2	25–30	Y	aO	NR	Y	S	W, p one ridg
<i>Sthenopus</i>	1	12	8–10	20–22	1	7–9	14–15	I+2	26	N	O	NR	Y	S	W, ill-defined
<i>Xenaploactis</i>	3	12–14	7–9	21–22	1	8–10	14–15	I+3	27–28	N	pO	NR	Y	dV	S, varies

Abbreviations: Y, present; N, absent.

^a dorsal fin insertion: (A) situated anterior to orbit; (O) situated above orbit; (P) situated posterior to orbit; (a) anterior margin; (m) middle; (p) posterior margin.

^b gill opening: (R) restricted; (NR) not restricted.

^c squamation: (S) skin smooth, sometimes with dermal appendages but scales lacking or deeply embedded; (V) scales present in the form of velvety prickles; (s) sparse; (d) dense.

^d interorbital ridges: (W) ridges weakly sculptured or smooth; (M) ridges moderately sculptured; (S) ridges strongly sculptured; (Para) ridges parallel; (Conv) ridges convergent; (Div) ridges divergent; (p one ridg) ridges convergent anteriorly but forming a single ridge posteriorly; (sl) slightly; (st) strongly.

from South Africa, the Comores and Tanzania, *C. masudai* Matsubara, 1943 from Japan, *C. steinitzi* Eschmeyer & Dor, 1978 from the Red Sea, Andaman Islands, and northern Papua New Guinea, *C. larvatus* Poss & Allen, 1987 from the Marshall, Ryukyu, Great Banda and Christmas islands, and northern Papua New Guinea, *C. keramensis* Imamura & Shinohara, 2003 from Kerama Islands, southern Japan, and the new species from central eastern Australia. The last appears to be a rare cryptic species; type specimens were collected from among heavy cover within a rockpool and boulder seawalls in a highly accessible and reasonably well-collected region of eastern Australia.

Materials and methods

Methods for counts and measurements follow Eschmeyer (1969), except the term lachrymal is substituted for preorbital. The last rays of the dorsal and anal fins appear separate, but are borne on the same pterygiophore as the penultimate, so each pair is counted as one. Vertebral counts were made from radiographs. Measurements were taken using a dial calipers, with the aid of a stereo microscope where necessary. Interorbital width was taken horizontally, across the middle of the orbit. Specimen lengths are Standard Lengths in mm. Where different, values for paratypes follow those of the holotype in parentheses. Meristic and morphometric details for the new taxa are presented in Tables 2 and 3. A brief diagnosis of key features is provided from the material examined of the two species recorded in Australian waters for the first time. Institutional codes follow Leviton *et al.* (1985).

Comparative material examined

Adventor elongatus QM I.26849, 84 mm, Warrior Reefs, Torres Strait, Qld, 9°48'S 142°58'E.

Aploactis aspera QM I.9993, 66 mm, 6–7 mi NE of Caloundra lighthouse, Qld, 26°45'S 153°13'E; QM I.27328, 60 mm, 16 km NE of Double Island Point, Qld, 25°51'S 153°19'E; QM I.29954, 54 mm, NE of Shelburne Bay, Qld, 11°39'S 143°35'E; QM I.33331, 52 mm, E of Curtis Island, Qld, 23°35'S 151°34'E.

Aploactisoma milesii QM I.373, 127 mm, Port Jackson, NSW; QM I.2677, 78 mm, same data; QM I.2678, 72 mm, same data; QM I.22850, 128 mm, Fly Point, Port Stephens, NSW.

Bathyaploactis ornatissima QM I.10697, 45 mm, Off Redcliffe, Moreton Bay, Qld, 24°14'S 153°07'E.

Cocotropus altipinnis AMS I.5132, holotype, 34 mm, Lord Howe Island (vertebral and gill-raker counts provided by Dr Hisashi Imamura, Hokkaido University Museum).

Cocotropus dermacanthus BMNH 1908.3.23.180–181, Seychelles (radiograph only).

Cocotropus larvatus WAM P.29008-001, paratype, 21 mm, Christmas Island, 10°26'S 105°40'E; WAM P.30620-011, 24 mm, Madang, Papua New Guinea, 5°09'S 145°50'E.

Cocotropus monacanthus BMNH 1905.1.7.6, South Africa (radiograph only).

Cocotropus roseus BMNH 1846.11.22, Madras, India; BMNH 1901.12.31.20, Maldives (radiographs only).

Cocotropus steinitzi NTM S.13668-011, 29.7 mm, reef ESE of Gosem Island, Madang, Papua New Guinea.

Erisphex aniarus QM I.28307, 74 mm, NE of Cape

- Moreton, Qld, 26°55'S 153°36'E.
Kanekonia florida UMMZ 192040, 3: 27–30 mm, Nagasaki, Japan.
Kanekonia queenslandica QM I.27726, 37 mm, Gulf of Carpentaria, Qld, 10°20.2'S 141°09.7'E.
Neaploactis tridorsalis WAM P.25529-001, holotype, 34 mm, One Tree Island, Qld, 23°30'S 152°00'E.
Paraploactis trachyderma QM I.30298, 105 mm, Polka Point flats, Dunwich, Qld, 27°30'S 153°24'E.
Peristrominous dolosus QM I.23553, 58.5 mm, west of Watt Reef, Qld, 18°42.5'S 147°03.2'E.
Ptarmus gallus BMNH 1960.3.15.1724–1725, 2: 25–39 mm, Knor Shinab, Sudan, Red Sea; BMNH 1960.3.15.1726–1728, 3: 13.5–30.5 mm, Khor Inkeifail, Sudan, Red Sea.

***Pseudopataecus* n.gen.**

Type species. *Pseudopataecus taenianotus* n.sp.

Diagnosis. Dorsal fin XIII–XV, 14–15; anal fin I, 11–13; pectoral fin 11; pelvic fin I, 3; all fin rays unbranched. Dorsal fin high, with membrane not or only slightly incised, anterior portion distinctly raised, originating on cranium almost one eye diameter before anterior margin of eye. Pelvic fins long and slender, reaching about two-thirds distance to anus. Head and body highly compressed, body width 6.4–6.9 in SL; frontal bone with non-prominent laterally-bowed ridges, a shallow fleshy depression in their interspace; fleshy cirri densely arranged on margin and ventral surface of mandible; anterior tip of isthmus free; modified scales densely arranged on head and body; bands of minute villiform teeth in jaws and on vomer; no teeth on palatines; vertebrae 30.

Discussion. *Pseudopataecus* can readily be distinguished from all other aploactinid fishes in having a combination of high numbers of dorsal-fin rays, anal-fin rays and vertebrae, markedly compressed head and body, well-developed velvety scales, and shallow fleshy depression present between the laterally-bowed fleshy frontal ridges (Table 1). It has the dorsal fin inserted far forward (almost one orbital diameter before a vertical from anterior margin of eye) and containing 28 or 29 elements, and 30 vertebrae. Of all known aploactinids, only the monotypic *Aploactis* Temminck & Schlegel, 1843 and *Aploactisoma* Castelnau, 1872 have a total of both 28 or more dorsal fin elements and 29 or more vertebrae. Species of the latter are easily distinguished from this genus by their more robust head and body, more prominent and sculptured cranial ridges (interorbital ridges slightly divergent in *Aploactis*, strongly convergent in *Aploactisoma*), more posteriorly inserted dorsal fin (above posterior margin of eye in *Aploactis*, anterior margin of eye or just before in *Aploactisoma*), much shorter dorsal- and anal-fin rays (longest dorsal- and anal-fin rays 1.7–2.1 and 2.0–2.5 in *Aploactis*, 1.8–2.3 and 2.0–2.5 in *Aploactisoma*, versus 1.2–1.4 and 1.6–1.8 in head length respectively in *Pseudopataecus*), and two versus three pelvic-fin rays. Some species of *Erisphex* Jordan & Starks, 1904 may have up to 27 dorsal fin elements and 31 vertebrae (Poss, 1999), however members of this genus have a considerably more robust head and body, pungent lachrymal, preopercular and dorsal-fin spines, smooth scaleless skin, and only two pelvic fin rays. The broadly defined *Cocotopus* Kaup, 1858 is superficially similar to

Pseudopataecus, but has parallel interorbital ridges, with no more than a narrow shallow groove within the interspace, 25 or fewer dorsal fin elements including 11 or fewer rays, 11 or fewer anal-fin ray elements, 9–12 lateral-line tubes (versus 13–14), and 28 or fewer vertebrae. The frontal bones of *Paraploactis* Bleeker, 1865 have prominent ridges diverging posteriorly to form a bony pyriform depression. They are more elaborately sculptured, not covered in skin, and their depression deeper and more angular than in *Pseudopataecus*. *Paraploactis* also has no more than 25 dorsal fin elements and 28 vertebrae (Poss & Eschmeyer, 1978). *Ptarmus* Smith, 1947 shares a notably compressed head and body and forward-placed dorsal-fin insertion, but more closely resembles the tetrarogin scorpaenids, with smooth, ill-defined head ridges, a larger mouth, more prominent snout, pungent lachrymal, preopercular, and dorsal-, anal- and pelvic-fin spines, significantly fewer dorsal-, anal- and pectoral-fin rays, and no scales other than in the lateral line (densely arranged in *Pseudopataecus*).

***Pseudopataecus taenianotus* n.sp.**

Longfin velvetfish

Figs. 3a,b, 1; Table 2

Type material. HOLOTYPE: QM I.33192, 82 mm, WSW of Lady Musgrave Island, 23°57.21'S 152°13.32'E, scallop trawl, 37 m, Qld Fisheries Service, 4 October 2000. PARATYPES: AMS I.42652-001, 75 mm, NE of Burnett Heads, 24°39.028'S 152°41.438'E, scallop trawl, 25 m, Qld Fisheries Service, 12 October 2002; QM I.30723, 93 mm, 15 mi NE of Burnett Heads, 24°38'S 152°36'E, scallop trawl, G. Lowe, 27 January 1982; QM I.33193, 80 mm, NE of Burnett Heads, 24°36.52'S 152°31.91'E, scallop trawl, 20 m, Qld Fisheries Service, 9 October 2000; QM I.33850, 93 mm, NE of Rodds Peninsula, 23°51.44'S 151°48.27'E, scallop trawl, 36 m, Qld Fisheries Service, 11 December 2002; QM I.33944, 108 mm, W of Bunker Group, 23°48.1'S 151°56.50'E, scallop trawl, 40 m, Qld Fisheries Service, 10 October 2002; QM I.33945, 97.5 mm, NE of Keppell Islands, 22°59.01'S 151°17.37'E, scallop trawl, 40 m, Qld Fisheries Service, 14 October 2002.

Non-type material. QM I.33941, 2: 81.5–82 mm, NW of Sandy Cape, 24°30.87'S 152°53.62'E, scallop trawl, 35 m, Qld Fisheries Service, 13 October 2002; QM I.33942, 2: 74–107 mm, NE of Burnett Heads, 24°39.33'S 152°43.03'E, scallop trawl, 28 m, Qld Fisheries Service, 12 October 2002; QM I.33943, 97 mm, E of Round Hill Head, 24°08.24'S 152°10.26'E, scallop trawl, 33–37 m, Qld Fisheries Service, 14 October 2002.

Diagnosis. See generic diagnosis.

Description. Head 3.3 (3.1–3.3) in SL, markedly compressed and covered with modified scales ending in spinous points; scales less dense on snout and interorbital space. Dorsal profile of head convex, ascending steeply, obscured by loose skin at base of extremely anteriorly inserted dorsal fin, inclined dorsoposteriorly about 60° from horizontal. Eye 3.8 (3.8–4.6) in head. Lachrymal spines connected at base, with broad blunt points, first directed anteroventrally over maxilla, second slightly longer and

Table 2. Selected meristic and morphological values for type specimens of *Pseudopataecus taenianotus* (measurements as percentage of standard length).

	holotype	paratypes					
	QM I.33192	AMS I.42652-001	QM I.33193	QM I.33850	QM I.30723	QM I.33945	QM I.33944
standard length	82	75	80	91.5	93	97.5	108
dorsal-fin rays	XIV/14	XIII/15	XIV/14	XIV/15	XIV/15	XIV/14	XV/14
anal-fin rays	i/12	i/11	i/12	i/11	i/11	i/13	i/12
pectoral-fin rays	11,11	11,11	11,11	11,11	11,11	11,11	11,11
caudal-fin rays	12	13	13	12	13	13	13
gill-rakers	1+6,1+5	0+5,1+5	1+6,1+5	0+5,0+5	1+4,1+4	1+6,1+4	1+6,1+5
lateral-line tubes	14	13	13	14	14	13	13
vertebrae	30	—	30	—	30	—	—
pelvic-fin rays	i/3	i/3	i/3	i/3	i/3	i/3	i/3
head length	30.6	31.7	32.4	31.4	31.5	31.4	32.4
snout length	7.4	8.0	8.0	7.4	8.1	8.0	7.9
orbit diameter	8.0	7.2	8.1	7.4	8.0	6.9	7.4
interorbital width	8.0	8.3	7.5	7.8	7.7	7.4	7.5
jaw length	9.9	10.4	9.3	10.3	10.5	9.8	9.5
postorbital length	16.4	16.9	17.4	17.4	17.2	16.7	17.0
body depth	33.3	36.3	33.9	35.4	34.6	35.0	35.3
body width	14.5	15.7	15.0	14.4	—	15.4	15.6
predorsal length	9.1	9.7	8.9	9.0	9.6	9.4	10.0
dorsal-fin base (to last ray)	92.3	92.0	91.0	92.6	93.1	91.2	92.3
dorsal-base (to membrane)	99.4	98.0	98.8	98.6	100.0	98.1	96.7
anal-fin base	31.5	37.3	33.6	33.2	30.3	35.9	34.1
caudal-fin length	30.6	30.7	27.6	29.5	28.7	26.8	26.7
pectoral-fin length	33.5	34.1	33.8	31.7	31.3	32.2	31.4
pelvic-fin length	18.5	19.3	18.8	15.3	17.4	17.2	17.8
first dorsal-fin spine length	31.6	31.2	32.3	30.5	30.4	26.7	27.6
second dorsal-fin spine length	33.3	34.1	33.3	32.3	32.1	31.4	31.2
third dorsal-fin spine length	32.7	32.7	32.4	30.1	28.8	30.6	30.4
fourth dorsal-fin spine length	26.8	27.3	27.6	27.7	24.4	25.7	26.5
fifth dorsal-fin spine length	21.3	22.7	22.3	21.7	20.1	21.3	21.0
penultimate dorsal-fin spine length	17.6	16.9	16.6	17.6	14.6	16.6	16.3
last dorsal-fin spine length	17.4	17.1	16.6	17.7	14.8	—	16.6
longest dorsal-fin ray	24.5	25.5	23.9	22.6	24.9	23.1	22.2
first anal-fin spine length	6.5	4.7	5.8	5.1	5.2	4.2	5.7
longest anal ray	18.7	20.0	18.8	17.0	18.6	18.5	17.5
least depth of caudal peduncle	9.9	10.7	9.9	9.8	10.8	9.4	9.4

narrower, directed posteriorly just below the horizontal. Small blunt bony knob-like spine at base of first lachrymal spine. Suborbital ridge with 4 or 5 low knob-like spines, covered with skin, anterior two difficult to detect. Interorbital ridges not prominent, covered with skin, laterally-bowed at midlength, then gently converging posteriorly to meet a flat transverse bony process anterior to base of first dorsal spine; ridges forming a shallow fleshy depression in their interspace (Fig. 1). Tip of rostral cartilage from ascending premaxillary processes evident by a low bump in fleshy depression. Simple to poorly branched cirrus anteriorly at inside edge of each ridge and posteriorly at the outside edge of each ridge. No spines on nasals. Anterior nostril a simple tab-like tube midway between eye and tip of snout. Posterior nostril just anterior to middle of eye, a less prominent open tube with anterior margin raised. Fleshy, slightly raised pores at snout tip, middle of lower margin of lachrymal, and at upper and lower margins of preopercle. Preopercle with 5 blunt spines; dorsalmost largest, projecting laterally and posterodorsally; others with broader tips, directed perpendicular to curve of preopercular margin, gradually decreasing in size; lower 3 each armed with a poorly branched cirrus. Anterior edge of interopercle with

2 similar cirri. Operculum with 2 ridges; lower horizontal, reaching opercular margin; upper inclined about 45° to the horizontal, not reaching opercular margin; neither with spinous tips. Dorsal margin of operculum scalloped and steeply inclined dorsoposteriorly; opercular tip narrow, directed toward seventh or eighth dorsal spine. Supraocular, sphenotic, pterotic, lower posttemporal and supracleithral spines forming similar-sized blunt ridges; less prominent and covered with thicker skin in larger paratypes. Cleithrum without spine. Ventral surface of lower jaw with numerous branched and unbranched cirri, those at posterior of outer row longest, up to about half eye diameter; those anterior and in inner rows mostly shorter and unbranched; more papillose and tufted anteriorly in larger paratypes. Prominent pores ventrally at middle and posterior of mandibles. Both lips papillose, but papillae more cirri-like anteriorly, those at tip of lower lip particularly well developed. Maxilla broad, scaled, with a well-developed cirrus near lower margin; rear margin very slightly curved, extending just beyond a vertical from anterior margin of eye. Both jaws with broad uniform band of minute firm conical teeth. Similar small but well-developed teeth in a crescentic band on the vomer, band projecting anteriorly and widest medially. No teeth on

Table 3. Selected meristic and morphological values for type specimens of *Cocotropus microps* (measurements as percentage of standard length).

	holotype	paratypes	
	QM I.31134	AMS I.41877-001	AMS I.41266-014
standard length	39	24	18
dorsal-fin rays	XII/7	XII/7	XII/7
anal-fin rays	ii/5	ii/5	ii/5
pectoral-fin rays	11,11	10,10	10,11
caudal-fin rays	16	16	17
gill-rakers	1+5	1+4	2+5
lateral-line tubes	11	11	11
vertebrae	24	—	—
pelvic-fin rays	i/3	i/3	i/3
head length	36.2	35.8	38.9
snout length	12.3	11.3	11.1
orbit diameter	8.2	7.9	9.4
interorbital width	7.9	8.8	9.4
jaw length	16.2	16.3	14.4
postorbital length	18.5	15.8	17.8
body depth	36.9	36.7	34.4
body width	13.6	13.8	14.4
predorsal length	19.7	23.8	23.3
dorsal-fin base (to last ray)	82.1	76.7	73.3
dorsal-fin base (to membrane)	84.1	80.4	75.0
anal-fin base	26.7	26.3	25.6
caudal-fin length	23.8	27.5	27.8
pectoral-fin length	32.3	31.7	33.3
pelvic-fin length	18.2	16.7	16.1
first dorsal-fin spine length	18.2	17.5	18.3
second dorsal-fin spine length	21.8	21.3	21.7
third dorsal-fin spine length	21.3	21.3	21.7
fourth dorsal-fin spine length	18.2	17.1	16.1
fifth dorsal-fin spine length	14.4	12.9	12.2
penultimate dorsal-fin spine length	9.5	10.8	9.4
last dorsal-fin spine length	10.3	12.1	10.6
longest dorsal-fin ray	24.1	22.5	22.8
first anal-fin spine length	7.2	6.7	6.1
second anal-fin spine length	9.7	10.0	8.9
longest anal-fin ray	20.5	19.2	20.0
least depth caudal peduncle	13.3	12.9	13.3

palatines. Tongue stout and rounded. Gill rakers short knobs, 1 (0–1) on upper limb, 5 on right side and 6 on left side of lower limb in holotype (4–6), total 6 on right side and 7 on left side of first arch (5–7); when present the single raker on upper arch very poorly developed. Spacing of rakers somewhat irregular, usually a short gap devoid of rakers below and adjacent to angle of arch. No slit behind posterior hemibranch. Branchiostegal membranes not fused to isthmus. Isthmus with fleshy extension anteriorly, slightly expanded, its free tip longer than wide.

Body markedly compressed, depth 3.0 (2.8–3.0) in SL, width 6.9 (6.4–6.9) in SL, densely covered with modified scales. Lateral line with 14 (13–14) tubes, gently sloping posteroventrally to the midlateral, then continuing in a generally straight course to the caudal base. Tubed scales mostly armed with a small cirrus; last scale on the caudal

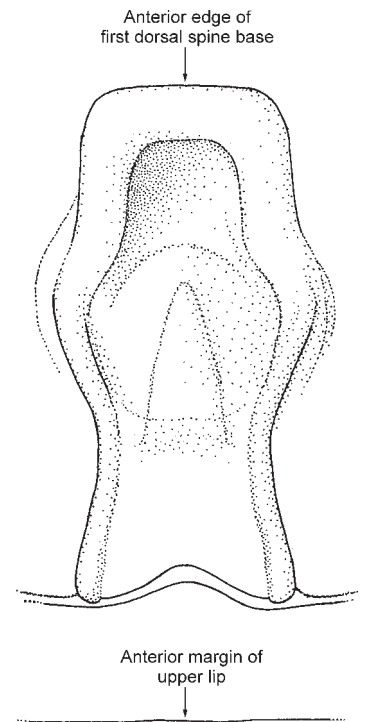


Fig. 1. Frontal view of interorbital region of *Pseudopataecus taenianotus*, showing laterally-bowed ridges and shallow fleshy depression. Scale = 3 mm.

base. Dorsal fin originating slightly more than two-thirds of eye diameter before anterior margin of eye. Second dorsal-fin spine longest, first or third next longest, spines decrease in length posteriorly to sixth or seventh spine, then slightly increase at seventh or eighth, with ninth to fourteenth spines approximately equal in length. Dorsal-fin membrane not or very weakly incised, membrane from last dorsal-fin ray adnate to upper corner of caudal-fin base. Pectoral fin rounded, tips of rays protruding from membrane, fourth or fifth ray longest, reaching vertical between anus and first anal-fin spine. Pelvic fin relatively long and slender, 1.5 (1.5–1.7) in distance from their base to anus; with flexible spine and 3 rays; first ray subequal to second, third or innermost ray rudimentary and much shorter; longest pelvic-fin ray subequal to fifth dorsal-fin spine; pelvic-fin membrane not adnate to body. Anal fin with single short spine, not protruding from membrane; rays gradually increasing in length to ninth or tenth, last two shorter; membranes distinctly incised. Caudal fin rounded, with 12 (12–13) rays; the latter protruding slightly from membrane. All fin-rays unbranched. Vertebrae 30.

Preserved coloration (in alcohol). Pale grey-brown with irregular fine darker brown mottlings and diffuse blotches on head and body. Two round dark brown blotches, slightly larger than eye, on upper body just reaching lateral line, first above middle of pectoral fin and second below last dorsal-fin rays, fading in preservative. Dorsal and pectoral fins with fine dusky mottling, darkest on outer half of fin. Anterior elevated portion of dorsal fin with slightly more defined pattern of wavy markings. Anterior edge of first dorsal-fin spine with irregular transverse dark brown bars. Caudal, anal and pelvic fins with more uniformly distributed dusky mottling. Tips of all fin rays pale. A narrow transparent area of membrane at upper and lower posterior margin of caudal fin.

Ventral side of head, breast and belly pale.

Live coloration. Fresh specimens dull red to chocolate-brown in ground coloration, with breast and belly cream to creamy yellow.

Etymology. *Pseudopataecus* from the Greek pseudo, “false”, in reference to the superficial but false likeness to the pataecid genus *Pataecus*. The species epithet *taenianotus* refers to its long ribbon-like dorsal fin.

Distribution. Known from the types and five other specimens, all taken between 20 and 40 m depth by scallop trawl offshore inside the Capricorn-Bunker Group (22°59.01' to 24°39.33'S), in southern Queensland, Australia. Trawls were carried out over predominantly sandy bottom, with some scattered shell and rubble. Brown algae *Padina* sp. and smaller amounts of rubble and the seagrasses *Halophila ovalis* and *H. spinulosa*, were recorded in the catch with one of the specimens.

Discussion. *Pseudopataecus taenianotus* appears most closely related to *Aploactisoma milesii* (Richardson, 1850), but differs in having much less prominent and sculptured cranial ridges, interorbital ridges laterally-bowed versus strongly convergent, more compressed head and body (body width 6.4–6.9 versus 4.3–5.7 in SL, interorbital width 3.8–4.3 versus 3.5–3.8 in head length), fin rays longer and less robust (longest dorsal-fin ray 1.2–1.4 versus 1.8–2.3, longest anal-fin ray 1.6–1.8 versus 2.0–2.5 in head length), velvety scales less papillose and robust, and three versus two pelvic-fin rays. The differences between these two species are clearly accentuated with age. There is little change in proportions with growth in *P. taenianotus*, but *A. milesii* becomes increasingly robust with age.

There are strong anecdotal and survey-based indications that the range of this species is patchy and limited broadly to that documented here. A photograph of *Pseudopataecus taenianotus* presented to commercial scallop fishermen from the Bundaberg region was promptly identified as a species occasionally captured from the northern Hervey Bay–Bundaberg region (c. 23°30'–24°50'S), “on grounds rich in algae, sponges and various invertebrates”. They reported that it was “absent on scallop grounds to the north where the substrate is generally much cleaner” (lacking in rubble, plant and sessile invertebrate growth). It is most likely that the fishermen’s reports pertain to *P. taenianotus*, rather than another scorpaeniform species. The pataecid, *Pataecus fronto* Richardson, is superficially similar in appearance, however the latter has a more southerly distribution (northernmost record is off Alexandra Headland, 26°40'S Johnson, 1999: 728), lacks pelvic fins, and has a more uniform and brighter reddish coloration. The scorpaenid, *Ablabys taenianotus* (Cuvier) has a similar compressed appearance and long-based dorsal fin, however it has smooth cycloid scales (rather than dense velvety scales), and obviously pungent spines to the dorsal and anal fins. No other known aploactinid fish from Australian tropical waters is easily confused with *P. taenianotus*. Specimens of *P. taenianotus* have also failed to feature in numerous museum collections and research surveys using trawl gear in similar depths elsewhere throughout eastern Australia. Most of the twelve known specimens have been collected in a relatively small patch NE of Burnett Heads. This is despite intensive

collecting by long-term monitoring and scallop bycatch research surveys throughout the region. It seems likely that the occurrence of this species is correlated with bottom structure, flora or invertebrate communities specific to the area. It could potentially be threatened by concentrated fishing effort within its narrow range.

Cocotropus microps n.sp.

Patchwork velvetfish

Fig. 3c,d; Table 3

Cocotropus sp.—Johnson, 1999: 728, fig. 2E.

Type material. HOLOTYPE: QM I.31134, 39 mm, Southport seawall, about 150 m west of entrance, 27°56'S 153°26'E, 2–4 m, J. Johnson, 29 May 1998. PARATYPES: AMS I.41266-014, 18 mm, Ballina, Richmond River, south wall c. 100 m west of entrance, 28°52.55'S 153°35.14'E, 0–4 m, M. McGrouther & A. Gill, 20 March 2002; AMS I.41877-001, 24 mm, Spooky Point, Angourie, large rockpool east of “Blue Pool”, 29°28.73'S 153°21.83'E, 0–1.5 m, M. McGrouther, A. Gill & J. Pogonoski, 12 December 2002.

Non-type material. AMS I.41265-098, 2: 15.5–16.1 mm, Iron Peg Point, channel on southern side, off Rocky Point Road, 28°49.36'S 153°36.36'E, 0–1.5 m, A. Gill, K. Parkinson, M. McGrouther, 20 March 2002; AMS I.40868-024, 19.7 mm, Chowder Bay, Sydney Harbour, end of fuel wharf on east side, 33°50.5'S 151°15.18'E, 14.4 m, AMS Team, 24 May 2001.

Diagnosis. Dorsal XII, 7; anal II, 5; pectoral 10–11; pelvic I, 3; caudal 16–17; all fin rays unbranched; vertebrae 24. Dorsal fin with anterior, middle and posterior portions notably elevated, first interspace moderately scalloped, second deeply notched; dorsal fin membrane connected posteriorly to caudal peduncle; head, body and fins densely covered with scales, modified to form velvety prickles; a small fleshy extension on the anterior of the isthmus; frontal ridges parallel on interorbital; body and fins variously marked with pale or white blotches, or small irregular spots.

Description. Head 2.8 (2.6–2.8) in SL, moderately compressed and covered with modified scales forming velvety prickles; the latter prominent on operculum, preorbital, snout and lower surface of mandible, sparse on much of postorbital, in groove between frontal ridges and absent around nostrils. Dorsal profile of head slightly concave overall between snout tip and insertion of dorsal fin; small bump at tip of nasals, then straight to base of first dorsal spine; ascending at about 50° from horizontal. Eye 4.4 (4.1–4.5) in head. Lachrymal large, movable, with two short knob-like spines ventrally, followed by large blunt spine directed posteriorly and reaching almost to vertical from rear margin of eye. Very small blunt knob anterodorsally of first lachrymal spine base, and larger knob-like spine, subequal to second lachrymal spine, above mid-distance between first and second lachrymal spines. Suborbital ridge with two spines, first firm, bluntly pointed, below anterior margin of orbit; second much larger, more knob-like, centred below rear margin of pupil. Interorbital ridges distinct, but not strongly sculptured, parallel from their base at posterior tip of nasals almost to their termination

at base of first dorsal spine, where they are slightly flared laterally; shallow groove in their interspace. No spines on nasals. Anterior nostril a simple tube, slightly nearer tip of snout than anterior margin of eye. Posterior nostril less prominent, an open pore with slightly raised rim, situated just anterior to horizontal from upper edge of pupil. Slightly raised pores at upper base of lachrymal, interorbital above posterior nostril, and preopercle below fourth preopercular spine. Preopercle with 4 robust blunt spines; dorsalmost largest, projecting laterally and slightly above the horizontal; others with broader tips, directed perpendicular to curve of preopercular margin, gradually reducing in length; all densely armed with well-developed knobby prickles. Opercular ridges poorly defined, surface of operculum obscured by large knobby prickles. Operculum with 2 spines, upper a low blunt point, just anterior to rear tip, second slightly smaller, short distance below on opercular margin. Dorsal tip of operculum a small free flap, received by well-developed V-shaped pit, the point of which is directed toward the sixth or seventh dorsal spine. Cleithrum with robust blunt spine. Upper and lower post-temporal spines large, broad-based, blunt and bulbous, the former not forming distinct point, latter with its tip hooked back posterolaterally; supracleithral spine posterior to and slightly below lower post-temporal, much smaller and more slender, bluntly pointed and directed toward about sixth dorsal spine. No other prominent spines on head. Ventral surface of lower jaw densely covered with numerous small knobby papillae. Each side of jaw, adjacent to ventral edge of lower lip, with 3 stubby papillae subequal in length to pupil diameter, each also covered with small knobby papillae. Two similar stubby papillae on medial edge of dentary, and one on rear of dentary posteroventral to rear tip of maxillae. Four pores along each side of dentary and a pair of pores at posterior of symphysis. Ventral edge of dentary projecting medially. Both lips densely covered in uniform knobby papillae. Maxilla broad, scaled, with a short stubby papillae just anterior to rear tip; its rear margin slightly rounded, extending to vertical through middle of eye. Both jaws with teeth in broad villiform bands, widest anteriorly, with at least 12 tooth rows at widest point, no enlarged teeth. Vomer with narrow band of minute teeth. Palatines edentulous. Tongue stout and broadly rounded. Gill rakers as low knobs, not evenly spaced, 1 (1–2) on upper limb and 5 (4–5) on lower limb of first arch. No slit behind posterior hemibranch. Branchiostegal membranes not fused to isthmus. Isthmus with fleshy extension anteriorly, slightly expanded, its free tip slightly longer than wide.

Body moderately compressed, depth 2.7 (2.7–2.9) in SL, width 7.4 (6.9–7.4) in SL, densely covered with modified scales ending in spinous points. Lateral line with 11 tubes, gently sloping posteroventrally to the midlateral, then continuing in a generally straight course to the caudal base. Tubed scales enlarged, but not armed with cirri; last scale on the caudal base. Vertebrae 24.

Dorsal fin with anterior, middle and posterior portions notably elevated; first interspace shallowly scalloped, second deeply notched. First dorsal-fin spine insertion over anterior third of eye in holotype, to posterior fourth of eye in juvenile paratype. Dorsal-fin spines strong, rigid, but not pungent; second longest, gradually decreasing in length to fifth; sixth and seventh abruptly longer, gradually shorter to the eleventh; twelfth slightly longer. First dorsal-fin ray

abruptly longer than last spine, 1.7 (1.5–1.7) times its length; fourth ray longest. First 4 dorsal-fin rays with distal tips strongly curved posteriorly. Dorsal-fin membrane weakly incised, connected posteriorly to caudal peduncle less than one pupil diameter anterior to upper caudal-fin base. Anal fin with 2 soft flexible spines, first 1.4 (1.4–1.5) in length of second, second 1.6 in length of first segmented ray; fourth anal-fin ray longest; first 4 rays with distal tips strongly curved posteriorly; membranes moderately incised. Caudal fin rounded, with 16 (16–17) rays, the rays not protruding from membrane. Pectoral fin rounded, thick and fleshy, tips of median rays protruding from membrane, fourth or fifth ray longest, reaching a vertical from base of last dorsal-fin spine when addressed. Pelvic fins with a firm but non-pungent spine and 3 fairly robust rays, second ray easily the longest, third or innermost ray shortest; longest pelvic-fin ray equal in length to fourth dorsal-fin spine, reaching less than half distance to anus; pelvic-fin membrane not adnate to body. All fin rays unbranched; most fin elements and membranes variously covered with scales, modified to form velvety prickles.

Live coloration. Holotype mostly dark greyish brown on head and body, with prominent mottled patchwork of yellowish cream on body. Dorsal fin with splotches of dark greyish brown on mainly yellowish cream background, with darker areas mainly centred on elevated portions of fin, and pale areas containing some fine dark flecking. Anal fin not mottled, darker brown than remainder of body, tips of rays paler than remainder of fin. Pelvic fins light brown, with membranes slightly darker than rays. Pectoral fins mostly light brown, but with broad dusky marginal band, and narrow pale edge, including tips of individual rays. Caudal fin with similar pattern to dorsal, but with distal half of fin containing all the mottling and basal half uniformly pale. One paratype (18 mm juvenile) uniformly dusky, except for individual small pale blotches at anus, inner and outer pectoral bases, and pectoral and caudal fins. Another paratype (24 mm juvenile) similarly dusky, caudal fin with two pale blotches at its margin, but with only four very small, more inconspicuous individual white spots situated dorsally on inner pectoral fin bases, just above centre of lateral line on right side, and on anus.

Etymology. The specific name *microps* refers to the small, inconspicuous eyes.

Distribution. Known from six specimens collected in subtropical eastern Australia, between Southport, Queensland, and Sydney Harbour, New South Wales, in 0–14.4 m depth, among rocky substrate. Another specimen, collected in 15 m among rocky reef with some coral growth at Cook Island, New South Wales (28°12'S 153°35'E), was unavailable for this study.

Discussion. *Cocotropus microps* further expands the somewhat elastic concept of this genus. It is referred to the genus on the basis of its meristics, parallel interorbital ridges, presence of a fleshy extension to the isthmus, continuous dorsal fin, and type of velvety scales. This species differs most notably from its congeners in having lower dorsal- and anal-fin ray counts (XII, 7 versus XII–XV, 8–11 and II, 5 versus I–II, 6–9 respectively); dorsal fin with three distinctly elevated sections, at the front, centre and rear portions of the fin; and in coloration. Its pectoral-fin ray count

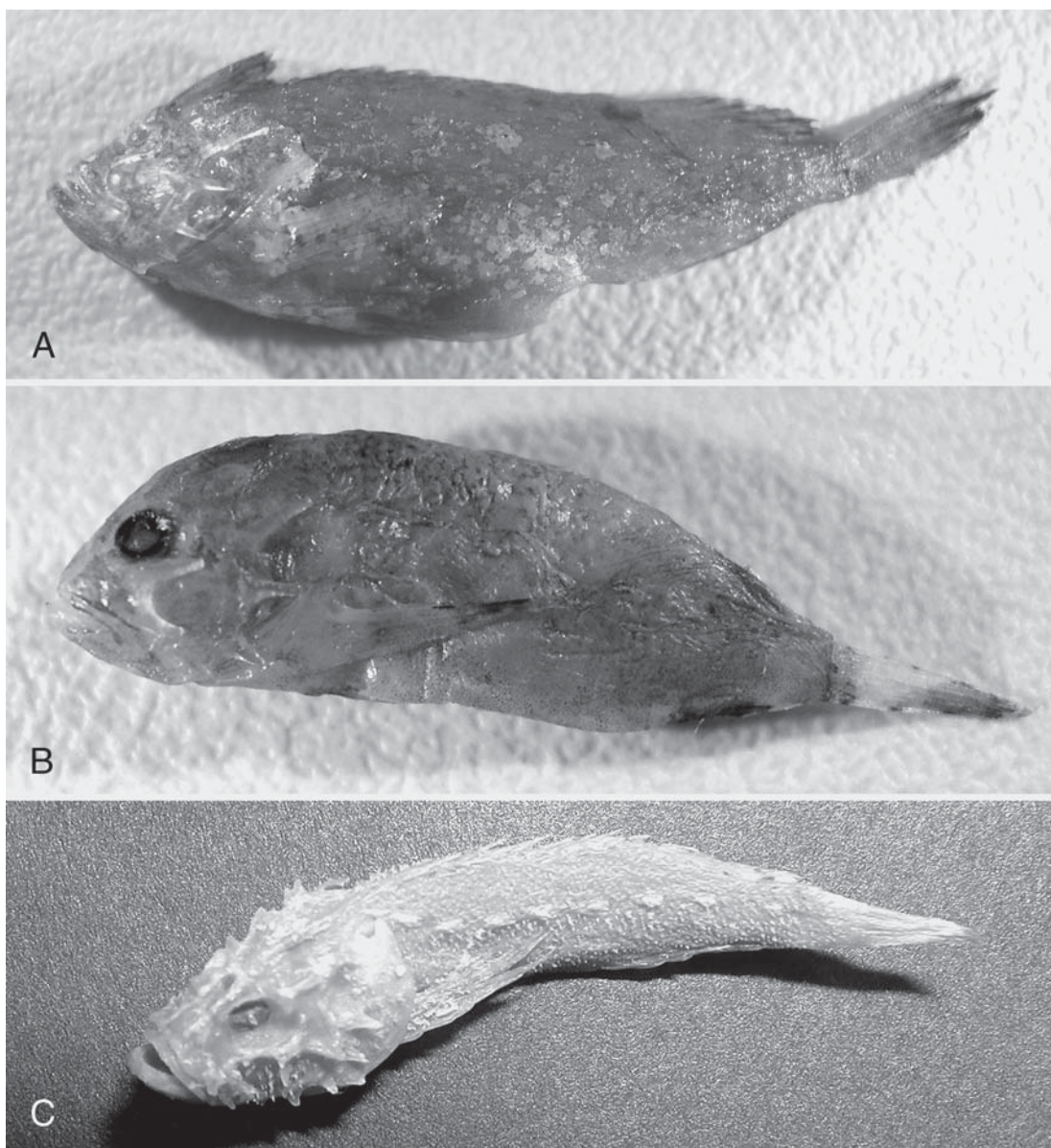


Fig. 2. New records of aploactinid fishes from Australian waters. (a) *Acanthosphex leurynnis*, WAM P.31618-001, 25.7 mm; (b) *A. leurynnis*, QM I.29200, 17 mm; (c) *Xenaploactis cautes*, AMS I.24800-004, 21.9 mm.

(10–11) is low for the genus (only *C. dermacanthus* with 11–13 and *C. echinatus* with 11 overlap), its caudal-fin ray count (16–17) is high (other species 11–16), and its vertebral count is the lowest known for the genus (24 versus 25–28).

New records for Australia

Two species of velvetfishes are recorded in Australian waters for the first time. A diagnosis is provided for the voucher material.

Acanthosphex leurynnis (Jordan & Seale, 1905), previously known from Hong Kong, Gulf of Thailand, southeast India, Indonesia and eastern Papua New Guinea (Vidthayanon & Bettencourt, 1988; Eschmeyer, 1998; Poss, 2000), is reported from the Cumberland Group in tropical eastern Australia, Arafura Sea, NE of Goulburn Island, Northern Territory, and north of Perth, southern Western Australia (Fig. 2a,b).

Diagnosis. Dorsal fin III, IX–X, 6–8; anal fin I–II, 6; pectoral fin 9–10, pelvic fins I, 2; lateral-line tubes 9; gill openings restricted to sides of head; preorbital armed with 2 very large posteriorly directed blunt spines, extending well beyond posterior margin of eye; preoperculum with 4 large spines, upper largest, spines gradually decreasing in length ventrally.

Material examined. QM I.29200, 17 mm SL, Repulse Bay, 20°36'S 148°44'E, beam trawl, Qld Fisheries Service, 23 March 1994; QM I.23965, 2: 13.5–14.1 mm SL, Whitsunday Island, c. 20°15'S 148°56'E, seagrass trawl, Qld Fisheries Service, 29 March 1987; WAM P.31618-001, 25.7 mm SL, c. 1 km off Whitfords Beach, WA, c. 31°48'S 115°43'E, 8 m, trawl, WA Fisheries; NTM S.11899-012, 9.6 mm SL, Arafura Sea, NE of Goulburn Island, Northern Territory, 10°38'S 134°00'E, 60 m, trawl, NT Fisheries, 25 April 1986.

Xenaploactis cautes Poss & Eschmeyer, 1980, previously known only from the Andaman Sea and Gulf of Thailand (Poss & Eschmeyer, 1980) is reported from off northwestern

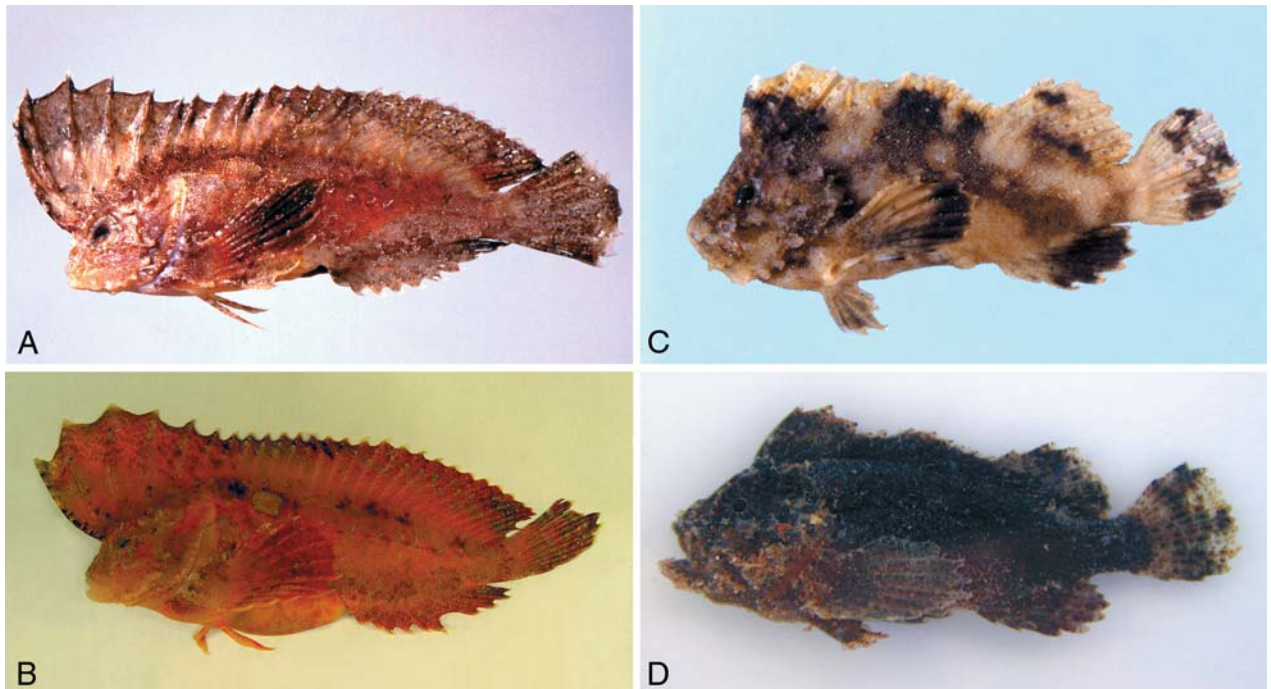


Fig. 3. Type specimens of new aploactinid fishes. (a) *Pseudopataecus taenianotus*, holotype, QMI.33192, 82 mm; (b) *P. taenianotus*, paratype, QMI.33944, 108 mm; (c) *Cocotropus microps*, holotype, QMI.31134, 39 mm; (d) *C. microps*, paratype, AMS I.41877-001, 24 mm.

Australia (Fig. 2c) and the Gulf of Carpentaria, Queensland. Based on material from the Northern Territory Museum, the record of *Xenaploactis* sp. from the Arafura Sea, northern Australia as reported by Russell & Houston (1989) is erroneous, and confirmed (above) as a record of *Acanthosphex leurynnis* (Jordan & Seale).

Diagnosis. Dorsal fin III, XI, 7–8; anal fin I, 8; pectoral fin 14–15, pelvic fins I, 3; lateral-line tubes 10; gill-rakers 2–3+7; body depth 25.6–30.7% SL; interorbital ridges almost parallel.

Material examined. AMS I.24800-004, 21.9 mm, Northwest Shelf, 72 nautical miles NNW of Dampier, WA, 19°29'S 116°29'E, 110 m, trawl, S.J. Jenkins, 26 October 1983; QM I.34890, 28.7 mm, Gulf of Carpentaria, Qld, 11°11'S 139°26.4'E, 50 m, dredge, J. Johnson, 28 November 1991.

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