

## Class ACTINOPTERYGII

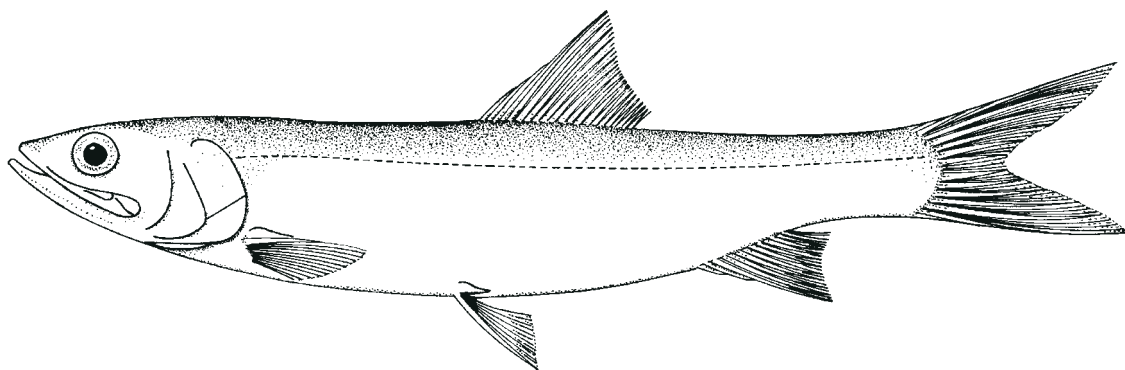
## Order ELOPIFORMES

## ELOPIDAE

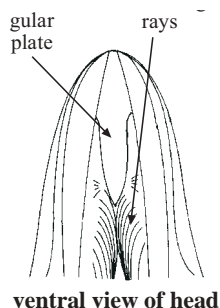
## Tenpounders (ladyfishes)

by D.G. Smith

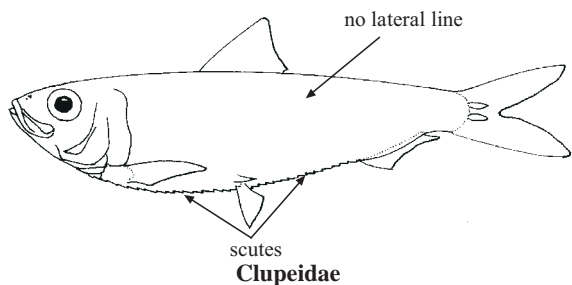
A single species occurring in the area.

*Elops hawaiiensis* Regan, 1909**Frequent synonyms / misidentifications:** *Elops australis* Regan, 1909 / *Elops saurus* Linnaeus, 1766.**FAO names:** En - Hawaiian ladyfish.

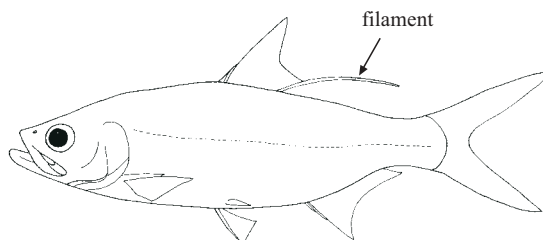
**Diagnostic characters:** Body elongate, fusiform, moderately compressed. Eye large. Mouth large, gape ending behind posterior margin of eye; mouth terminal, jaws approximately equal; a **gular plate present between arms of lower jaw**. Teeth small and granular. **Branchiostegal rays numerous, approximately 20 to 25**. **All fins without spines**; dorsal fin begins slightly behind midbody; anal fin short, with approximately 14 to 17 rays, begins well behind base of dorsal fin; caudal fin deeply forked; pectoral fins low on side of body, near ventral outline; pelvic fins abdominal, below origin of dorsal fin. **Scales very small, approximately 100 in lateral line**. **Colour:** blue or greenish grey above, silvery on sides; fins sometimes with a faint yellow tinge.

**Similar families occurring in the area**

Clupeidae: lateral line absent; gular plate absent; most species have scutes along midline of belly.

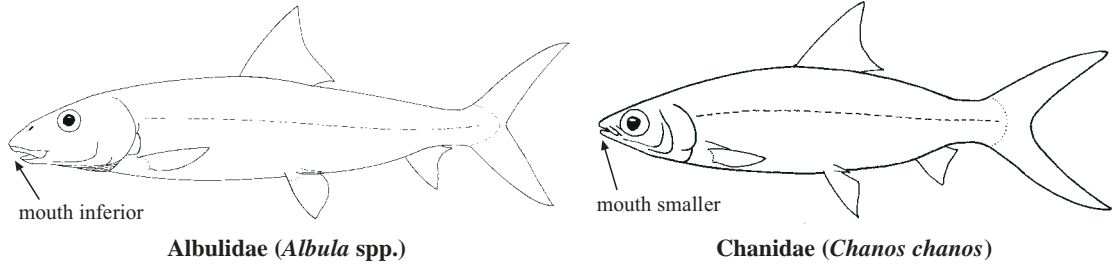
Megalopidae (*Megalops cyprinoides*): scales much larger, about 30 to 40 in lateral line; last ray of dorsal fin elongate and filamentous.

Clupeidae

Megalopidae (*Megalops cyprinoides*)

Albulidae (*Albula* spp.): mouth inferior.

Chanidae (*Chanos chanos*): mouth smaller, gape not extending behind eye; gular plate absent; branchiostegal rays fewer, approximately 4 or 5.

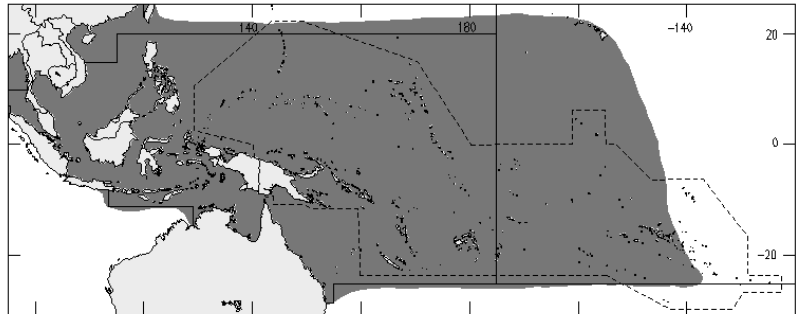


**Size:** Maximum standard length slightly less than 1 m, commonly to 50 cm; seldom reaches a weight of 5 kg (= "ten pounds"), despite the family's common name.

**Habitat, biology, and fisheries:** A coastal fish, commonly entering lagoons, bays, and estuaries. An active swimmer, commonly travelling in schools in open water; feeds on various fishes and crustaceans. Little detailed knowledge exists of its biology. Like *Megalops*, *Albula*, and the eels, it has a leptocephalus larva. Spawning takes place offshore and young larvae are found in the open sea. As the larvae develop, they move toward shore, and juveniles are commonly found in salt marshes, canals, and tidal streams. Caught throughout the area, mainly with seines, gill nets, and handlines; separate statistics not available; marketed fresh or frozen; in some places ground up as fish meal. A good sport fish on light tackle, striking a variety of artificial lures as well as live shrimp or baitfish.

**Distribution:** Found throughout the area.

**Remarks:** Currently treated as a single species, but this status should be considered provisional. Further studies may reveal a complex of closely related species, as in the case of *Albula*.



## References

- Regan, C.T. 1909. A revision of the fishes of the genus *Elops*. *Ann. Mag. nat. Hist.*, (8)3:37-40.  
 Whitehead, P.J.P. 1962. The species of *Elops* (Pisces: Elopidae). *Ann. Mag. nat. Hist.*, (13)5:323-329.

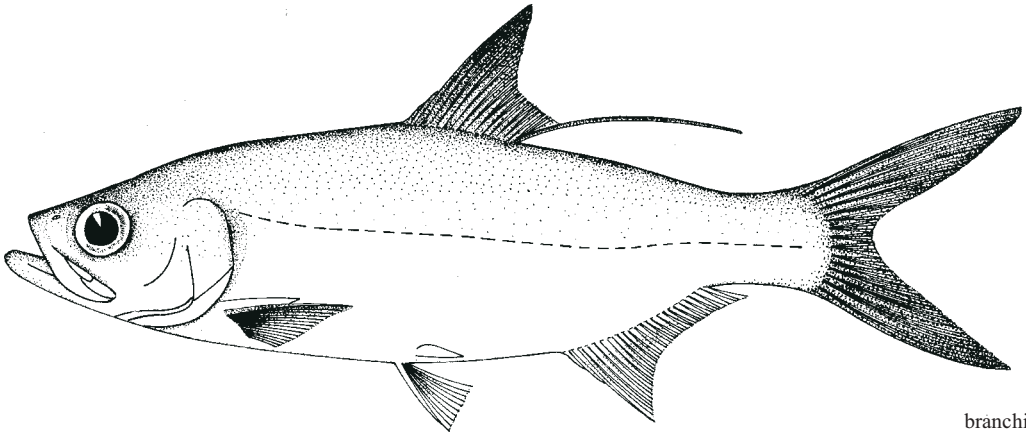
## MEGALOPIDAE

## Tarpons

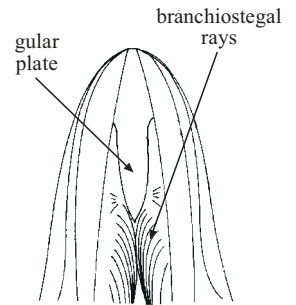
by D.G. Smith

**A single species occurring in the area.***Megalops cyprinoides* (Brussonet, 1782)

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**Frequent synonyms / misidentifications:** None / None.**FAO names:** En - Indo-Pacific tarpon; Fr - Tarpon indo-pacifique; Sp - Tarpón indo-pacífico.

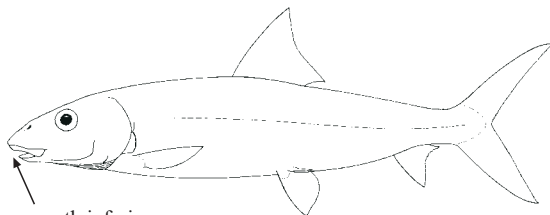
**Diagnostic characters:** Body moderately deep, compressed, deepest in middle, tapering toward both ends. Eye large. Mouth large, gape ending at level of posterior margin of eye; **lower jaw projects beyond snout; a gular plate present between arms of lower jaw.** Teeth small, granular. Branchiostegal rays numerous, 26 or 27. Gill rakers long and slender. Fins without spines; dorsal fin at midbody, directly over pelvic fins, **last ray elongate and filamentous;** pectoral fins low on side of body near ventral margin; pelvic fins abdominal; anal fin begins behind dorsal fin; caudal fin deeply forked. **Scales large,** about 40 to 50 in lateral line. **Colour:** bluish green above, silvery on sides.



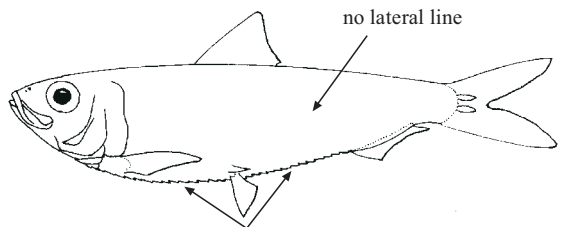
ventral view of head

**Similar species occurring in the area**Albulidae (*Albula* spp.): mouth inferior; last dorsal-fin ray not elongate and filamentous; scales smaller.

Clupeidae: lateral line absent; gular plate absent; most species have scutes on midline of belly.



mouth inferior

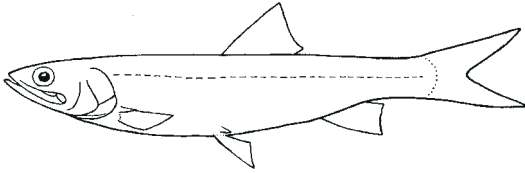
**Albulidae (*Albula* spp.)**

scutes

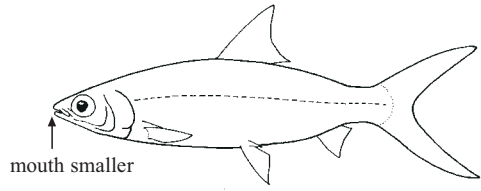
**Clupeidae**

Elopidae (*Elops* spp.): scales much smaller, about 100 on lateral line; last dorsal-fin ray not elongate and filamentous.

*Chanos chanos*: mouth smaller, gape not reaching beyond anterior part of eye; scales smaller; last dorsal-fin ray not elongate and filamentous; gular plate absent; fewer branchiostegal rays (4).



**Elopidae (*Elops* spp.)**

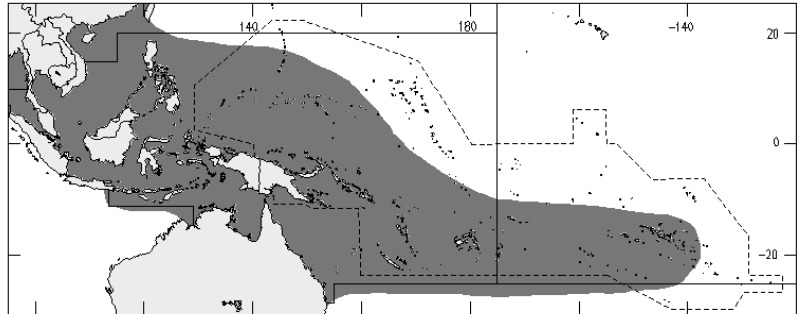


**Chanidae (*Chanos chanos*)**

**Size:** Maximum total length 55 cm, commonly to 30 cm.

**Habitat, biology, and fisheries:** Primarily a coastal fish, commonly entering lagoons and estuaries; an active swimmer, living in open water. Tarpon have a leptocephalus larva, similar to that of *Elops*, *Albula*, and the eels. They spawn offshore and young larvae are found in the open sea. Juveniles move inshore and often occur in tidal streams and marshes. Juveniles and adults can tolerate a wide variety of salinities. Their modified swimbladder permits them to breathe air and thus survive in oxygen-poor water. Tarpons are predaceous, feeding mainly on fishes and crustaceans. Caught by gill nets, seines, and trawls, and by hook-and-line; marketed fresh and dried salted. From 1990 to 1995, FAO's Yearbook of Fishery Statistics reports a range of yearly production of 280 to 1 100 t of *Megalops cyprinoides* from the Western Central Pacific (Malaysia, Philippines). This is a good sport fish, although it does not grow nearly as large as the Atlantic tarpon.

**Distribution:** Widely distributed in the tropical Indo-West Pacific from East Africa and the Red Sea eastward through most of the western Central Pacific to the Society Islands and Australia.



## Reference

Wade, R.A. 1962. The biology of the tarpon, *Megalops atlanticus*, and the ox-eye, *Megalops cyprinoides*, with emphasis on larval development. *Bull. Mar. Sci. Gulf and Caribb.*, 12(4):545-622.

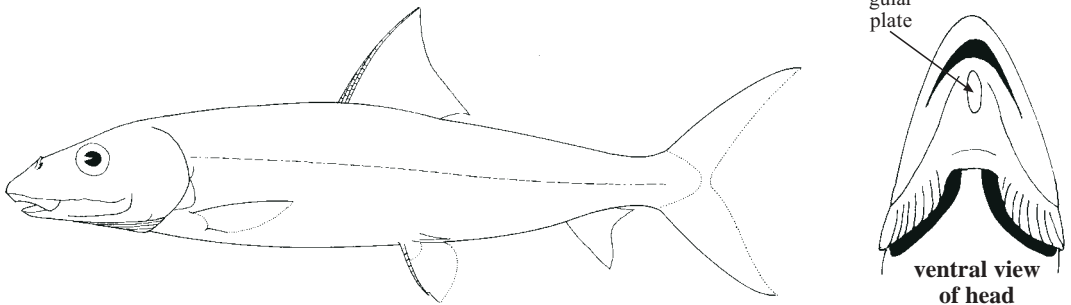
## Order ALBULIFORMES

## ALBULIDAE

## Bonefishes

by D.G. Smith and J.E. Randall

**Diagnostic characters:** Body moderately elongate, fusiform, slightly compressed. Eye large. **Snout conical, projecting well beyond lower jaw.** Mouth small, inferior, gape not reaching anterior margin of eye; a small gular plate present between arms of lower jaw, but small and inconspicuous. Teeth small, granular, in patches on jaws and on roof and floor of mouth. Branchiostegal rays about 10 to 15. **Gill rakers rudimentary**, consisting of small patches of minute, villiform teeth. **All fins without spines;** dorsal fin located at about midbody, with about 16 or 17 rays; anal fin with 7 to 9 rays, located well behind dorsal fin; caudal fin deeply forked; pectoral fins low on side of body, near ventral outline; pelvic fins abdominal, located under posterior part of dorsal fin. **Scales small, about 60 to 80 along lateral line.** **Colour:** bluish green dorsally, often with several faint saddles of slightly darker colour; silvery on sides, with several faint, narrow, longitudinal lines; belly white.



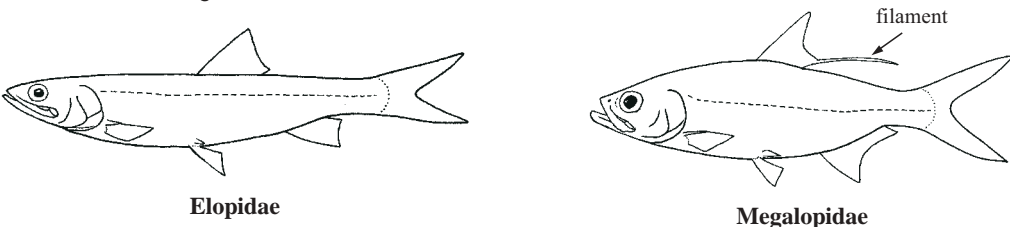
**Habitat, biology, and fisheries:** Bonefish occur primarily in shallow, coastal waters on sand or mud bottoms, in areas of relatively high salinity. They are bottom feeders, rooting in the substratum for crustaceans and various other small invertebrates and fishes; when feeding in very shallow water, the caudal fin may protrude from the water, a habit known as "tailing". They are active fishes, generally travelling in small groups and covering large areas while foraging. Like *Elops*, *Megalops*, and the eels, bonefish have a compressed, transparent leptocephalus larva. They spawn offshore and the young larvae are found in the open sea. The bonefish is a renowned sport fish, famous for its long, powerful runs. In clear, shallow water bonefish are extremely wary and difficult to approach, a quality that enhances their challenge to anglers. While they can easily be caught on live shrimp or crabs, most anglers prefer to use various artificial lures, including flies. Their flesh is of excellent quality, but the numerous small bones make them as much of a challenge to eat as to catch. They are caught locally, mainly with gill nets or occasionally cast nets; no separate statistics available; marketed fresh.

**Remarks:** The Albulidae contains 2 main groups of species, which at various times have been recognized as genera or subgenera. *Albula (Dixonina) nemoptera* lives in somewhat deeper water and is confined to the western Atlantic and eastern Pacific. The *Albula (Albula) vulpes* group lives in shallower water and is found in all tropical seas. It was formerly believed that *Albula vulpes* is a single cosmopolitan species. Recent work has shown that this "species" is actually a complex of several similar but genetically distinct species. Two species are known from the Western Central Pacific. They are nearly identical in external appearance and can be distinguished only with difficulty. Both species occur throughout the area.

**Similar families occurring in the area**

Elopidae (*Elops* spp.): mouth terminal.

Megalopidae (*Megalops* spp.): mouth supraterminal, lower jaw projecting; last dorsal-fin ray elongate and filamentous; scales larger.



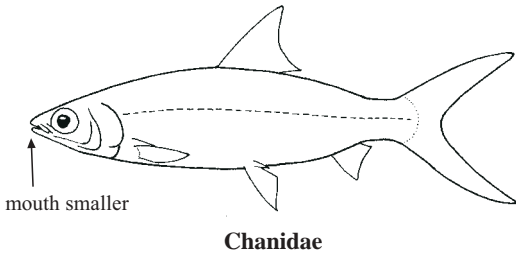
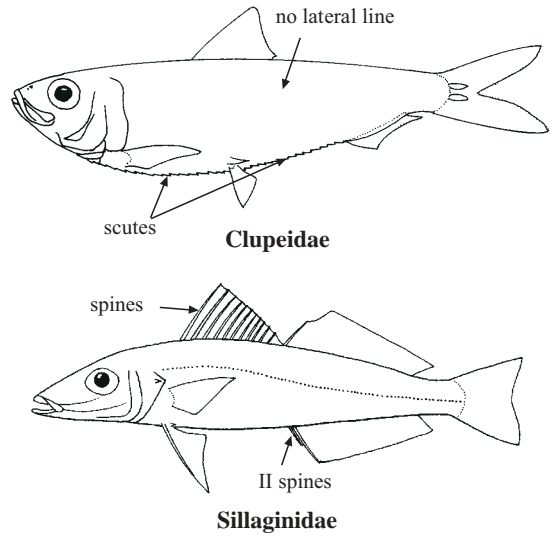
Elopidae

Megalopidae

Clupeidae: lateral line absent; gular plate absent; most species have scutes along midline of body.

Chanidae (*Chanos chanos*): gular plate absent; fewer branchiostegal rays (4 or 5).

Sillaginidae: 2 dorsal fins, first with IX to XII spines; anal fin with long base, consisting of II spines and 15 to 27 soft rays.



**Key to the species of Albulidae occurring in the area**

1a. Upper jaw (tip of snout to posterior end of maxilla) shorter, 3.05 to 3.25 times in head length; tip of lower jaw broadly rounded (Fig. 1a); a spot of black pigment often present on underside of snout, at least in smaller individuals; tooth patches on parasphenoid and basibranchial bones more broadly oval in shape, average width/length 0.38 and 0.45, respectively (Fig. 2a); number of teeth in second pharyngobranchial tooth patch usually 5 to 15 (Fig. 2a) . . . . . *Albula glossodonta*

1b. Upper jaw longer, 2.65 to 2.85 times in head length; tip of lower jaw angular, with a pointed symphysis (Fig. 1b); no black pigment on ventral surface of snout; tooth patches on parasphenoid and basibranchial bones more elongate, average width/length 0.28 and 0.34 respectively (Fig. 2b); number of teeth in second pharyngobranchial tooth patch usually 15 to 30 (Fig. 2b) . . . . . *Albula forsteri*

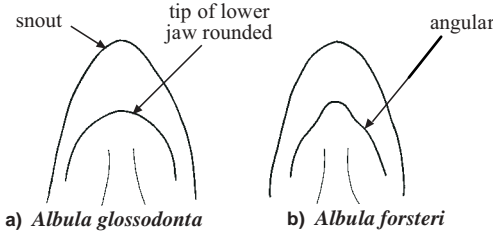


Fig. 1 ventral view of head

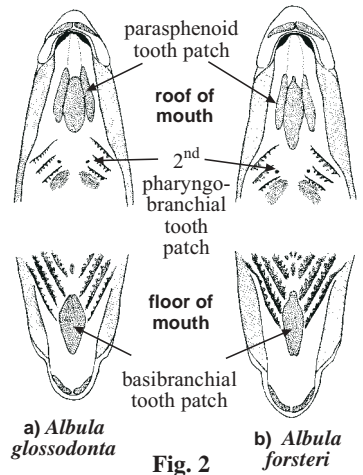


Fig. 2

**List of species occurring in the area**

- Albula forsteri* Valenciennes, 1847 (formerly known as *Albula neoguinaica*)
- Albula glossodonta* (Forsskål, 1775)

**References**

Alexander, E.C. 1961. A contribution to the life history, biology and geographic distribution of the bonefish, *Albula vulpes* (Linnaeus). *Dana Rept.*, (53):51 p.

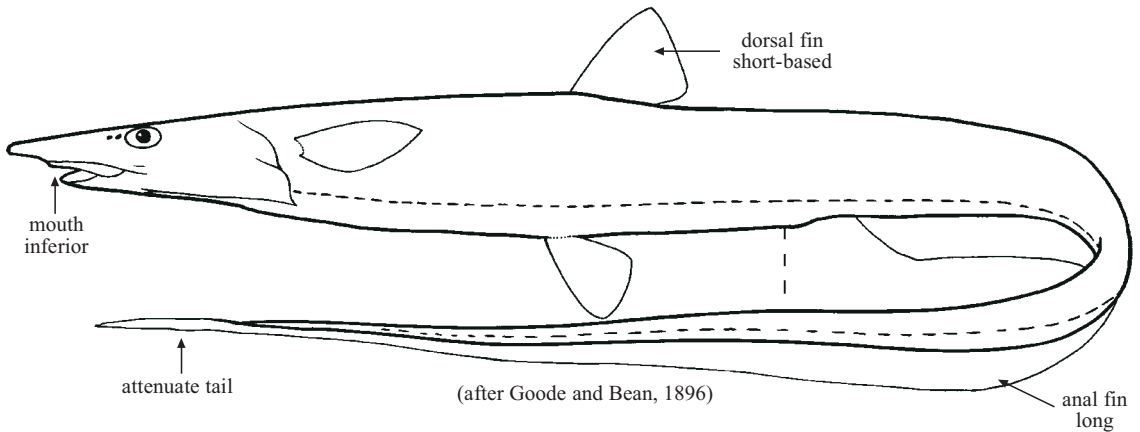
Shaklee, J. B. and C. S. Tamaru. 1981. Biochemical and morphological evolution of Hawaiian bonefishes (*Albula*). *Syst. Zool.*, 30(2):125-146.

## HALOSAURIDAE

### Halosaurs

by D.G. Smith

**Diagnostic characters:** **Body elongate; tail slender and attenuate**, frequently broken and regenerated; anus slightly before midlength. Head elongate, its length contained approximately 3 times in preanal length. Eye well developed. Snout prolonged, extending well in front of mouth, tip rounded or pointed, often depressed. Anterior and posterior nostrils close together, in front of eye. **Mouth inferior, overhung by snout**, moderate in size, gape ending approximately under or slightly before front of eye. Teeth small, granular, in patches on jaws and palatopterygoid. **Dorsal fin short-based**, on midtrunk, slightly closer to anus than to tip of snout, **all rays segmented** (anteriormost ray reduced and unsegmented in *Aldrovandia*); **anal fin long, extending from just behind anus to tip of tail**; pectoral fins well developed, on side of body at or above lateral midline; pelvic fins present, located abdominally, under or slightly in front of dorsal fin; caudal fin absent. Scales relatively large, overlapping, covering body in well-defined horizontal and vertically oblique rows; scales of lateral line enlarged; head partially scaled. Lateral line well developed, canals large and cavernous on head and body; lateral line runs along lower side of body, near ventral outline in lateral view. **Colour:** variable, ranging from black to light grey or tan; sides of body and opercle often silvery in fresh specimens; no bars, stripes, spots or other distinct markings; inside of mouth and pharyngeal cavity sometimes black.

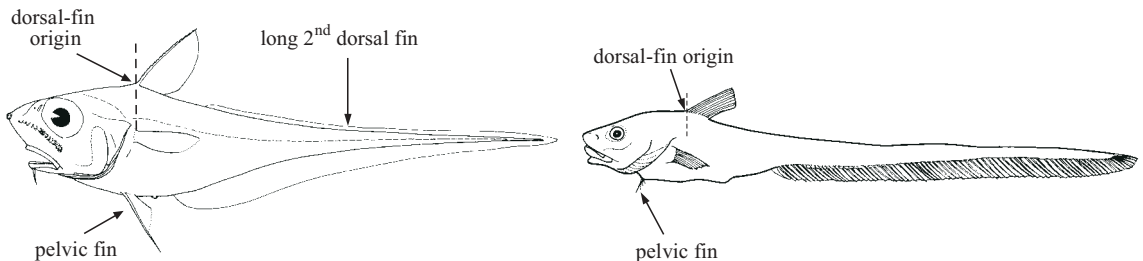


**Habitat, biology, and fisheries:** Halosaurs live on or near the bottom in moderate to deep water, usually between about 500 and 3 000 m. They are bottom feeders, preying mainly on crustaceans and other small invertebrates. Males develop markedly enlarged olfactory organs at maturity, suggesting that they locate their mates through pheromones. Like eels and elopiforms, halosaurs have a pelagic, leptocephalous larva. Although they are occasionally taken in deep bottom trawls, halosaurs have no commercial importance.

#### Similar families occurring in the area

**Macrouridae:** anterior dorsal fin directly above pectoral fins; a long, low second dorsal fin extending to end of tail; pelvic fins directly under pectoral fins.

**Ateleopodidae:** dorsal fin above pectoral fins; pelvic fins under or ahead of pectoral fins; snout short and bulbous; scales very small or absent.

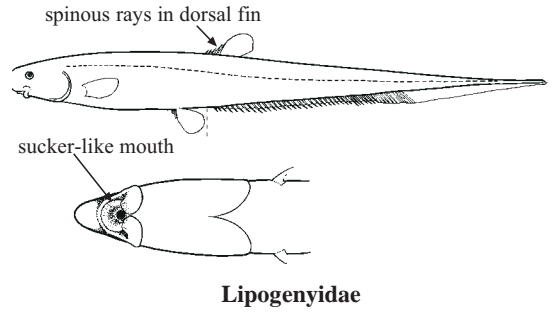
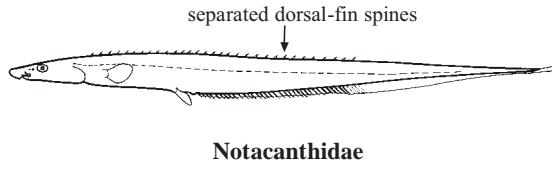


**Macrouridae**

**Ateleopodidae**

Notacanthidae: dorsal fin consists of a series of separated spines, not connected by a membrane.

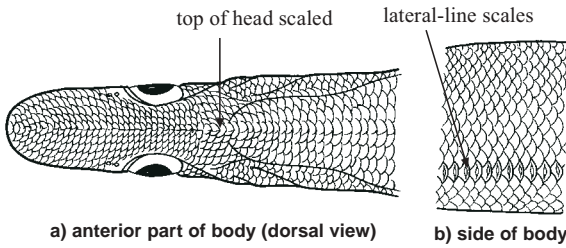
Lipogenyidae: dorsal fin with 4 to 6 unsegmented spinous rays; mouth sucker-like.



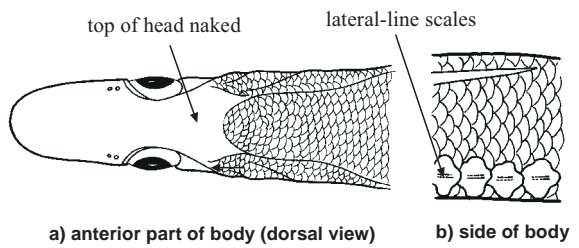
**Key to the genera of Halosauridae**

Remarks on key characters: trawled specimens often lose their scales; scale pockets remain, however, and these are usually sufficient to indicate where scales have been.

- 1a. Top of head scaled at least as far forward as level of nostrils (Fig. 1a); lateral-line scales slightly enlarged, 1 such scale for each transverse row of body scales (Fig. 1b) . . . . . *Halosaurus*
- 1b. Top of head naked (Fig. 2a); lateral-line scales markedly enlarged, 1 such scale for each 2 or 3 transverse rows of body scales (Fig. 2b) . . . . . → 2



**Fig. 1 *Halosaurus***



**Fig. 2 *Aldrovandia***

- 2a. First dorsal-fin ray segmented, as long as second ray; scales present on opercular bone . . . . . *Halosauropsis*  
(so far, known only from Atlantic, South Africa, and New Zealand)
- 2b. First dorsal-fin ray reduced to a short, unsegmented spine, much shorter than second dorsal-fin ray; scales absent on opercular bone (although they may be present just dorsal to the bone) . . . . . *Aldrovandia*

**List of species occurring in the area**

- Aldrovandia affinis* (Günther, 1877)
- Aldrovandia mediorostris* (Günther, 1887)
- Aldrovandia phalacra* (Vaillant, 1888)
- Halosaurus ridgwayi* (Fowler, 1934)

**References**

Goode, G.B. and T.H. Bean. 1896. Oceanic Ichthyology. *Spec. Bull. U.S. Natn. Mus.*, 553 p.

McDowell, S. 1973. Family Halosauridae. In *Fishes of the Western North Atlantic, Part 6*, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res.*, 1(6):32-123.

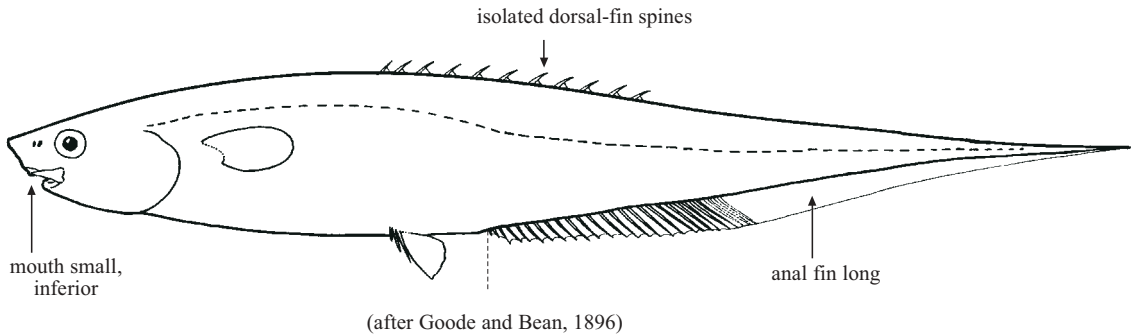


## NOTACANTHIDAE

### Spiny eels

by D.G. Smith

**Diagnostic characters:** Body moderate to moderately elongate; **tail slender and tapering to a point, often broken and regenerated**; anus somewhat before midlength. Head moderately deep to moderately elongate, somewhat compressed, its length contained 2 to 3 times in preanal length. Eye well developed. Snout projects beyond mouth, tapering to a rounded tip. Anterior and posterior nostrils close together, in front of eye. **Mouth relatively small, inferior, overhung by snout**, gape ending in front of or under eye; **maxilla without teeth, nearly excluded from gape by premaxilla**. Teeth small, pointed, in a single row on premaxilla, in 1 to several rows on palatine and dentary. **Dorsal fin consists of a series of unsegmented spines, isolated from each other and not connected by a membrane**, its length variable, beginning on head or trunk and extending behind anus, but ending well before end of tail; **anal fin long, extending from just behind anus to tip of tail, anterior rays spinous**; pectoral fins well developed, located on midside, a short but distinct distance behind gill opening; pelvic fins abdominal, slightly in front of anus; caudal fin absent. Scales small and overlapping, covering most of head and body. Lateral line complete, on dorsal half of body anteriorly, becoming midlateral on tail; canals and scales not notably enlarged. **Colour:** light grey to dark brown; lining of mouth and branchial chamber black; no distinct markings or patterns.



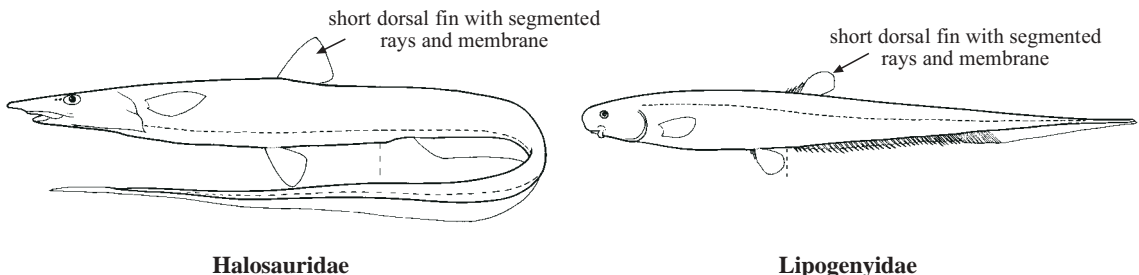
**Habitat, biology, and fisheries:** Spiny eels (or notacanthids) live on the bottom at depths of approximately 200 to 3 500 m. They feed on various small invertebrates, including crustaceans, echinoderms, polychaetes, bryozoans, and hydrozoans. Their olfactory organs are well developed and are undoubtedly used in finding food. Spiny eels show little sexual dimorphism, although the males tend to be smaller than females and have a larger olfactory organ. The larva is a leptocephalus, similar to that of the halosaurs, eels, and elopiforms. Spiny eels are occasionally taken in deep bottom trawls, but they have no commercial value.

#### Similar families in the area occurring in the area

Spiny eels are unlikely to be confused with any other fishes. The peculiar spinous dorsal fin, without connecting membranes, the slender, tapering tail, and the long anal fin distinguish them from all other families in the area.

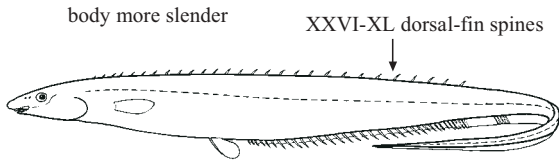
Halosauridae: dorsal fin short, with soft rays connected by membrane.

Lipogenyidae: dorsal fin with both spines and segmented soft rays, connected by a membrane and forming a single, short-based fin.

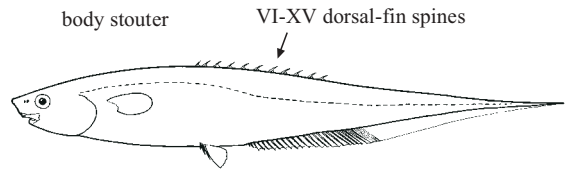


### Key to the genera of Notacanthidae

- 1a.** Dorsal-fin spines XXVI to XL; body and head more slender (Fig. 1) . . . . . *Polyacanthonotus*  
**1b.** Dorsal-fin spines VI to XV; body and head stouter (Fig. 2) . . . . . *Notacanthus*



**Fig. 1** *Polyacanthonotus*



**Fig. 2** *Notacanthus*

### List of species occurring in the area

Note: a single species, *Notacanthus abbotti*, has actually been recorded from the area. Others are known from Japan and New Zealand and may possibly extend into the area in very deep water. The following list includes those species known from the western and Central Pacific.

- Notacanthus abbotti* Fowler, 1934  
 ? *Notacanthus chemnitzii* Bloch, 1788  
 ? *Notacanthus sexspinis* Richardson, 1846  
 ? *Polyacanthonotus challengerii* (Vaillant, 1888)

### References

- Goode, G.B. and T.H. Bean. 1896. Oceanic Ichthyology. *Spec. Bull. U.S. Natn. Mus.*, 553 p.  
 McDowell, S. 1973. Family Notacanthidae. In *Fishes of the Western North Atlantic*, Part 6, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res.*, 1(6):124-207.  
 Sulak, K.J., R.E. Crabtree, and J.-C. Hureau. 1988. Provisional review of the genus *Polyacanthonotus* (Pisces: Notacanthidae) with description of a new Atlantic species, *Polyacanthonotus merretti*. *Cybium*, 8(4):57-68.

## LIPOGENYIDAE

## Spiny sucker eels

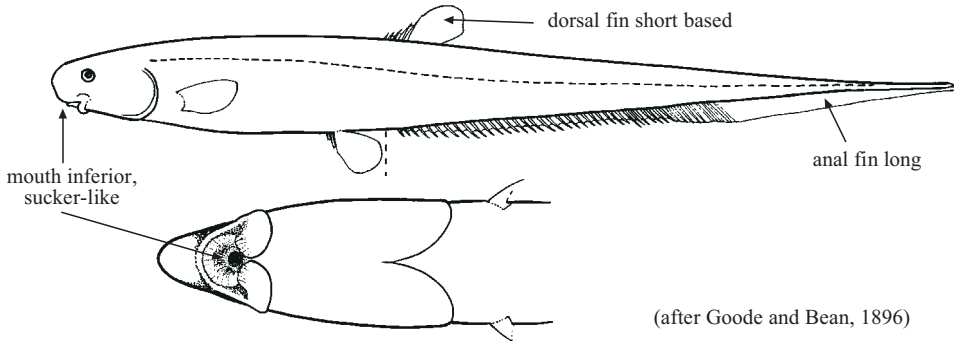
by D.G. Smith

A single species in this family.

*Lipogenys gilli* Goode and Bean, 1896

Frequent synonyms / misidentifications: None / None.

FAO names: En - Spiny sucker eel.



anterior part of body (ventral view)

**Distinctive characters:** Body moderately elongate; **tail slender and tapering to a point**. Head narrow, somewhat compressed, tapering anteriorly to a rounded point as seen from above, more broadly rounded as seen from side. Eye well developed. Snout projects beyond mouth. Anterior and posterior nostrils close together, about halfway between eye and tip of snout. **Mouth inferior, small and sucker-like; upper lip with thick, pleated folds; posterior end of maxilla bent sharply downward, forming a flap-like structure; fleshy papillae on snout bordering upper lip. Teeth absent. Dorsal fin short based, located above anus, the first 4 to 6 rays hard and spinous, increasing in length from front to back, the remainder soft and segmented, membrane connecting all rays except first 1 to 3 spines. Anal fin long, extending from just behind anus to tip of tail, anterior rays spinous, posterior rays segmented, the transition gradual.** Pectoral fins slightly below midside, behind gill opening; pelvic fins abdominal; caudal fin absent. Scales small, covering most of head and body. Lateral line complete, on dorsal half of body anteriorly, becoming midlateral on tail; canals and scales not notably enlarged. **Colour:** light brown or grey; lining of gill chamber dark brown; no markings or patterns.

**Similar species occurring in the area**

Halosauridae: mouth normal, not sucker-like; dorsal fin without spines or with a single, short spine connected to remainder of fin by membrane.

Notacanthidae: mouth normal, not sucker-like; dorsal fin without segmented rays, instead, a series of isolated spines unconnected by a membrane.

**Size:** Maximum total length about 50 cm.

**Habitat, biology, and fisheries:** This species lives on the bottom in approximately 600 to 2 000 m and seems to feed mostly on organic material contained in bottom sediment drawn up by the sucker-like mouth. Little is known about its biology; there is no obvious sexual dimorphism. *Lipogenys gilli* is primarily an inhabitant of colder water and is currently known from the western North Atlantic, Japan, and New Zealand. It is included here on the chance that it might extend into the area in deep water. *L. gilli* is rarely seen and has no commercial value.

**Remarks:** Although *Lipogenys* is usually placed in its own family, primarily because of the peculiar and highly modified mouth, its anatomy is similar in most respects to that of the Notacanthidae. Indeed, a recent study placed *Lipogenys* as the sister group of *Polyacanthonotus* within the Notacanthidae.

**Reference**

McDowell, S. 1973. Family Lipogenyidae. In *Fishes of the Western North Atlantic, Part 6*, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res.*, 1(6):208-228.

