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.
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).


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.


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 succulentus, 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 non-constricted 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 Ophichthinae (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).
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 5/64/193. Proportions are given in Table I.
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.
**TABLE 1**

*Suculentophichthus nasus* n. gen. n. sp.

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

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value (mm)</th>
<th>TL/Measure</th>
<th>Percent TL</th>
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</thead>
<tbody>
<tr>
<td>Total length</td>
<td>374.5</td>
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<td></td>
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<tr>
<td>Predorsal length</td>
<td>16.5</td>
<td>22.7</td>
<td>4.4</td>
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<tr>
<td>Preanal length</td>
<td>128.0</td>
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<td>34.2</td>
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<td>Prepectoral fin length</td>
<td>24.8</td>
<td>15.1</td>
<td>6.6</td>
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<tr>
<td>Preanus length</td>
<td>125.7</td>
<td>3.0</td>
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<tr>
<td>Head length</td>
<td>24.7</td>
<td>15.2</td>
<td>6.6</td>
</tr>
<tr>
<td>Body depth at gill openings</td>
<td>6.4</td>
<td>58.5</td>
<td>1.7</td>
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<tr>
<td>Body width at gill openings</td>
<td>5.8</td>
<td>64.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Orbit diameter</td>
<td>2.3</td>
<td>162.8</td>
<td>0.6</td>
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<tr>
<td>Preorbital length</td>
<td>4.0</td>
<td>93.6</td>
<td>1.1</td>
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<tr>
<td>Bony interorbital</td>
<td>2.4</td>
<td>156.0</td>
<td>0.6</td>
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<tr>
<td>Tip of snout to rictus of jaw</td>
<td>7.8</td>
<td>48.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Tip of chin to rictus of jaw</td>
<td>6.9</td>
<td>54.3</td>
<td>1.8</td>
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<tr>
<td>Upper-jaw length</td>
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<tr>
<td>Width of gill opening</td>
<td>1.7</td>
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<tr>
<td>Trunk length</td>
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<td>Tail length</td>
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<td>Isthmus width</td>
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<td>Pectoral-fin length</td>
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<tr>
<td>Length of pectoral-fin base</td>
<td>1.2</td>
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<td>0.3</td>
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</table>
**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)

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**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 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 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 teeth, multiserial on vomer in species of *Myrichthys*); and 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**

1a. Pectoral fins absent ........................................................................................................................................ 2
1b. Pectoral fins present, sometimes reduced ................................................................................................... 6

2a. Anal fin absent ........................................................................................................................................ Phaenomonas cooperae (Palmer 1970)
2b. Anal fin present, though sometimes low and inconspicuous .................................................................... 3

3a. Dorsal fin begins near level of gill opening................................................ Yirrkala tenuis (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 nebulosus (Smith 1962)
4b. Underside of snout grooved; vomer with 4–5 pairs of teeth, vertebrae 174–205 ................................. 5
5a. Head length 18–20 in TL; tail 3.2–3.6 in TL; vertebrae 195–205; whitish to cream with broad midlateral dark stripe, dorsal-fin margin black ................................................................. *Callechelys catostoma* (Schneider [ex Forster] in Bloch & Schneider 1801)

5b. 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 ................... *Callechelys marmorata* (Bleeker 1854)

6a. Anterior nostrils with conspicuous, leaf-like appendages ................................................................. 7

6b. Anterior nostrils without conspicuous, leaf-like appendages ............................................................. 8

7a. 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 .............................. *Suculentophichthus nasus* n. gen. n. sp.

7b. Vomer without teeth; **SOC absent**; caudal vertebrae only slightly more numerous than precaudal vertebrae; dorsal fin beginning above pectoral-fin base .................... *Phyllophichthus xenodontus* (Gosline 1951)

8a. Upper lip fringed with cirri ......................................................................................................................... 9

8b. Upper lip not fringed with cirri, although 1–2 barbels may be present .................................................... 10

9a. Dorsal fin begins in front of gill opening; tail much longer than head and trunk; canine teeth absent ........................................................... *Cirrhimuraena playfairii* (Günther 1870)

9b. Dorsal fin begins behind gill opening; tail about equal to head and trunk; canine teeth in jaws ................ *Brachysomophis cirrocheilos* (Bleeker 1857)

10a. Dorsal fin begins well in front of gill opening .......................................................................................... 11

10b. Dorsal fin begins over or behind gill opening ........................................................................................ 12

11a. 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) ............................................................... *Myrichthys colubrinus* (Boddaert 1781)

11b. 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 .... *Myrichthys maculosus* (Cuvier 1816)

12a. Teeth on jaws and vomer molariform or granular; pectoral-fin base broad, spanning nearly entire rear border of gill opening ............................................................... *Pisodonophis cancrivorus* (Richardson 1848)

12b. Teeth not molariform or granular; pectoral-fin base restricted, not spanning nearly entire rear border of gill opening ........................................................................................................ 13

13a. Vertebrae 186; colouration tan, paler ventrally, without spots, fins pale ...................................................... *Ophichthus echeloides* (D’Ancona 1928)

13b. Vertebrae 143–155; colouration yellow, boldly marked with brown subcircular spots, smaller and more numerous on head ............................................... *Ophichthus erabo* (Jordan & Snyder 1901)
Comparative material:


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References


