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# Suculentophichthus nasus, a new genus and new species of snake eel from the northern Gulf of Aqaba, Red Sea (Teleostei: Ophichthidae)

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#### **Abstract**

A new genus and species of snake eel, *Suculentophichthus nasus*, is described on the basis of a single specimen collected with a beach seine in 0.5–1 m depth at the northern beach of Eilat, Israel, Gulf of Aqaba, Red Sea. The new genus is characterized within the subfamily Ophichthinae by the tail which is much longer than the head and trunk; median fins low; origin of dorsal fin well in advance of pectoral-fin base; lower part of pectoral-fin base arising opposite upper one-fourth of gill opening, and occupying the upper one third of gill opening; gill openings sublateral, elongate, nearly vertical and crescentic, shorter than isthmus; eye moderately developed, its center above posterior third of upper jaw, its posterior margin well in advance of rictus; jaws moderately developed, lower jaw fits into upper jaw; snout conical, tapering evenly, its tip rounded; underside of snout with a median sulcus exposing the teeth in advance of the anterior nostril bases; anterior nostrils within short tubes; a large, succulent-leaf shaped flap behind anterior nostril; posterior nostril a hole above upper lip; teeth conical, erect, numerous, and small, anteriorly biserial and posteriorly uniserial on maxillary and biserial on mandible; a series of 6 vomerine teeth; and two preopercular pores. The new species is compared with other species of the subfamily and a key to the ophichthine eels of the Red Sea is presented.

**Key words:** reef fishes, taxonomy, systematics, Israel, morphology, identification keys. blue= correction in proof

#### Introduction

Snake eels of the family Ophichthidae are a diverse and highly successful group of eels that occur in a wide variety of habitats from muddy estuaries to coral reefs to the midwater realm. They are more characteristic of continental waters than of islands. The family is found from the shore to depths of 800 meters, but most occur in less than 200 meters. Their sharp snouts and tails and their muscular bodies are well adapted for burrowing, and many species spend most of their adult lives buried in the bottom sediment. They often come out at night to forage. Like all eels, ophichthids have a pelagic leptocephalus larva (Smith & McCosker 1999: 1662–1663).

Ophichthids are characterized by an elongate to very elongate, snake-like body, with the tip of the tail either hard and pointed (Ophichthinae) or bearing a caudal fin (Myrophinae); eye variable, from well developed to rudimentary; snout pointed; mouth moderate to large, terminal or inferior; teeth variable; anterior nostril tubular, near tip of snout; posterior nostril low on head, on lip, or opening inside mouth; gill opening midlateral to completely ventral, round or slit-like; branchial region reinforced by numerous branchiostegal rays, those of the two sides overlapping ventrally, often free from attachment to the hyoid arch; head and body scaleless; lateral line on the head and body complete, usually with well developed pores arranged in canals, right and left sides connected by a frontal and temporal canal on head, median pore usually present in frontal canal on top of head (Smith & McCosker 1999: 1662).

The classification of ophichthids was revised by McCosker (1977), who distinguished the subfamily Myrophinae, possessing conspicuous caudal-fin rays, with 8 valid genera, and the subfamily Ophichthinae, possessing a hard tail tip without any caudal-fin rays, with 41 valid genera. The new genus described here possessess a hard tip of the tail without a caudal fin, therefore belonging to the subfamily Ophichthinae. The following genera of ophichthine eels have been described since McCosker's (1977) revision: *Hyphalophis* McCosker & Böhlke 1982 (McCosker & Böhlke 1982: 116, type species *Hyphalophis devius* McCosker & Böhlke 1982 from the western Atlantic), *Kertomichthys* McCosker & Böhlke 1982 (McCosker & Böhlke 1982: 119, type species *Mystriophis blastorhinos* Kanazawa 1963 from the western Atlantic), *Lethogoleos* McCosker & Böhlke 1982 (McCosker & Böhlke 1982: 114, type species *Lethogoleos andersoni* McCosker & Böhlke 1982 from the western Atlantic), *Xestochilus* McCosker 1998 (McCosker 1998: 208; type species *Callechelys nebulosus* Smith 1962 from the Red Sea and the Indo-West Pacific from East Africa to the Marquesas Islands), *Rhinophichthus* McCosker 1999 (McCosker 1999: 581; type species *Rhinophichthus penicillatus* McCosker 1999 from New Caledonia, southwestern Pacific), *Luthulenchelys* McCosker 2007 (McCosker 2007: 4; type species *Luthulenchelys heemstraorum* McCosker 2007 from the southwestern Indian Ocean). The present number of valid ophichthid genera therefore is increased to 59, with 12 genera in the Myrophinae and 47 genera in the Ophichthinae.

Golani & Bogorodsky (2010: 12–13) listed a total of 20 valid ophichthid eel species including 13 ophichthine species from the Red Sea. In addition, the new myrophine species *Mixomyrophis longidorsalis* was recently described by Hibino, Kimura & Golani (2014: 185) from the Gulf of Aqaba, Red Sea, at a depth of 200 m.

A single specimen of an undescribed species of ophichthine snake eel, collected from the Gulf of Aqaba, Red Sea, appearing most similar to *Phyllophichthus*, but considered sufficiently distinct, is described herein as a separate new genus. An individual presumed to be the same species was photographed in the same habitat, but was not collected. The monotypic genus *Phyllophichthus* was first described by Gosline (1951: 316), with *Phyllophichthus xenodontus* Gosline 1951 as the type species. *P. xenodontus* occurs in the Red Sea and the Indo-West Pacific from East Africa east to Indonesia, Australia, Ryukyu Islands, the Philippines, to the Hawaiian Islands, Marquesas Islands, and Society Islands.

#### **Materials and Methods**

The holotype of the new species is deposited in the Fish Collection of the Hebrew University, Jerusalem (HUJ). Comparative materials are listed below. Abbreviations of museum collections (see below) follow Fricke & Eschmeyer (2015a).

Methods follow McCosker (1977) and fin-ray counts follow Fricke (1983). The starting point for length measurements is the tip of the snout. Total length (TL) is measured from the tip of the snout to the tip of the tail,

as there is no caudal fin. The head-pore terminology follows McCosker *et al.* (1989: 257), in which supraorbital pores include the ethmoidal pore + pores in supraorbital canal, i.e. 1 + 4, and the infraorbital pores include pores along the upper jaw + those in the vertical canal behind the eye ("postorbital pores"), i.e. 4 + 2, as the last pore included along the upper jaw is frequently part of the postorbital series. The vertebral counts were taken from an x-ray; the mean vertebral formula (MVF) is expressed as the average of predorsal, preanal, and total vertebrae (Böhlke 1982). The identification key is based on Smith & McCosker (1999), but updated and adjusted for the Red Sea and distinguished to the species level.

Classification and nomenclature follow Eschmeyer (2015). Reference citations follow Fricke (2015), journal citations follow Fricke & Eschmeyer (2015b).

### Suculentophichthus, n. gen.

**Type species.** Suculentophichthus nasus, new species (by monotypy)

Gender. Masculine.

**Diagnosis.** An elongate ophichthid, subfamily Ophichthinae, tribe Ophichthini (*sensu* McCosker 1977), with tail much longer than head and trunk; median fins low; origin of dorsal fin well in advance of pectoral-fin base; lower part of pectoral-fin base arising opposite upper one-fourth of gill opening and occupying upper one third of gill opening (Fig. 3); gill openings sublateral, elongate, nearly vertical and crescentic, shorter than isthmus; eye moderately developed, its center above posterior third of upper jaw, its posterior margin well in advance of rictus; jaws moderately developed, lower jaw fitting into upper jaw; snout conical, tapering evenly, its tip rounded; underside of snout with a median sulcus exposing teeth in advance of anterior nostril bases; anterior nostrils within short tubes; a large, succulent-leaf shaped flap behind anterior nostril; posterior nostrils a hole above upper lip; teeth conical, erect, numerous and small, anteriorly biserial and posteriorly uniserial on maxillary and biserial on mandible, a series of 6 vomerine teeth; two preopercular pores. Other characters those of the single species.

**Etymology.** The name of the new genus is derived from the Latin *suculentus*, meaning succulent. The name refers to the succulent-leaf shaped snout appendages of the new genus, which are characteristic; *ophichthus* refers to its snake eel identity. The name also alludes to its similarity to *Phyllophichthus*.

Comparisons. In McCosker's (1977) and Smith & McCosker's (1999) keys to ophichthids, the new genus keys out close to *Phyllophichthus*. Characters shared with *Phyllophichthus* are a hard tail tip without a caudal fin; a nonconstricted gill opening; an elongate neurocranium; the pectoral fin well developed, longer than the eye diameter; the median fins low; the fifth ceratobranchial absent; only two preopercular pores; and the anterior nostrils with conspicuous appendages. Based on these characters, it is classified as a member of the tribe Ophichthini in the subfamily Ophichthiae (following McCosker 1977). It is, however, distinguished from *Phyllophichthus* by having a series of 6 vomerine teeth (vs. no teeth on the vomer); a much more simple, succulent-leaf shaped appendage behind anterior nostril (vs. elaborate and branching leaf-like); the caudal vertebrae much more numerous than the precaudal vertebrae (vs. caudal vertebrae only slightly more numerous than precaudal vertebrae); and the dorsal fin beginning well in advance of the pectoral-fin base (vs. beginning above pectoral-fin base).

In addition, *Suculentophichthus* differs from *Rhinophichthus* McCosker 1999 by the anterior nostrils which are barely tubular, but have a large, succulent-leaf shaped appendage (vs. tubular, without the appendage); the dorsal fin beginning well in advance of the pectoral-fin base (vs. beginning well behind pectoral-fin base); the vomer with a series of 6 teeth (vs. 15 teeth); the dentition of the lower jaw biserial (vs. uniserial); and the elongate pectoral fins (vs. small and paddle-shaped, not elongate); *Suculentophichthus* is distinguished from *Luthulenchelys* McCosker 2007 by the anterior nostrils which are barely tubular, but have a large, succulent-leaf shaped appendage (vs. tubular, directed forward in a 45° angle, without the appendage); the dorsal fin beginning well in advance of the pectoral-fin base (vs. beginning well behind the pectoral-fin base); a series of 6 vomerine teeth (vs. a single vomerine tooth); and the posterior nostril a slit above the upper lip (vs. a hole in upper lip covered by a flap).



**Figure 1.** *Suculentophichthus nasus* n. gen. n. sp., holotype, HUJ 20382, 374.5 mm TL, Red Sea, Gulf of Aqaba, Israel, Eilat, North beach: Coloration immediately after collection (D. Golani).

## Suculentophichthus nasus, new species

Red Sea Flappy Snake Eel

Figures 1–4, Table 1.

**Holotype.** HUJ 20382, 374.5 mm TL, Red Sea, Israel, Eilat, North beach, 29°32'40" N 34°58'21" E, 0.5–1 m depth, Daniel Golani, Feb. 14, 2013.

**Diagnosis.** An elongate species of ophichthine with: tail length 66.4%, head length 6.6%, and body depth at gill opening 1.7% of total length; dorsal-fin origin well in advance of pectoral-fin base; pectoral fin elongate; posterior nostril a hole above upper lip; a broad, succulent-leaf shaped flap near anterior nostril; pores small but conspicuous, SO 1 + 4, IO 4 + 2, POM 5 + 2, ST 3; teeth small and conical, biserial on anterior part of upper jaw, biserial on lower jaw, a series of 6 vomerine teeth; coloration light brown, with numerous dark brown lines on head and pigment spots on upper half of body, dorsal and anal fins whitish; vertebral formula 5/64/193.

**Description.** P1 ii, 10 (total 12). Head pores: SO 1 + 4, IO 4 + 2, POM 5 + 2 (Fig. 2). Vertebral formula  $\frac{5}{64}$ /193. Proportions are given in Table I.

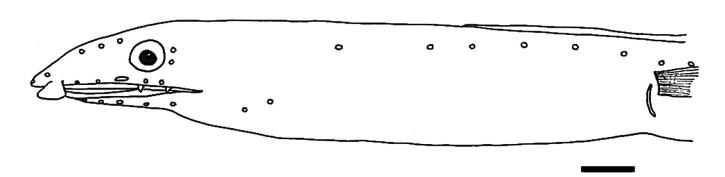
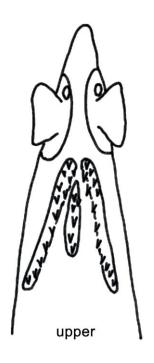


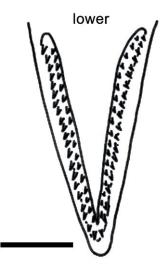
Figure 2. Suculentophichthus nasus, lateral view of head showing head pores. Scale bar indicates 2 mm.

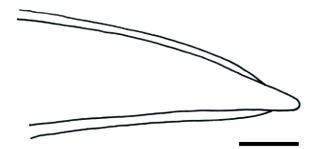


Body very elongate, trunk subcircular in cross section, tail laterally compressed. Branchial basket moderately expanded, ~21 pairs of overlapping branchiostegal rays visible by radiograph. Head 4.1 in trunk. Head and trunk 3.0 in TL. Snout rounded, moderately acute when viewed from above; a groove bisecting underside of snout nearly to tip of upper jaw. Lower jaw fits into upper jaw when mouth closed, its tip not reaching base of anterior nostril tubes. Upper jaw not elongated, rictus well behind a vertical line at posterior margin of eye. Eye moderate, 3.3 in upper jaw and 10.7 in head. Anterior nostrils barely tubular; a large, succulent-leaf shaped flap behind anterior nostril. Posterior nostrils an elongate opening well above upper lip and below anterior margin of eye. No fringes along upper lip, but a barbel present below the eye. Dorsal-fin origin well in advance of pectoral-fin base. Median fins low but obvious, ending a little less than eye diameter before bluntly pointed and laterally compressed tail tip (Fig. 3). Pectoral fins elongate.

Head pores small but apparent, formula SO 1 + 4, IO 4 + 2, POM 5 + 2, ST 3 (Fig. 2). Single median interorbital and temporal pores. Lateral line pores apparent only in anterior trunk region; five before gill opening in a slightly arching sequence (Fig. 2), the remainder difficult to discern due to condition of specimen.

Teeth (Fig. 3) conical, erect, numerous and small, anteriorly biserial and posteriorly uniserial on maxillary and biserial on mandible, a series of 6 vomerine teeth. Maxillary with inner row of 9 larger teeth, flanked anteriorly by 4 smaller teeth in outer row. Lower-jaw teeth biserial, 21 descending in size to become very small posteriorly.





**Figure 3.** Suculentophichthus nasus **left:** upper and lower jaw; **right:** tip of tail (scale bars indicate 2 mm).

TABLE 1 Suculentophichthus nasus n. gen. n. sp.

HUJ 20382, holotype, 374.5 mm TL, Red Sea, Gulf of Aqaba, Israel, Eilat, North beach

	measurement in mm	TL/measure	Percent TL
Total length	374.5		
Predorsal length	16.5	22.7	4.4
Preanal length	128.0	2.9	34.2
Prepectoral fin length	24.8	15.1	6.6
Preanus length	125.7	3.0	33.6
Head length	24.7	15.2	6.6
Body depth at gill openings	6.4	58.5	1.7
Body width at gill openings	5.8	64.6	1.6
Orbit diameter	2.3	162.8	0.6
Preorbital length	4.0	93.6	1.1
Bony interorbital	2.4	156.0	0.6
Tip of snout to rictus of jaw	7.8	48.0	2.1
Tip of chin to rictus of jaw	6.9	54.3	1.8
Upper-jaw length	7.7	48.6	2.1
Width of gill opening	1.7	220.3	0.4
Trunk length	101.0	3.7	27.0
Tail length	248.8	1.5	66.4
Isthmus width	3.0	124.8	0.8
Pectoral-fin length	5.2	117.0	1.4
Length of pectoral-fin base	1.2	312.1	0.3

Color immediately after collection (Fig. 1). Head and body light brown, with numerous dark brown lines on head and pigment spots on upper half of body; eye dark gray. Back near dorsal fin dark brown. Dorsal and anal fins whitish. In life (Fig. 4), the flaps near the anterior nostril are yellow, and the anterior and posterior parts of the eye also yellow, the remainder of the iris silvery white; two dark brown spots behind rictus of jaws, another behind the eye. Peritoneum white.

**Colour in alcohol.** Similar to fresh colouration, except that the colours fade to more or less uniform yellowish brown.

**Distribution.** The species is only known from the type locality, Eilat, Israel, Gulf of Aqaba, Red Sea. The holotype was seined on shallow sand bottom, at a depth of 0.5–1 m. Another individual, presumably of the same species, was photographed near Eilat, also on sand bottom, at an unknown depth (Fig. 2).

**Etymology.** The name of the new species, *nasus* (Latin), means nose. The name refers to the nose-like snout of the new species. In combination with the generic name, it is treated as a noun in apposition, and does not change its ending.

Comparisons. Suculentophichthus nasus n. gen. n. sp. differs from other ophichthine eels by the characters of the genus. Compared to other Red Sea ophichthines, it differs from all species except *Phyllophichthus xenodontus* by the barely tubular anterior nostrils and having a large, succulent-leaf shaped appendage behind the nostril; it is further distinguished from *Brachysomophis cirrocheilos* (Bleeker 1857) by the dorsal fin beginning well in advance of the gill opening (vs. beginning behind the gill opening), the upper lip without fringes (vs. fringed), and the eye relatively large, in lateral position (vs. small, positioned dorsally on head); from *Callechelys catostoma* (Schneider & Forster in Bloch & Schneider 1801) and C. *marmorata* (Bleeker 1853) by the presence of pectoral fins (vs. absent in species of *Callechelys*) and the nearly vertical, crescentic gill opening which is sublateral in position (vs. gill opening oblique, ventral in position in species of *Callechelys*); from *Cirrhimuraena playfairii* (Günther 1870) by the upper lip without fringes (vs. fringed), and the pectoral fin which begins well above the gill opening, with the pectoral-fin base shorter than length of gill opening (vs. pectoral-fin base not beginning above gill opening, pectoral-fin base length equals length of gill opening); from *Myrichthys colubrinus* (Boddaert 1781)



**Figure 4.** Presumed specimen of *Suculentophichthus nasus* n. gen. n. sp., Red Sea, Gulf of Aqaba, Israel, Eilat, North beach. Underwater photograph. Photographer unknown, photograph in HUJ collection.

and M. maculosus (Cuvier 1816) by the head and body lacking characteristic stripes or blotches (vs. either stripes or blotches present in species of *Myrichthys*), by having conical teeth, uniserial on vomer, biserial anteriorly (molariform teeth, multiserial on vomer in species of *Myrichthys*); from *Ophichthus echeloides* (D'Ancona 1928) and O. erabo (Jordan & Snyder 1901) by the dorsal fin beginning well before gill opening (vs. beginning over or well behind gill opening in species of *Ophichthus*), and the presence of two preopercular pores (3 pores in species of *Ophichthus*); from *Phaenomonas cooperae* Palmer 1970 by the dorsal fin beginning well before gill opening (vs. beginning just behind the occiput), the dorsal fin ending shortly before tip of tail (vs. ending less than two head lengths behind gill opening), and the presence of a pectoral and anal fin (vs. both lacking); from Pisodonophis cancrivorus (Richardson 1848) by the conical teeth in one or two bands on jaws and vomer (vs. molariform in multiserial bands) and the dorsal fin beginning well before gill opening (vs. beginning above gill opening); from *Xestochilus nebulosus* (Smith 1962) by the pectoral fins present and well developed (vs. absent), the teeth biserial in lower jaw (vs. uniserial), and 193 total vertebrae (vs. 157–165); and from Yirrkala tenuis (Günther 1870) by the barely tubular anterior nostril (vs. tubular), the pectoral fins present (vs. absent), and the median fins low (vs. reduced). The new species differs from *Phyllophichthus xenodontus* Gosline 1951 by having a series of 6 vomerine teeth (vs. no teeth on the vomer), the SOC present, with 1 + 4 pores (vs. absent), the caudal vertebrae much more numerous than the precaudal vertebrae (vs. caudal vertebrae only slightly more numerous than precaudal vertebrae), and the dorsal fin beginning well in advance of the pectoral-fin base (vs. beginning above pectoral-fin base).

**Discussion.** The holotype of the new genus and species *Suculentophichthus nasus* was collected on a shallow sand bottom of 0.5–1 m depth. An individual presumably of the same species (Fig. 2) was photographed probably a little deeper, but in the same type of habitat. *S. nasus* may be endemic to the Gulf of Aqaba; suitable habitats are found on the northern beach of Eilat and Aqaba, but also in the fringing reef lagoons along the shores of the Gulf.

This species seems to be very rare, or at least rarely encountered, since the second author has regularly collected in this habitat with beach seines for decades. However, as the species is slender it may pass through the mesh of the net, and, due to its cryptic burying habits, would be rarely encountered by divers or snorkelers. The collection of inshore fishes is now difficult or impossible in most parts of the Gulf of Aqaba; therefore it seems unlikely additional specimens will be obtained in the near future.

# Key to the Red Sea Species of subfamily Ophichthinae

la.	Pectoral fins absent		2
1b.	Pectoral fins present, sometimes reduced		6
2a.	Anal fin absent	operae (Palme	er
2b.	Anal fin present, though sometimes low and inconspicuous		3
3a.	Dorsal fin begins near level of gill opening	(Günther 1870	))
3b.	Dorsal fin begins on head, closer to eye than to gill opening		4
4a.	Underside of snout barely grooved; one pair of stout teeth on vomer; vertebrae 155–165  Xestochilus nebulos		
4b.	Underside of snout grooved; vomer with 4–5 pairs of teeth, vertebrae 174–205		5

Head length 14–16 in TL; tail 2.6–2.8 in TL; vertebrae 174–183; head yellowish, body white to pale yellowish with sense black spots and blotches
Anterior nostrils with conspicuous, leaf-like appendages
Anterior nostrils without conspicuous, leaf-like appendages
Vomer with a series of teeth; SOC present, with 1 + 4 pores; caudal vertebrae much more numerous than precaudal vertebrae; dorsal fin beginning on head, well in advance of gill opening
Vomer without teeth; SOC absent; caudal vertebrae only slightly more numerous than precaudal vertebrae; dorsal fin beginning above pectoral-fin base
Upper lip fringed with cirri
Upper lip not fringed with cirri, although 1–2 barbels may be present
Dorsal fin begins in front of gill opening; tail much longer than head and trunk; canine teeth absent
Dorsal fin begins behind gill opening; tail about equal to head and trunk; canine teeth in jaws
Dorsal fin begins well in front of gill opening
Dorsal fin begins over or behind gill opening
Head length 17–20 in TL; body depth 48–68 in TL; vertebrae 190–202; pectoral-fin rays 9; head and body white, with dark bars (sometimes with additional dark spots between the bars)
Head length 12–15 in TL; body depth 33–46 in TL; vertebrae 185–189; pectoral-fin rays 12–14; head and body yellowish to cream, with a pattern of large oval black spots <i>Myrichthys maculosus</i> (Cuvier 1816)
Teeth on jaws and vomer molariform or granular; pectoral-fin base broad, spanning nearly entire rear border of gill opening
Teeth not molariform or granular; pectoral-fin base restricted, not spanning nearly entire rear border of gill opening
Wentshree 196; colouration ton polar ventrally, without anotal financia
Vertebrae 186; colouration tan, paler ventrally, without spots, fins pale

#### **Comparative material:**

Brachysomophis cirrocheilos (Bleeker 1857): USNM 379083 (4), Philippines, Mindoro. Callechelys catostoma (Schneider [ex Forster] in Bloch & Schneider 1801): SMNS 1780 (1), Red Sea, Egypt, Al-Qusayr. Callechelys marmorata (Bleeker 1854): SMNS 3579 (2), Red Sea, Egypt, Al-Qusayr. Cirrhimuraena playfairii (Günther 1870): SMNS 1781 (2, syntypes of *Ophichthys arenicola* Klunzinger 1871), Red Sea, Egypt, Al-Qusayr. *Ophichthys* semicinctus (Lay & Bennett 1839): SMNS 1514 (1), Indonesia, Maluku, Aru Islands; SMNS 2790 (1), South Seas; SMNS 3962 (1), Western Samoa, Upolu; SMNS 17728 (1), Cook Islands, Rarotonga; SMNS 22863 (1), New Caledonia, Grande Terre, Île des Pins. Mixomyrophis longidorsalis Hibino, Kimura & Golani 2014: HUJ 11561 (holotype), Red Sea, Israel, Eilat. Myrichthys breviceps (Richardson 1848): SMNS 1068 (1), Suriname. Myrichthys colubrinus (Valenciennes in Cuvier & Valenciennes 1839): SMNS 1547 (1), Indonesia, Maluku, Buru; SMNS 8675 (1), Philippines, Mindanao, Davao; SMNS 10810 (1), Indonesia, Sumatra; SMNS 18253 (1), New Caledonia, Grande Terre, Yaté; SMNS 18293 (2), New Caledonia, Grande Terre, Yaté; SMNS 25262 (1), São Tomé and Principe, São Tomé; SMNS 26199 (1), Fiji, Viti Levu; SMNS 26480 (1), New Caledonia, Grande Terre, Goro. Myrichthys maculosus (Cuvier 1816): HUJ 4861 (1), Red Sea, Egypt, Ras Muhammad; HUJ 14658 (1), Red Sea, Egypt, Ras Muhammad; HUJ 15677 (1), Red Sea, Gulf of Agaba, Egypt, Nabek; HUJ 15688 (1), Red Sea, Gulf of Agaba, Egypt, Nabek; SMNS 3468 (3), Red Sea, Egypt, Al-Qusayr; SMNS 20828 (1), La Réunion; SMNS 20938 (2), La Réunion. Myrichthys pardalis (Boddaert 1781): SMNS 1453 (1), Indonesia, Maluku, Ambon; SMNS 3934 (1), Western Samoa, Upolu. Ophichthus echeloides (D'Ancona 1928): HUJ 14133 (1), Red Sea, Israel, Eilat. Ophichthus rufus (Rafinesque-Schmaltz 1810): SMNS 24207 (1), Mediterranean Sea, Italy, Livorno. Ophichthus singapurensis Bleeker 1864–1865: SMNS 3800 (1), Singapore. Ophisurus serpens (Linnaeus 1758): HUJ 19554 (1), Mediterranean Sea, Israel, Ashdod; SMNS 459 (1), Mediterranean Sea, Italy, Sicily. Phaenomonas cooperae Palmer 1970: BMNH 1969.8.26.90 (holotype), Kiribati, Gilbert Islands. Phyllophichthus xenodontus Gosline 1951: SMNS 26491 (4), New Caledonia, Grande Terre, Goro. Pisodonophis cancrivorus (Richardson 1848): SMNS 4261 (1), Indonesia, Java; SMNS 12244 (5), Thailand, Phetchaburi. Pisodonophis semicinctus (Richardson 1848): SMNS 1495 (1), Nigeria; SMNS 3394 (1), West Africa. Xestochilus nebulosus (Smith 1962): USNM 273656 (1), Red Sea, Israel, Eilat. Yirrkala tenuis (Günther 1870): SMNS 13665 (1), Red Sea, Egypt, Endeavour Harbour; SMNS 13685 (1), Red Sea, Egypt, southern Sinai, Beacon Rock; SMNS 22548 (1), Red Sea, Egypt, Nuweiba.

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#### References

- Böhlke, E.B. (1982) Vertebral formulae for type specimens of eels (Pisces: Anguilliformes). *Proceedings of the Academy of Natural Sciences of Philadelphia*, 134, 31–49.
- Eschmeyer, W.N. (Ed.) (2015) Catalog of Fishes, electronic version (5 May 2015). San Francisco (California Academy of Sciences). Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/fish-catmain.asp (last accessed 10 July 2015).
- Fricke, R. (1983) A method of counting caudal fin rays of actinopterygian fishes. *Braunschweiger Naturkundliche Schriften*, 1, 729–733.
- Fricke, R. (Ed.) (2015) References in the Catalog of Fishes, electronic version (5 May 2015). San Francisco (California Academy of Sciences). Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp (last accessed 12 May 2015).

- Fricke, R. & Eschmeyer, W.N. (2015a) A guide to fish collections in the Catalog of Fishes, electronic version (5 May 2015). San Francisco (California Academy of Sciences). Available at <a href="http://research.calacademy.org/research/Ichthyology/Catalog/collections.asp">http://research.calacademy.org/research/Ichthyology/Catalog/collections.asp</a> (last accessed 12 May 2015).
- Fricke, R. & Eschmeyer, W.N. (2015b) Journals in the Catalog of Fishes, electronic version (5 May 2015). San Francisco (California Academy of Sciences). Available at http://research.calacademy.org/research/ Ichthyology/Catalog/journals.asp (last accessed 5 May 2015).
- Golani, D. & Bogorodsky, S.V. (2010) The fishes of the Red Sea reappraisal and updated checklist. *Zootaxa*, 2463, 1–135.
- Gosline, W.A. (1951) The osteology and classification of the ophichthid eels of the Hawaiian Islands. *Pacific Science*, 5 (4), 298–320.
- Hibino, Y., Kimura, S. & Golani, D. (2014) A new ophichthid species from the Red Sea of the genus *Mixomyrophis*, formerly known as Atlantic genus. *Ichthyological Research*, 62 (2), 184–188. [First published online on 18 July 2014, pp. 1–5; printed version appeared on 24 Jan. 2015]
- McCosker, J.E. (1977) The osteology, classification, and relationships of the eel family Ophichthidae. *Proceedings of the California Academy of Sciences (Series 4)*, 41 (1), 1–123.
- McCosker, J.E. (1998) A revision of the snake-eel genus *Callechelys* (Anguilliformes: Ophichthidae) with the description of two new Indo-Pacific species and a new callechelyin genus. *Proceedings of the California Academy of Sciences*, 50 (7), 185–214, pl. 1.
- McCosker, J.E. (1999) Pisces Anguilliformes: deepwater snake eels (Ophichthidae) from the New Caledonia region, southwest Pacific Ocean. *Mémoires du Muséum National d'Histoire Naturelle, Paris (N. S.) (Série A) Zoologie*, 180, 571–588.
- McCosker, J.E. (2007) *Luthulenchelys heemstraorum*, a new genus and species of snake eel (Anguilliformes: Ophichthidae) from KwaZulu-Natal, with comments on *Ophichthus rutidoderma* (Bleeker, 1853) and its synonyms. *Smithiana, Publications in Aquatic Biodiversity, Bulletin*, 7, 3–7.
- McCosker, J.E., Böhlke, E.B. & Böhlke, J.E. (1989) Family Ophichthidae. *In*: Böhlke, E.B. (Ed.). *Volume One: Orders Anguilliformes and Saccopharyngiformes. Fishes of the western North Atlantic.* Memoirs of the Sears Foundation of Marine Research, Yale University, New Haven, CT, pp. 254–412.
- McCosker, J.E. & Böhlke, J.E. (1982) Three new genera and two new species of deepwater western Atlantic snake-eels (Pisces: Ophichthidae). *Proceedings of the Academy of Natural Sciences of Philadelphia*, 134, 113–121.
- Smith, D.G. & McCosker, J.E. (1999) Family Ophichthidae. Snake eels, worm eels. *In*: Carpenter, K.E. & Niem, V.H. (Eds.). *Species identification guide for fisheries purposes. The living marine resources of the western central Pacific. Batoid fishes, chimeras and bony fishes, Part 1 (Elopidae to Linophrynidae). Volume 3.* FAO, Rome, pp. 1662–1669.