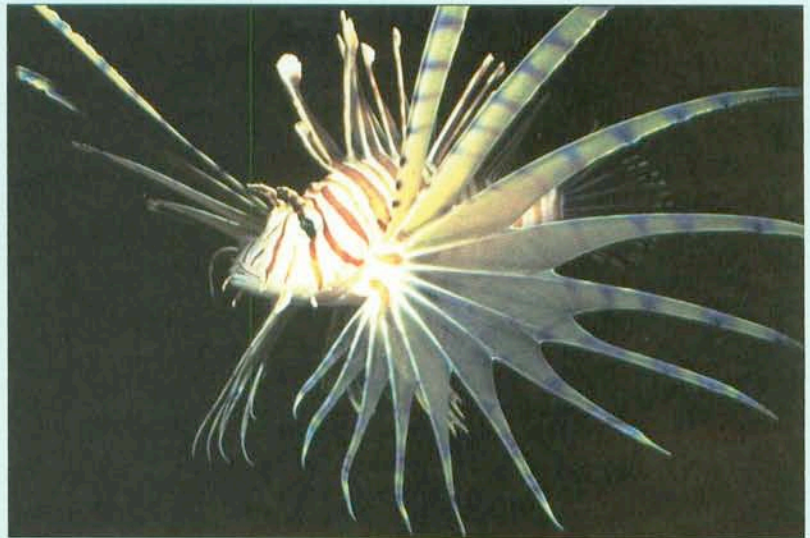


## Scorpaeniformes II

(Scorpionfishes and relatives)

**Class** Actinopterygii  
**Order** Scorpaeniformes  
**Number of families** 14

**Photo:** A red lionfish (*Pterois volitans*) in the Coral Sea. The lionfish can give venomous stings from its pelvic, dorsal, and anal spines. (Photo by JLM Visuals. Reproduced by permission.)



### Evolution and systematics

The approximately 1,400 species of mail-cheeked fishes (order Scorpaeniformes), first grouped together by the naturalist Georges Cuvier, are united because they share a single remarkable feature. This feature, the suborbital stay, is a bony strut that connects the bones under the eye with the front of the gill cover. This character is found in all scorpaeniforms except the Australian prowlfishes (Pataecidae). The gapers (Champsodontidae) are sometimes included in the Scorpaeniformes, but here are included in the Trachinoidei chapter.

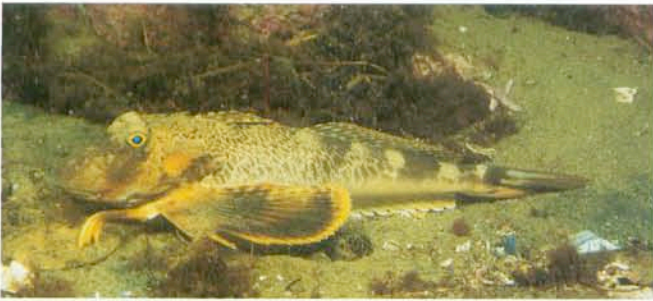
This chapter covers the suborder Scorpaenoidei. Because scorpaenoids are the dominant group of venomous fishes, they have one of the oldest and best-documented natural histories (especially in terms of venomology), dating back almost 2,400 years. Even with this detailed historical record, the classification and taxonomy of the Scorpaenoidei remain some of the most difficult of all fish orders. The composition of the group presented here follows Joseph Nelson's 1994 book, *Fishes of the World*. The classification of the scorpionfishes and sea robins presented here is updated from Nelson's book and follows more recent studies.

The Scorpaenoidei is divided into two groups: the sea robins (composed of either one or two families) and the scorpionfishes and their relatives (composed of seven to thirteen families). Following Hisashi Imamura's 1996 analysis, there are two families of sea robins: the sea robins (Triglidae, about 110 species) and the armored sea robins (Peristediidae, about 40 species). Following Minoru Ishida's 1994 analysis and recent work by Randall Mooi and David Johnson, there are 12 families of scorpionfishes: longfinned waspfishes (Apistidae, three species), velvetfishes (Aploactinidae, about 40 species), orbicular velvetfishes (Caracanthidae, four species), pigfishes

(Congiopodidae, nine species), red velvetfish (Gnathanacanthidae, one species), gurnard perches (Neosebastidae, 12 species), prowlfishes (Pataecidae, three species), scorpionfishes (Scorpaenidae, some 200 species), rockfishes (Sebastidae, roughly 125 species), midwater scorpionfishes (Setarchidae, five species), stonefishes (Synanceiidae, about 35 species), and waspfishes (Tetrarogidae, about 40 species).

Traditionally, the scorpionfishes and their relatives have been grouped with the sea robins. Recent work suggests that the sea robins might be related more closely to the flatheads (Platycephaloidei); this hypothesis needs further testing. Generally, it is agreed upon that the Platycephaloidei and the Scorpaenoidei make up the "scorpaenoid lineage." All species in this lineage are united by the presence of an opercular spine (the largest bone that makes up the gill cover) that projects beyond the subopercle (the posterior margin of the gill cover) and a derived gas bladder muscle configuration. The Scorpaenoidei usually is treated as the most primitive group of scorpaeniforms, with the rockfishes (Sebastidae) representing the basic body form. Some researchers have argued that the rockfishes have numerous derived features, including live birth and modified gas bladder muscles, making them a poor choice for a primitive form. Because of these disagreements and the countless classifications that exist, a worldwide revision of the group is needed. In particular, an analysis of morphological and DNA sequence data is needed to resolve the remaining questions in scorpaenoid phylogeny and classification.

Regardless of the classification used, there are no known characters that unite all members of the Scorpaenoidei with or without the sea robins and relatives (Triglidae and Peristediidae). The scorpionfish and relatives clade can be broken into two groups. The first group is composed of the taxa that have the first and/or second dorsal spines and supports



A northern sea robin (*Prionotus carolinus*) "walking" on its fins in the Gulf of Maine. (Photo by Andrew J. Martinez/Photo Researchers, Inc. Reproduced by permission.)

articulating with the skull; this includes the families Aploactinidae, *Congiopodidae*, Gnathanacanthidae, Pataecidae, Synanceiidae, and Tetrarogidae. The remaining seven families have the traditional arrangement where the dorsal fin begins beyond the posterior margin of the skull. Recent work has suggested that the Australian prowfishes (Pataecidae) might not be related to the other scorpionfishes.

The scorpionfishes and their relatives first appear in the fossil record with an Eocene otolith (ear stone) record identified as *Scorpaenoideorum prominens* from the London Clay Formation in southern England. Another scorpaenoid fossil from the Miocene is the earliest scorpaenoid known from skeletal remains. This specimen is a fossil stonefish, *Eosynanceja brabantica*, from Belgium, which is known from a handful of bones, including portions of the jaw, cheek, and vertebral column.

### Physical characteristics

Most sea robins and armored sea robins are medium-sized fishes, up to 15.7 in (40 cm). Their most conspicuous characters are their greatly expanded pectoral fins and a head that is completely encased in bony plates. The armored sea robins, as their name suggests, take this protection one step further. Their entire body is covered with spine-bearing plates. Like



A spotted scorpionfish (*Scorpaena plumieri*) is well camouflaged in the coral of the Caribbean. (Photo by Animals Animals ©Franklin J. Viola. Reproduced by permission.)



A Pacific spotted scorpionfish (*Scorpaena mystes*) mimicking the colorful sponges near Darwin Island, Galápagos Islands. (Photo by Fred McConnaughey/Photo Researchers, Inc. Reproduced by permission.)

the flying gurnards (Dactylopteridae) and some stonefishes (Synanceiidae), both families have detached, fingerlike pectoral rays that they use as tactile and chemoreceptive organs. These elongate, free rays also are used for "walking" along the seafloor in search of prey.

The scorpionfishes and their relatives have a wide range of sizes, from the smallest velvetfishes at 0.8–1.2 in (2–3 cm) to the largest rockfishes at about 39.4 in (about 100 cm). Their diversity of sizes is matched by their diversity in body forms, with only numerous sharp spines being common to all species, although most species could be described as "bass-like." Scorpaenoids fall into one of two categories. The first group is composed of the brightly colored, highly venomous species (e.g., the lionfishes) that hover around coral reefs displaying their warning coloration. The second category is made up of the cryptic species. These species tend to be dominated by colors that mimic their surroundings. Additionally, these species are covered with numerous cirri, fleshy appendages, spines, and ridges; these appendages provide additional camouflage.

### Distribution

The Scorpaenoidei has a worldwide distribution in tropical and temperate marine waters. Most scorpaenoids (e.g., Scorpaenidae, Synanceiidae, Aploactinidae, and Tetrarogidae) are found primarily in the tropical Indo-Pacific. One tetrarogid, the bullrout (*Notesthes robusta*) from eastern Australia, is the only freshwater scorpaenoid. The other center of diversity for the scorpaenoids is the northern Pacific Ocean, which is dominated by the more than 80 species of rockfishes (Sebastidae).

### Habitat

Almost all scorpaenoids are benthic predators that are found in rocky, sea grass, or coral habitats. Basically, scorpionfishes can be found in any topographically complex environment, where they can use their cryptic coloration and

appendages to hide. Typically, sea robins, which are not as cryptic, are more common on sandy, rocky, or muddy habitats. Finally, the deep-water or midwater setarchids and armored gurnards are benthic species that are found at depths up to 6,562 ft (2,000 m), although most species are found at less than 2,297 ft (700 m).

## Behavior

There are few generalizations that can be made about the behavior of scorpaenoid fishes. Most scorpaenoids are territorial and lead solitary lives, except for the formation of mating aggregations. Scorpaenoids are masters of disguise. Many species have cryptic coloration; numerous leaflike appendages, or cirri; epibiotic growth; and bony ridges that give the appearance of rocks. Other scorpaenoid species have specialized pectoral fins that allow them to bury themselves in the sand. All of these features help scorpaenoids blend into their environment as they lie waiting for prey.

In addition to their camouflage and mimicry, scorpaenoids are protected in their environment by their pungent, venomous dorsal spines. Almost all scorpaenoids, except such groups as prowfishes (Pataecidae) and sea robins and their allies (Triglidae and Peristediidae), have venom glands associated with the fin spines. The venom from these glands has both neurotoxic (affecting the nervous system) and hemotoxic (affecting the blood vessels) action, which has led to numerous human fatalities and given these species their infamous reputation. The venom of the colder-water species (e.g., the rockfishes, Sebastidae) generally has less severe effects, and that of the stonefishes (Synanceiidae) and lionfishes (*Pterois*) is most deadly. The stonefishes, in particular, have devised a particularly dastardly venom apparatus that has a hollowed-out dorsal spine with muscular control, which basically gives them a hypodermic needle to inject their deadly venom. Fortunately, we have learned that the effects of the venom are minimized if the affected area is soaked in very hot (not boiling) water to help denature the proteins; additionally, topical treatment with stonefish antivenoms limits the damage.



A red lionfish (*Pterois volitans*) eating a zebra turkeyfish (*Dendrochirus zebra*). (Photo by Tom McHugh/Steinhart Aquarium/Photo Researchers, Inc. Reproduced by permission.)



A tub gurnard (*Chelidonichthys lucerna*) on top of a European plaice (*Pleuronectes platessa*). (Photo by Tom McHugh/Photo Researchers, Inc. Reproduced by permission.)

## Feeding ecology and diet

Almost all scorpaenoids are benthic predators that feed primarily on crustaceans and smaller fishes. Most species are typical lie-and-wait predators that use their highly camouflaged bodies and burst speed to capture prey. The sea robins (Triglidae) have excised pectoral rays that are chemoreceptive. These fishes run these fingerlike rays through the sand or mud to locate prey as they walk along the seafloor. Adult scorpaenoid fishes are rarely preyed upon because of their powerful venom, but venomous juveniles and less venomous species (e.g., rockfishes) are preyed upon by larger fishes, humans, and pinnipeds (e.g., California sea lion).

## Reproductive biology

There are numerous reproductive modes in the Scorpaenoidei. All species are iteroparous (having more than one spawning event per lifetime) and have many sexual partners (at least the males). One of the most interesting scorpaenoid reproductive strategies is live birth, which is found in some



The face of a tub gurnard (*Chelidonichthys lucerna*) near Brittany, France, in the Atlantic Ocean. (Photo by Jeff Rtman/Photo Researchers, Inc. Reproduced by permission.)

rockfishes (Sebastidae). The live-born *Sebastes* embryos are interesting, because they derive nutrients both from the yolk sac and directly from the mother. A possibly related reproductive strategy is used by many scorpaenoids (e.g., *Pterois* and *Sebastolobus*). In this strategy, the male inseminates the female, and then the female extrudes the fertilized eggs in a gelatinous mass that floats at the surface. There are many scorpaenoid species that are typical broadcast spawners with planktonic larvae, for example, sea robins (Triglidae) and pigfishes (Congiopodidae). Last, there are two scorpaenoid families whose reproductive biology is unknown—orbicular velvetfishes (Caracanthidae) and velvetfishes (Aploactinidae).

### Conservation status

At the present time, there are four scorpaenoids listed by the IUCN. First is the deepwater jack, *Pontinus nigropunctatus*, from Saint Helena, which is considered Vulnerable. The redfish, *Sebastes fasciatus*, from the northwest Atlantic and *Sebastolobus alascanus* from the northeast Pacific, are considered Endangered. Finally, the bocaccio, *Sebastes paucispinis*, from the northeast Pacific is considered Critically Endangered. These species, except for the deepwater jack, have been reduced to critical levels because of the pressures of overfishing. A recent report suggests that another eleven species of rockfishes (Sebastidae) also should be given protected status

in North America because of continually declining numbers due to overfishing.

### Significance to humans

Despite their venomous nature, many scorpaenoids support important commercial and recreational fisheries worldwide. The rockfish fishery in the northern Pacific and Atlantic is one of the best known. Unfortunately, many *Sebastes* species have been overfished. This exploitation is due to numerous factors, including life history traits, oceanography, and the difficulty in identifying larval species, which interferes with accurate population management. Another interesting scorpaenoid fishery is the commercial harvesting of the highly venomous stonefish, *Synanceia verrucosa*, for live fish markets in Hong Kong. This fishery has been so successful that there is serious discussion about aquaculturing the highly venomous stonefish species.

The lionfishes (*Pterois* and *Dendrochirus*) make up one of the dominant groups of fishes in the marine aquarium trade. These fishes are not bred in captivity; all are collected from the wild. In addition to the large number of lionfishes that are collected annually, many other scorpaenoids are collected occasionally for the aquarium trade (e.g., the weedy scorpionfish (*Rhinopias*), the sea robin (*Prionotus*), and the bearded ghou (*Inimicus*).



1. Bearded ghou (*Inimicus didactylus*); 2. Ocellated waspfish (*Apistus carinatus*); 3. Crested scorpionfish (*Ptarmus jubatus*); 4. Striped sea robin (*Prionotus evolans*); 5. Deepwater scorpionfish (*Setarches guentheri*); 6. South American pigfish (*Congiopus peruvianus*); 7. Reef stonefish (*Synanceia verrucosa*); 8. Cockatoo waspfish (*Ablabys taenianotus*). (Illustration by Jonathan Higgins)



1. Belalang (*Gargariscus prionocephalus*); 2. Red lionfish (*Pterois volitans*); 3. California scorpionfish (*Scorpaena guttata*); 4. Red indianfish (*Pataecus fronto*); 5. Merlet's scorpionfish (*Rhinopias aphanes*); 6. Bocaccio (*Sebastes paucispinis*); 7. Red gumard (*Chelidonichthys spinosus*); 8. Spotted coral croucher (*Caracanthus maculatus*). (Illustration by Jonathan Higgins)

## Species accounts

### Ocellated waspfish

*Apistus carinatus*

#### FAMILY

Apistidae

#### TAXONOMY

*Apistus carinatus* Bloch and Schneider, 1801, Tranquebar, India.

#### OTHER COMMON NAMES

English: Bearded waspfish; French: Rascasse ocellée; Spanish: Rascacio ocelado; Japanese: Hachi.

#### PHYSICAL CHARACTERISTICS

Reaches 6.7 in (17 cm) maximum length. An orange, bronze, or gray scorpionfish, with greatly expanded pectoral fins and free pectoral rays, similar to those seen in sea robins and stingfishes. Becomes increasingly white ventrally, with a characteristic ocellated black spot on the posterior half of the spinous dorsal fin.

#### DISTRIBUTION

Widely distributed species found throughout the Indian Ocean and the western Pacific. They range from South Africa north to the Red Sea and Persian Gulf in the western Indian Ocean and from China and Japan south to Australia in the Pacific.

#### HABITAT

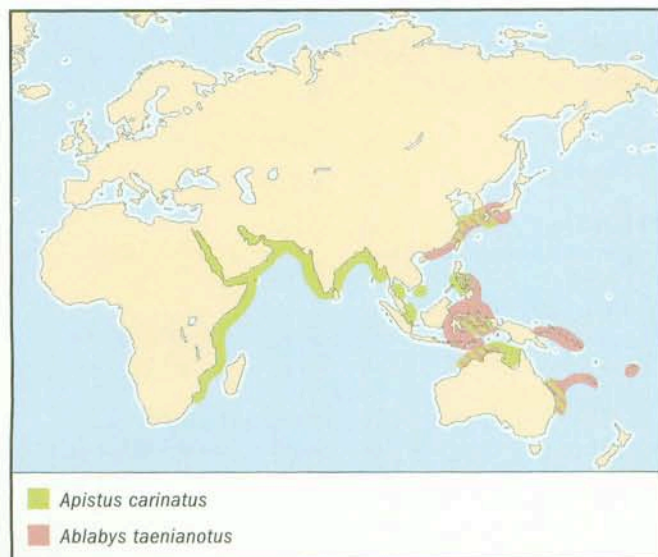
Typically collected on the continental shelf on muddy or sandy bottoms at depths ranging from 66–197 ft (20–60 m).

#### BEHAVIOR

The ocellated waspfish, like sea robins and stingfishes, moves slowly over the seafloor, searching through the soft bottom with its free pectoral rays. It is highly venomous.

#### FEEDING ECOLOGY AND DIET

Like most scorpionfishes, the ocellated waspfish feeds primarily on crustaceans and fishes; it is preyed upon by humans.



#### REPRODUCTIVE BIOLOGY

Little is known about the reproductive biology of the ocellated waspfish.

#### CONSERVATION STATUS

Not listed by the IUCN.

#### SIGNIFICANCE TO HUMANS

The ocellated waspfish is a commercially important food fish that is collected by trawls and seines in small quantities. This fish is sold in markets either fresh or dried and salted. ♦

### Crested scorpionfish

*Ptarmus jubatus*

#### FAMILY

Aploactinidae

#### TAXONOMY

*Ptarmus jubatus* Smith, 1935, Natal Coast, South Africa.

#### OTHER COMMON NAMES

None known.

#### PHYSICAL CHARACTERISTICS

Grows to 3.9 in (10 cm) maximum length. As is implied by the common name of their family, velvetfishes such as the crested scorpionfish have a derived “knobby” scale morphological feature that makes them feel velvety to the touch. The single, continuous dorsal fin originates over the eye. This species typically varies in coloring from light brown to black. It can be covered with white spots and has a black stripe through its eye.

#### DISTRIBUTION

Can be found from southern Mozambique down to the Natal coast of South Africa.

#### HABITAT

Usually found in relatively shallow water, particularly in weedy areas.

#### BEHAVIOR

Nothing is known.

#### FEEDING ECOLOGY AND DIET

The diet of these fishes is unknown, but it is likely that they feed primarily on crustaceans. May be eaten by larger fishes.

#### REPRODUCTIVE BIOLOGY

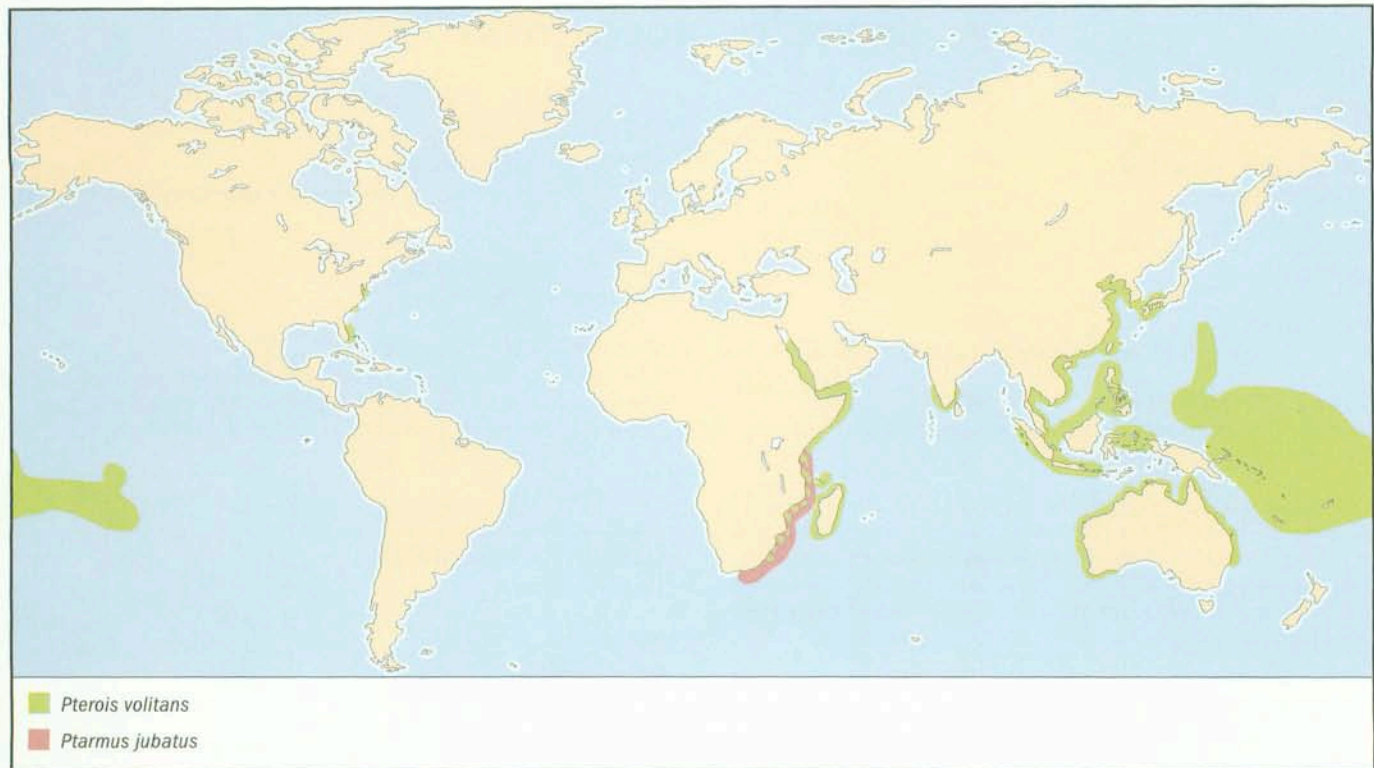
Nothing is known.

#### CONSERVATION STATUS

Not listed by the IUCN.

#### SIGNIFICANCE TO HUMANS

Not collected commercially and reported to be nonvenomous. ♦



## Spotted coral croucher

*Caracanthus maculatus*

### FAMILY

Caracanthidae

### TAXONOMY

*Caracanthus maculatus* Gray, 1831), Tuamotu Island, Polynesia.

### OTHER COMMON NAMES

Japanese: Dango-okoze.

### PHYSICAL CHARACTERISTICS

Reaches 1.6 in (4 cm) in maximum length. Small, rounded, laterally compressed fishes, with small pectoral fins and pelvic fins with one spine and three rays. Their bodies are covered with papillae, giving them a furry or velvet-like appearance. Typically gray laterally, with numerous red spots on the dorsal and lateral surfaces.

### DISTRIBUTION

Can be found from southern Japan to southeastern Polynesia, Australia, and the East Indies.

### HABITAT

These inconspicuous fishes can be found among the branches of *Acropora*, *Pocillopora*, and *Stylophora* corals.

### BEHAVIOR

Coral crouchers spend most of their time among the branches of corals, rarely venturing away from the coral head. It is not known whether they are venomous.

### FEEDING ECOLOGY AND DIET

Little is known about the feeding ecology and diet of these enigmatic scorpionfishes.

### REPRODUCTIVE BIOLOGY

Little is known about the reproduction of the spotted coral croucher.

### CONSERVATION STATUS

Not listed by the IUCN.

### SIGNIFICANCE TO HUMANS

These fishes are too small to be commercially fished, but they are occasionally collected for the aquarium trade, where they are marketed as "gumdrops." ♦

## South American pigfish

*Congiopodus peruvianus*

### FAMILY

Congiopodidae

### TAXONOMY

*Congiopodus peruvianus* Cuvier, 1829, San Lorenzo Island, Peru.

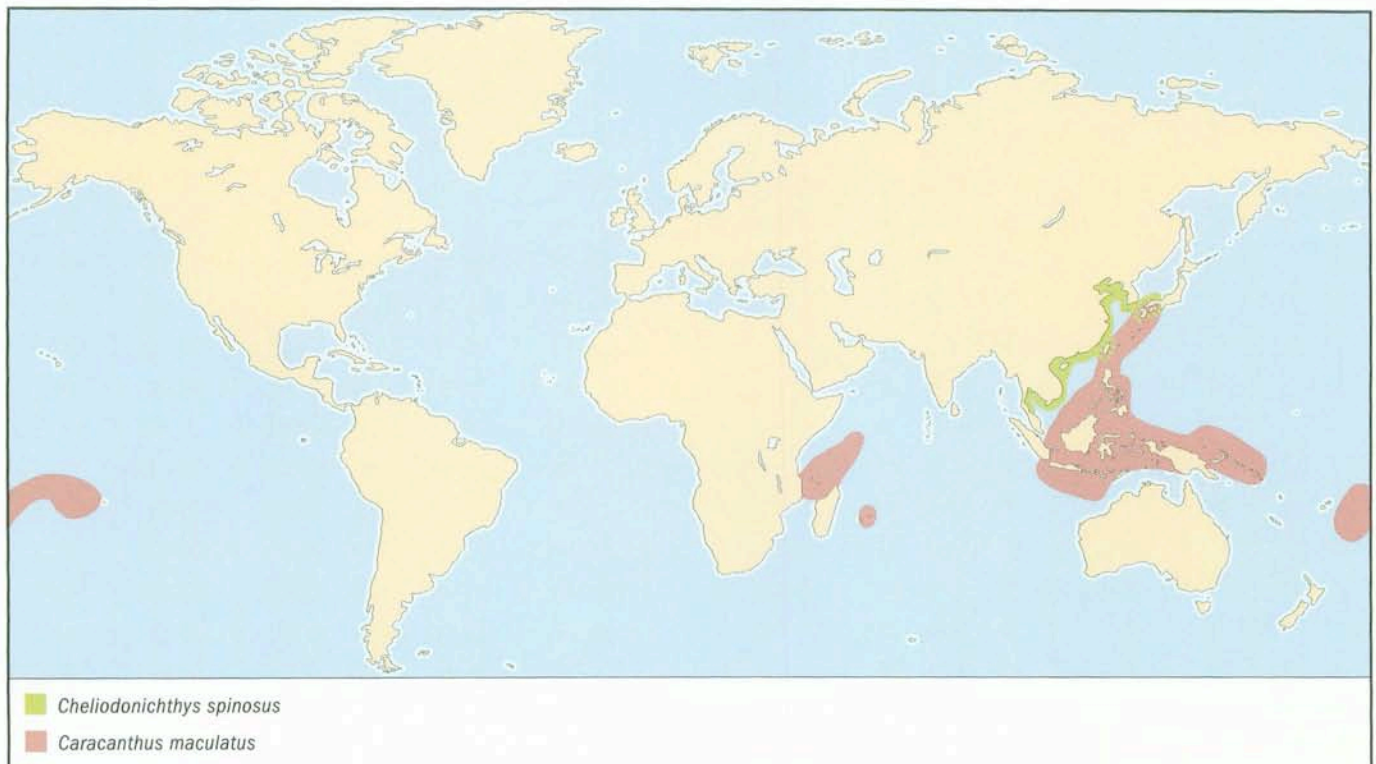
### OTHER COMMON NAMES

Spanish: Pez chancho, chanchito; Japanese: Apachhi.

### PHYSICAL CHARACTERISTICS

Grows to 11 in (28 cm) maximum length. Laterally compressed, with a single, sail-like dorsal fin. Snout has a single nostril on each side. The body is light brown with irregular dark blotches and spots, particularly on the dorsal fin. Additionally, there is a black band on the caudal peduncle and caudal fin.



**DISTRIBUTION**

This pigfish can be collected off the coast of South America in both the southeastern Pacific and southwestern Atlantic.

**HABITAT**

This is a demersal species that usually is taken at depths from 66–492 ft (20–150 m).

**BEHAVIOR**

As is seen in some other scorpionfishes, the molting or shedding of skin has been reported in congiopodids. These scorpionfishes are not venomous.

**FEEDING ECOLOGY AND DIET**

Very little is known about the diet of pigfishes. May be eaten by larger predatory fishes.

**REPRODUCTIVE BIOLOGY**

Nothing is known.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

Although the flesh of this species is edible, it is rarely eaten. ♦

**Red indianfish**

*Pataecus fronto*

**FAMILY**

Pataecidae

**TAXONOMY**

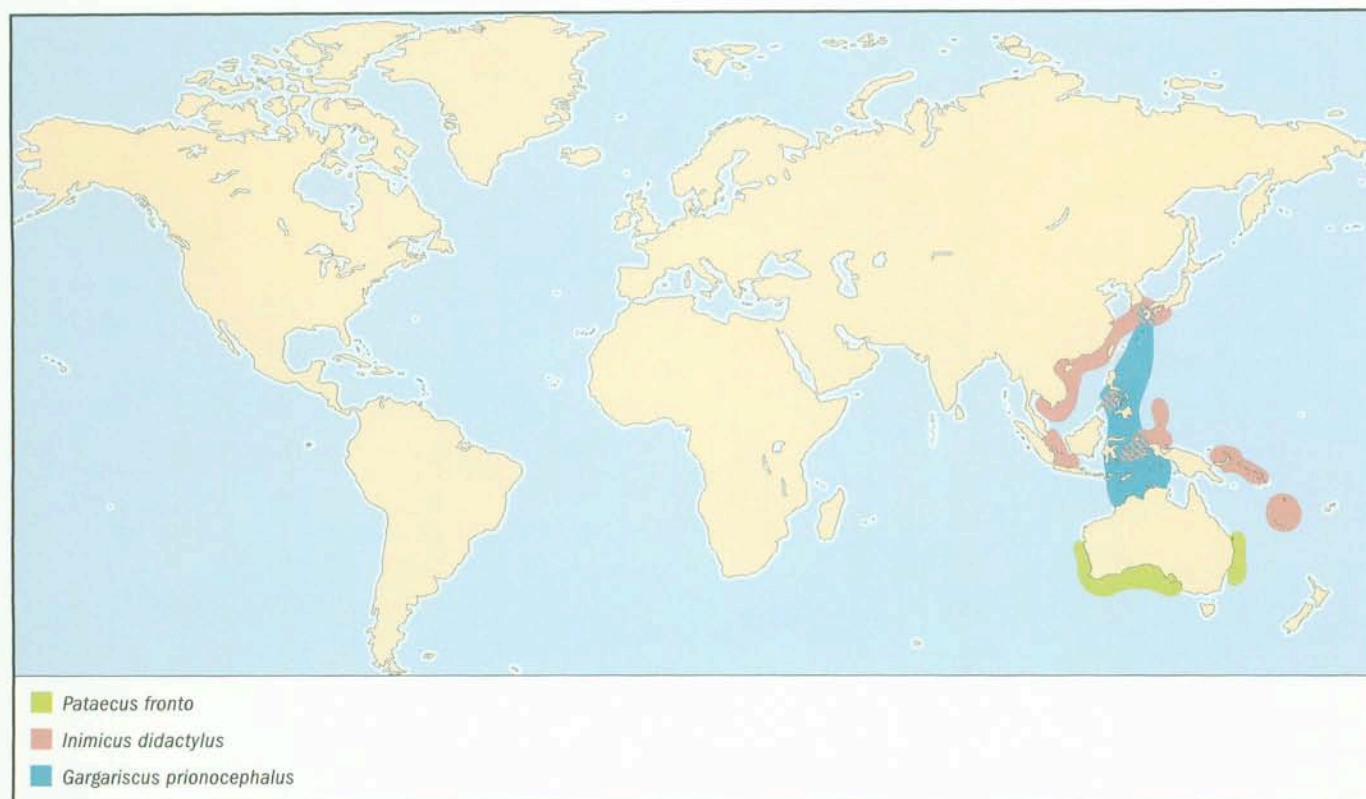
*Pataecus fronto* Richardson, 1844, Southern Australia.

**OTHER COMMON NAMES**

None known.

**PHYSICAL CHARACTERISTICS**

Grows to 11.8 in (30 cm) maximum length. An unusual-looking fish that is highly compressed, with a high dorsal fin con-



fluent with the caudal fin. The color varies but usually ranges from brownish orange to bright red. Their bodies often are covered by dark blotches dorsally.

#### DISTRIBUTION

Found in southern Australia from southern Queensland to eastern Victoria.

#### HABITAT

It is difficult to observe red indianfishes because of their excellent camouflage. When they are seen, they are found in rocky reefs and estuaries, often in similarly colored sponge beds.

#### BEHAVIOR

Red indianfishes often shed the outer layer of skin to help get rid of epibiotic growth (algae or bryozoans), which acts as camouflage. Additionally, these fishes have an unusual "swimming" style that mimics a dead leaf floating in the water; they basically twist and spin as they fall back to the sea floor. The red indianfish is not venomous.

#### FEEDING ECOLOGY AND DIET

Little is known about the diet of red indianfishes, but their diet probably consists primarily of shrimps and other crustaceans. May be eaten by larger predatory fishes.

#### REPRODUCTIVE BIOLOGY

Little is known about the reproductive biology of these fishes.

#### CONSERVATION STATUS

Not listed by the IUCN.

#### SIGNIFICANCE TO HUMANS

This species is not commercially fished, but they are occasionally captured in commercial trawl nets. ♦

### Belalang

*Gargariscus prionocephalus*

#### FAMILY

Peristediidae

#### TAXONOMY

*Gargariscus prionocephalus* Duméril, 1869, Sulawesi, Indonesia.

#### OTHER COMMON NAMES

Japanese: Onikihôbô.

#### PHYSICAL CHARACTERISTICS

Reaches 11 in (28 cm) maximum length. Coloring is orange to red, with black bands on the dorsal and pectoral margins. Its body is entirely encased in spine-bearing plates. There are seven large barbels on the lower jaw and a pair of sculptured rostral projections on the snout.

#### DISTRIBUTION

Distributed from Japan and the Philippines south to northern Australia.

#### HABITAT

A deepwater species that typically is taken on the continental shelf. It is collected at depths greater than 657 ft (200 m).

#### BEHAVIOR

Little is known. They do not appear to be venomous.

#### FEEDING ECOLOGY AND DIET

The diet consists primarily of crustaceans. Preyed upon by larger predatory fishes.

**REPRODUCTIVE BIOLOGY**

Nothing is known about their reproductive biology, but other armored gurnards produce small pelagic eggs.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

This species is rare, so it is not of commercial importance. ♦

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**Red lionfish**

*Pterois volitans*

**FAMILY**

Scorpaenidae

**TAXONOMY**

*Pterois volitans* Linnaeus, 1758, Moluccas Island, Indonesia.

**OTHER COMMON NAMES**

English: Volitan lionfish, butterfly cod, red firefish, turkeyfish; French: Poisson volant; German: Rotfeuerfisch; Japanese: Hana-minokasago, ominokasago.

**PHYSICAL CHARACTERISTICS**

Reaches 13.8 in (35 cm) maximum length. One of the most easily recognized of all marine fishes. The most striking features of the red lionfish are its banded (reddish to black) head and body and its unique pectoral configuration. The long, flowing pectoral rays have varying degrees of connecting membranes, giving them the distinctive appearance of separate threadlike projections. The dorsal and anal fins are covered with dark rows of spots on a clear to yellowish background. All of the non-pelvic spines—these include the pectoral, anal, and dorsal spines—are venomous.

**DISTRIBUTION**

A wide-ranging species found throughout the Indo-Pacific region. Recently, populations of the red lionfish have become established on the Atlantic coast of the United States, presumably released by aquarium wholesalers in Florida following Hurricane Andrew in 1992. This introduced species has been collected from the Florida Keys north to North Carolina and the southern coast of Long Island, New York.

**HABITAT**

Usually found in lagoon and seaward reefs. Typically, it is a fairly shallow-water species, but it can be found as deep as 164 ft (50 m). They tend to hide among rocks or in caves during the day.

**BEHAVIOR**

The audacity of the colors of this species is a clear warning sign for its exceedingly venomous spines. This species flexes its pectoral fins quickly to charge aggressors with its extended dorsal spines.

**FEEDING ECOLOGY AND DIET**

This species, like most species of *Pterois*, is a voracious predator that feeds primarily on small fishes, shrimps, and crabs. It has been reported that it can eat as much as 8.2 times its body weight per year. Feeds primarily at night, when it uses its widespread pectoral fins to trap prey into a corner. Preyed upon by humans.

**REPRODUCTIVE BIOLOGY**

Primarily solitary, but a single male forms aggregations with females for mating. Courtship begins at twilight and is initiated by the male. Females generally produce two tubes composed of mucus and between 2,000 and 15,000 eggs. Shortly after the females release the eggs, the tubes swell with seawater and are penetrated by the male's sperm. Fertilization proceeds, and the larvae hatch after 36–48 hours.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

Collected in large numbers for the aquarium trade. Despite its venomous nature, the red lionfish also is harvested commercially for food. ♦

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**Merlet's scorpionfish**

*Rhinopias aphanes*

**FAMILY**

Scorpaenidae

**TAXONOMY**

*Rhinopias aphanes* Eschmeyer, 1973, New Caledonia.

**OTHER COMMON NAMES**

English: Weedy scorpionfish.

**PHYSICAL CHARACTERISTICS**

Grows to 10.2 in (26 cm) maximum length. A compressed, large-headed scorpaenid, with an upturned mouth. Typically yellow and black, forming a paisley or "mazelike" appearance. Predominately brown, green, and black specimens also have been recorded. The body and head of this species are covered with cirri and other fleshy appendages.

**DISTRIBUTION**

Has been collected in northeastern Australia, New Caledonia, New Guinea, and southern Japan but probably is more widespread in the western Pacific.

**HABITAT**

Little is known about this cryptic species, but it often is found sitting on corals and appears to be most common on coral slopes.

**BEHAVIOR**

Like many other scorpaenoid fishes, this cryptic fish appears to shed its skin periodically to prevent the buildup of too much epibiotic growth. The presence or absence of venom in this species has not been reported.

**FEEDING ECOLOGY AND DIET**

The diet is unknown, but most other species of *Rhinopias* feed primarily on crustaceans and small fishes.

**REPRODUCTIVE BIOLOGY**

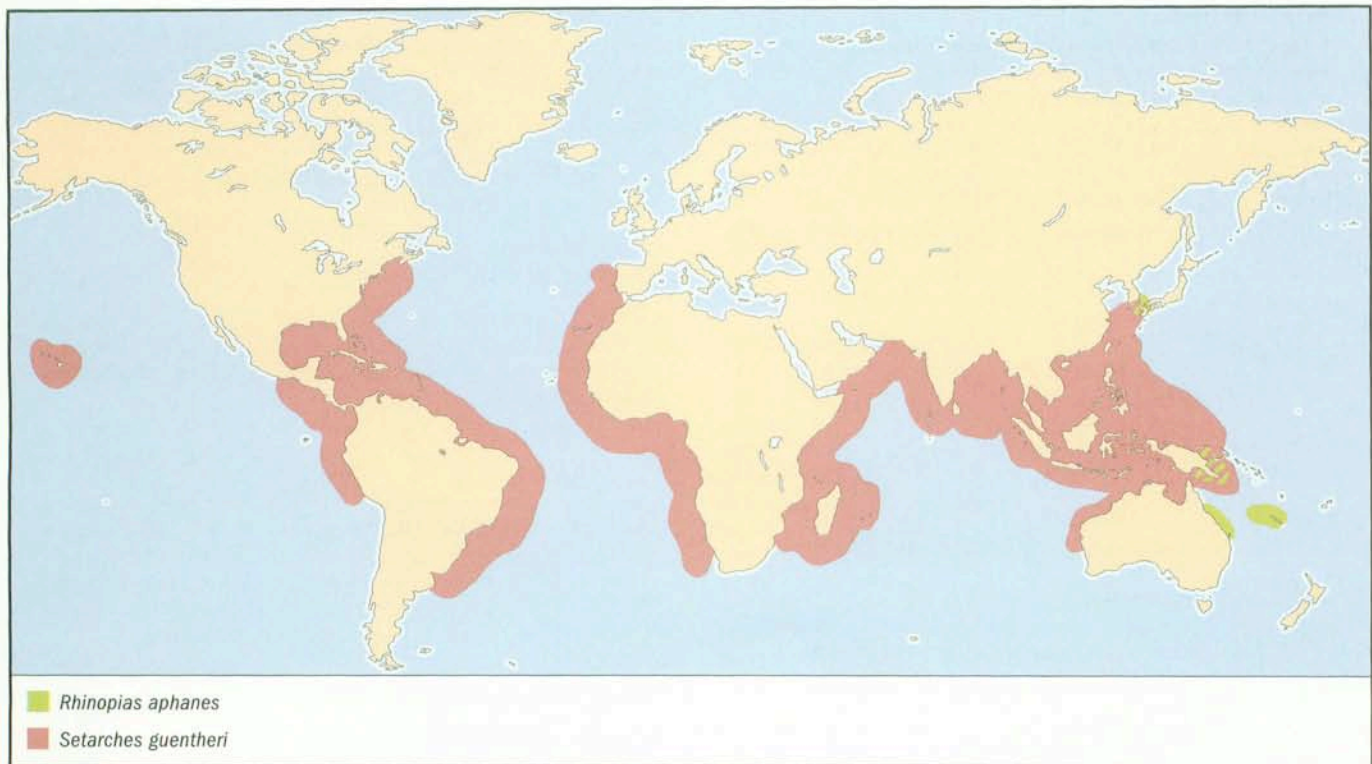
Nothing is known.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

Not commercially fished, but numerous other *Rhinopias* species are prized aquarium specimens. It is likely that Merlet's scorpionfish may already be imported for the aquarium trade. ♦



## California scorpionfish

*Scorpaena guttata*

### FAMILY

Scorpaenidae

### TAXONOMY

*Scorpaena guttata* Girard, 1854, Monterey, California.

### OTHER COMMON NAMES

English: Sculpin; French: Rascasse californienne; Spanish: Rascacio californiano, escorpión californiano.

### PHYSICAL CHARACTERISTICS

Reaches 16.5 in (42 cm) maximum length. Like most scorpaenids, it is a well-camouflaged, spiny, massive fish. The coloring varies widely, from a deep red through light brown. Black, dark brown, and maroon spots cover the body and fins.

### DISTRIBUTION

Found from Santa Cruz, California, south to southern Baja California. This species also is found in the Gulf of California.

### HABITAT

These scorpionfishes are most abundant on hard bottoms, particularly rocky reefs, caves, and man-made structures, such as wrecked ships. Additionally, they can be found on muddy and sandy bottoms.

### BEHAVIOR

Although most scorpionfishes and their allies are venomous, the California scorpionfish is the most venomous fish regularly collected off the California coast.

### FEEDING ECOLOGY AND DIET

The diet of these predators primarily consists of crabs, but small fishes, octopi, and other crustaceans also are eaten.

### REPRODUCTIVE BIOLOGY

Unlike most marine fishes, females produce eggs that are imbedded within the gelatinous walls of pear-shaped structures that float near the surface. After five days, the eggs hatch within these structures. The larval fishes that emerge have an integument that has an inflated appearance and is vesiculate. The larvae remain in plankton until they reach the length of 0.6–0.8 in (15–20 mm), upon which they settle in their adult habitat.

### CONSERVATION STATUS

Although the species represents a fairly important fishery, they currently are not threatened as are some of their rockfish relatives.

### SIGNIFICANCE TO HUMANS

Supports an important commercial and sport fishery in southern California and Ensenada, Baja California. Most fishes are taken in the spring and summer months, when commercial fishermen target spawning aggregations using hook and line, gill nets, and otter trawls. ♦

## Bocaccio

*Sebastes paucispinis*

### FAMILY

Sebastidae

### TAXONOMY

*Sebastes paucispinis* Ayres, 1854, California.

**OTHER COMMON NAMES**

English: Rock salmon; Spanish: Rocote bocaccio.

**PHYSICAL CHARACTERISTICS**

Grows to 37.4 in (95 cm) maximum length. Bocaccios are one of the most elongate rockfishes in California and one of the least spiny rockfishes. They tend to be reddish brown on the dorsal surface, pink or brown on the flanks, and silver ventrally. Juveniles and small adults are reddish brown with dark spots.

**DISTRIBUTION**

Widespread from Alaska to Baja California. They are most abundant from British Columbia to Washington.

**HABITAT**

Juveniles typically are collected in shallow waters under drifting kelp mats that have broken free. Adults form benthic aggregations over hard and rocky bottoms at depths ranging from 164 to 984 ft (50–300 m).

**BEHAVIOR**

Bocaccios are a mobile rockfish. Tagged juveniles often are recaptured 60–80 mi (97–129 km) away from their point of origin. As with many other scorpaenoids, the bocaccio is venomous, but the venom is comparatively weak (although local fishermen suggest that they are the most venomous of the rockfishes).

**FEEDING ECOLOGY AND DIET**

Juveniles feed on small fishes, particularly other rockfishes. Adults feed on rockfishes, sablefishes (Anoplopomatidae), anchovies (Engraulidae), and squids. Eaten by larger fishes and pinnipeds.

**REPRODUCTIVE BIOLOGY**

As with all sebastids, the bocaccio is viviparous (live bearing). Large females can produce more than two million eggs per season, which are released as larvae in two or more batches. Rockfish larvae remain in the upper 263 ft (80 m) of the water column for several months. This stage is followed by a pelagic juvenile stage that lasts one to several months, after which the larvae settle.

**CONSERVATION STATUS**

The bocaccio is the only Critically Endangered scorpaenoid. This listing suggests that the population size has decreased by more than 80% in about the last ten years of the twentieth century, owing to the pressure of overfishing and the low minimum population doubling time, which is longer than 14 years.

**SIGNIFICANCE TO HUMANS**

As their population decline suggests, bocaccios traditionally have been a very important commercial and recreational food fish in the eastern Pacific. When they were more abundant, they represented more than 14% of the total marine recreational catch of California. ♦

**Deepwater scorpionfish**

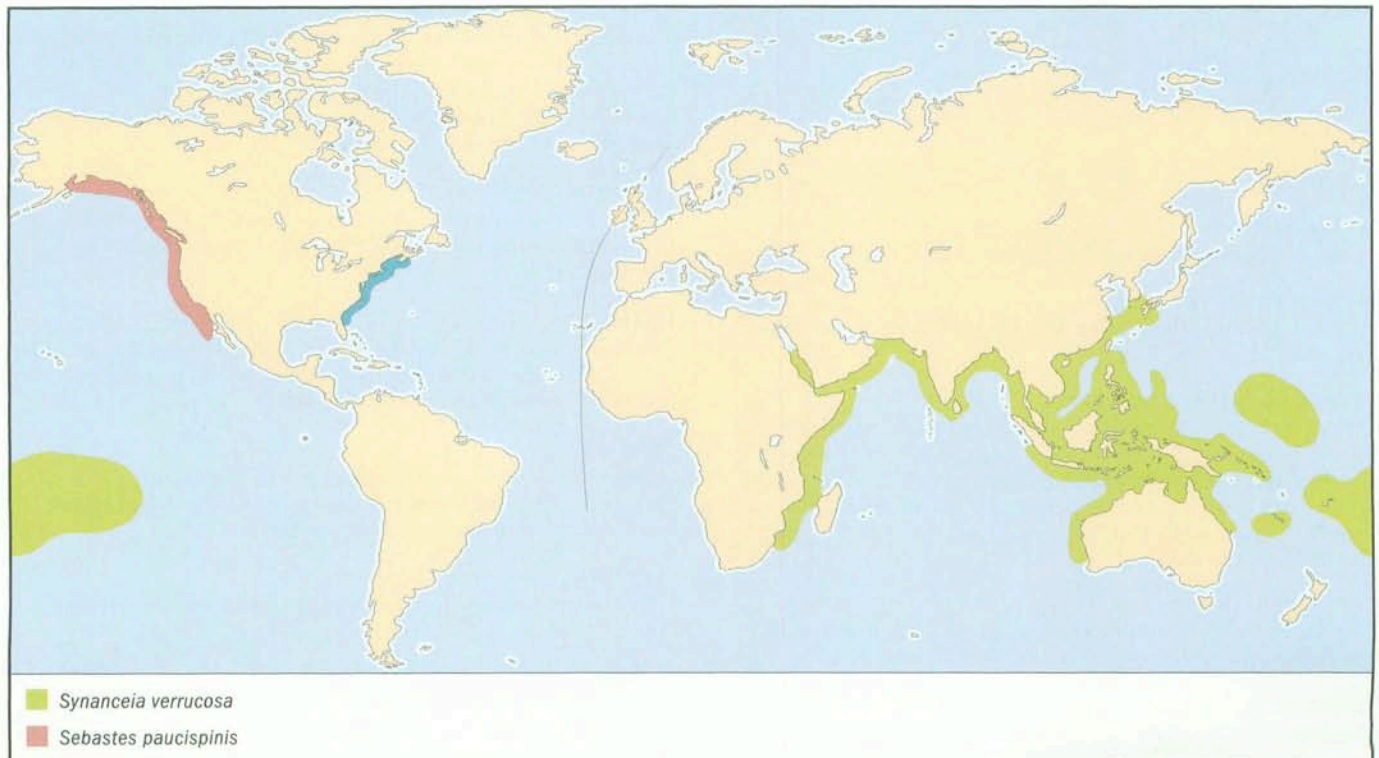
*Setarches guentheri*

**FAMILY**

Setarchidae

**TAXONOMY**

*Setarches guentheri* Johnson, 1862, Madeira.



**OTHER COMMON NAMES**

English: Channeled rockfish; French: Rascasse serran; Spanish: Rascacio serrano; Japanese: Shirokasago.

**PHYSICAL CHARACTERISTICS**

Grows to 9.4 in (24 cm) maximum length. Typically gray or a shade of orange or pink. As is seen with many deepwater fishes, the skeleton is poorly ossified, and the head is cavernous.

**DISTRIBUTION**

Described as the most widely distributed scorpaenoid, because it has been collected worldwide in all tropical and temperate deep waters.

**HABITAT**

A benthic species that lives on or near the bottom at depths between 591–2,297 ft (180–700 m).

**BEHAVIOR**

Nothing is known about the behavior of this species.

**FEEDING ECOLOGY AND DIET**

Preliminary investigations into the diet of this species suggest that it eats deepwater crustaceans, including oplophorids and amphipods.

**REPRODUCTIVE BIOLOGY**

Nothing is known.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

No commercial fishery exists for this deepwater species, although it can be found occasionally in eastern Atlantic fish markets. ♦

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**Bearded ghou**

*Inimicus didactylus*

**FAMILY**

Synanceiidae

**TAXONOMY**

*Inimicus didactylus* Pallas, 1769, Indian Ocean.

**OTHER COMMON NAMES**

English: Demon stinger, popeyed sea goblin, spiny devilfish; Japanese: Hime-oniokoze.

**PHYSICAL CHARACTERISTICS**

Grows to 7.9 in (20 cm) maximum length. The bearded ghou is best recognized by the shape of its head and its elongate pectoral fins, which it uses for crawling along the bottom. This species can be distinguished by the pattern on the medial surface of its pectoral fin, which has a broad, dark, transverse bar that may be streaked.

**DISTRIBUTION**

Distributed from southern Japan and Indonesia to Australia, the Solomon Islands, and New Caledonia.

**HABITAT**

A benthic species found on open sandy or silty bottoms, particularly in estuaries, lagoons, and seaward reefs.

**BEHAVIOR**

A particularly venomous species that is capable of killing a human. Like most stonefishes, this species is a lie-and-wait predator that relies on its cryptic coloration and body form to surprise prey.

**FEEDING ECOLOGY AND DIET**

Feeds primarily on crustaceans, but small fishes also are preyed upon.

**REPRODUCTIVE BIOLOGY**

Little is known about the reproductive biology of this species.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

Because of its small size, this species is not fished commercially; however, despite the fact that these fishes are highly venomous, they are collected occasionally for the aquarium trade, where they are sold as “popeyed sea goblins.” ♦

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**Reef stonefish**

*Synanceia verrucosa*

**FAMILY**

Synanceiidae

**TAXONOMY**

*Synanceia verrucosa* Bloch and Schneider, 1801, Indian Ocean.

**OTHER COMMON NAMES**

English: Stonefish, dornorn; French: Poisson pierre commun; Japanese: Oni-darumaokoze.

**PHYSICAL CHARACTERISTICS**

Reaches 15.7 in (40 cm) maximum length. The reef stonefish is among the best-camouflaged species in the world. Most of these fishes look like encrusted rocks or pieces of coral. Most specimens are dark brown or gray, but they usually have patches of yellow, red, or orange.

**DISTRIBUTION**

This is the most widely distributed stonefish. It can be found throughout the Indo-Pacific from Africa to the Tuomoto Archipelago.

**HABITAT**

Usually found living among rubble, on coral bottoms, or under rocks or ledges. They also are found on sandy or muddy bottoms, where they often bury themselves.

**BEHAVIOR**

This is the world's most venomous fish. Unlike most scorpaenoids, the stonefishes have grooves in their dorsal spines that act like syringes to deliver venom.

**FEEDING ECOLOGY AND DIET**

This species feeds primarily on small fishes and crustaceans that swim by.

**REPRODUCTIVE BIOLOGY**

Stonefishes are typically solitary creatures, but they do form larger aggregations for mating. The reef stonefish has external fertilization, and produces comparatively large eggs.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

Despite the extreme danger associated with collecting this species, there are commercial fisheries for both dead and live fish markets. In addition to their commercial fishery, stonefishes make their way into the aquarium trade. The sting of the stone fish is extremely painful and is followed by rapid swelling around the wound. The severity of the response is related to the depth of the penetration by the spines. The treatment of the wound consists of bathing the stung area in very hot water until the victim can be hospitalized. For more serious stings, it is often advisable for stonefish antivenin to be given intramuscularly. The stonefish antivenin is composed of purified antibodies against stonefish venoms and venom components. These antibodies are harvested from laboratory animals, which are given small doses of the venom. Eventually, these animals build up a tolerance to the venom, which allows them to produce the large quantity of venom antibodies required for the antivenin. ♦

**Cockatoo waspfish**

*Ablabys taenianotus*

**FAMILY**

Tetrarogidae

**TAXONOMY**

*Ablabys taenianotus* Cuvier, 1829, Mauritius.

**OTHER COMMON NAMES**

English: Rogue fish.

**PHYSICAL CHARACTERISTICS**

Grows to 5.9 in (15 cm) maximum length. A strongly compressed waspfish with a sail-like dorsal fin that originates above the eye. Cockatoo waspfishes are reddish brown with black lines and black and white blotches sprinkled over the dorsal and lateral surfaces.

**DISTRIBUTION**

Widely distributed in the western Pacific as far north as Japan and south to Australia and Fiji. Can be found as far west as India and as far east as the Society Islands.

**HABITAT**

A cryptic species that typically is collected among seaweed in littoral or rocky intertidal habitats in shallow depths to 263 ft (80 m).

**BEHAVIOR**

Cockatoo waspfishes tend to be more active at dusk or night. As is seen in some other scorpaenoids, this species often is found rocking back and forth in response to the surge, to mimic the seaweed that surrounds it. This species is quite venomous.

**FEEDING ECOLOGY AND DIET**

Like many waspfishes, this species feeds primarily on small crustaceans, particularly shrimps, and smaller fishes.

**REPRODUCTIVE BIOLOGY**

Little is known.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

Not commercially fished but collected for the aquarium trade. ♦

**Red gurnard**

*Chelidonichthys spinosus*

**FAMILY**

Triglidae

**TAXONOMY**

*Chelidonichthys spinosus* McClelland, 1844, China.

**OTHER COMMON NAMES**

Japanese: Hôbô.

**PHYSICAL CHARACTERISTICS**

Reaches 15.7 in (40 cm) maximum length. Head encased in bony armor with short rostral projections. Body coloration varies from brown to light orange or red when under stress. The dorsal surface of this species has brown patches, and the inner surface of the pectoral fins is olive to dark green, with scattered blue or white spots.

**DISTRIBUTION**

Found from southern Hokkaido (Japan) south to the South China Sea.

**HABITAT**

Found on sandy bottoms.

**BEHAVIOR**

The red gurnard, like all sea robins, spends much of its time "walking" on the seafloor, using its free pectoral rays to probe the sediment for food. Capable of making sounds using drumming muscles that are beaten against the gas bladder. Venom has not been found.

**FEEDING ECOLOGY AND DIET**

The diet consists mainly of various crustaceans and mollusks. Preyed upon by larger predatory fishes.

**REPRODUCTIVE BIOLOGY**

The red gurnard produces large pelagic eggs. There have been numerous reports of increased male grunting during the breeding season, suggesting that auditory signals are important in mate selection.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

An excellent food fish. Taken by trawlers throughout its range. ♦

**Striped sea robin**

*Prionotus evolans*

**FAMILY**

Triglidae

**TAXONOMY**

*Prionotus evolans* Linnaeus, 1766, North or South Carolina, United States.

**OTHER COMMON NAMES**

French: Grondin volant; Spanish: Rubio volador.

**PHYSICAL CHARACTERISTICS**

Reaches 17.7 in (45 cm) maximum length. Characterized by a large bony head with many ridges and spines and a bifurcate lateral line on the tail. The striped sea robin is white ventrally, with various shades of golden, brown, and orange on the sides and dorsal surface. It often has dark saddles underneath the dorsal fins and is best distinguished from other species by the two thin, black stripes running along the side of the body. The dorsal stripe runs the entire length of the fish along the lateral line, and the smaller, incomplete stripe is situated below. The tail has two black bars with a light area between them.

**DISTRIBUTION**

Found from southern Nova Scotia down the Atlantic Coast of North America to northeastern Florida. Typically collected at depths of less than 200 ft (61 m) but have been found at depths as great as 550 ft (168 m).

**HABITAT**

Usually found on sandy bottoms. It often can be taken in in-shore estuaries or over reefs, particularly in summer months.

**BEHAVIOR**

The striped sea robin uses its free pectoral rays to “walk” along the seafloor in search of prey. The sea robins along

the Atlantic Coast of North America are famous for their ability to produce sounds by “beating” the swim bladder muscles against the gas-filled swim bladder, making a characteristic grunting noise. Typically, the striped sea robin is found offshore, but the species makes migrations into the deeper, more saline estuaries for breeding. This species is not venomous.

**FEEDING ECOLOGY AND DIET**

The diet consists mainly of crustaceans, mollusks, and fishes. Preyed upon by larger predatory fishes.

**REPRODUCTIVE BIOLOGY**

Produces pelagic eggs. This species appears to breed in deeper estuarine environments, typically in the summer months from May to October. It seems clear that sound plays a role in choice of mate.

**CONSERVATION STATUS**

Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**

The striped sea robin is a commercially important fish. It is collected and used for human consumption, fishmeal, bait, pet food, and fertilizer. Smaller specimens often are collected for the aquarium trade, though they grow too large for most home aquaria. ♦

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