

# Madeira Canary Islands Azores – Fishes

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More than 150 species, more than 200 photos in colour.

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### **The blissful islands**

The „Macaronesian Islands“ are not – as one might suspect – somewhere in the Pacific Ocean. The German botanist A. Engler coined this name in 1879 for the Azores, Madeira (plus Porto Santo) and the Canary Islands, because of similarities in the plants of the plant species of these islands. The name comes from the Greek (*makaros, nesios*) and means „the blissful islands“. Later, many authors (probably for political reasons) also counted the Cape Verde Islands among the Macaronesian Islands but from a biological point of view this is not justified: the animal and plant life of the Cape Verde Islands is much more similar to tropical Africa than to the true Macaronesian Islands. Three fish species (*Raja maderensis*, *Gobius maderensis* and *Scorpaena canariensis*) live only around the Macaronesian Islands and nowhere else. The Blue Wrasse *Centrolabrus caeruleus* lives only at the Azores. Two rare and small gobies are currently only known from the Canary Islands (but may have been simply overlooked at other places until now).

With a distance of 1300 km to the mainland, the Azores are the most remote islands in the northern Atlantic. One consequence of this isolated position is that there are only about 400 different species of fish at the Azores (about 550 each at Madeira and the Canaries): some shore fish did not succeed to bridge such a large distance. The speciose family Sparidae (breems) provides a good example: whereas there are 24 different bream species at the Canary Islands, and 15 at Madeira, only 8 are recorded from the Azores.

All Macaronesian Islands have a volcanic origin. Coming from a depth of sometimes several thousand meters, these volcanoes break through the surface of the sea with but their tips. There are many more volcanoes in the same area, which do not reach the surface; however, some of them were also islands with terrestrial animals and plants in former times, when the sea level was about 120 m lower than today.

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### **Devil rays (Mobulidae)**

#### **Manta ray (*Manta birostris*)**

Up to 6.7 m wing span. Madeira, Canary Islands, Azores. 0 – 40 m depth.

Devil rays are large, free-swimming rays that feed on plankton. The head flaps direct water into the mouth. Plankton (and small fish) is then sieved out of the water with gill rakers. These head flaps can be rolled up and then project forward like to large horns, which has given these animals the name „devil rays“. Frequently, shark suckers are attached to manta rays. To see a manta ray „flying“ through the water is an unforgettable experience. These inquisitive animals often circle around divers for considerable time before moving on. The genus *Manta* differs from the genus *Mobula* (next double page) by its much longer horns and by having the opening of the mouth at the front. Both photos Pedro Monteiro.

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#### **Small devil ray (*Mobula tarapacana*)**

Up to 4 m wing span. Madeira, Canary Islands, Azores. 0 – 30 m depth.

The genus *Mobula* differs from the genus *Manta* (previous double page) by its much shorter horns and by the fact that the mouth opens at the lower side of the animal. The back is greenish (brownish to black in the manta ray). *Mobula*-species usually are much shyer than manta rays and do not let divers approach as closely. The belly of *Mobula tarapacana* is white in the front and dark on the rear. Similar species with completely white belly or spotted belly (*M. mobular* and *M. japonica*) may also occur in the area but have not yet been recorded. Please send photos of such animals to [peterwirtz2004@yahoo.com](mailto:peterwirtz2004@yahoo.com) ! Both photos Peter Wirtz.

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### **Sting rays (Dasyatidae)**

#### **Common sting ray (*Dasyatis pastinaca*)**

Up to 1.4 m wing span. Madeira, Canary Islands, Azores. 3 – 200 m depth.

Sting rays have one to two poisonous spines on their tail (insert). It consists of a substance similar to dental enamel, carries barbs and in the living animal it is surrounded by a poison gland. Sting rays use these weapons only for defence. Like a scorpion, they strike out with their tail against the (supposed) attacker. The Common sting ray has a rather pointed snout and a smooth, round tail. The back of pregnant females bulges upwards. After a gestation period of only 4 months, 3 to 7 young are born. The Common sting ray feeds on small bottom-living fish, snails, and crabs. Photos Peter Wirtz.

#### **Roughtail sting ray (*Dasyatis centroura*)**

Up to 2.2 m wing span. Madeira, Canary Islands. 10 – 200 m depth.

If you see a sting ray with more than 1.5 m wing span it must be this species. It carries large, horny tubercles on its tail, which gave the species its name. From head to tail, Roughtail sting ray may measure 5 m length !

Two to four live young are born in autumn or winter. Photo Robert Minderlein.

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#### **Round sting ray (*Taeniura grabata*)**

Up to 1.2 m wing span. Madeira, Canary Islands, Azores. 10 – 100 m depth.

The Round sting ray is easily told apart from the Common sting ray (previous page): it has a much rounder outline of the body, a darker colour and a slightly flattened tail that carries a skin fold on the lower rear edge. Uniformly coloured animals are more common than spotted ones at Madeira and the Azores; spotted ones can frequently be seen at the Canary Islands. Photo Peter Wirtz.

### **Butterfly rays (Gymnuridae)**

#### **Butterfly ray (*Gymnura altavela*)**

Up to 2 m wing span. Madeira, Canary Islands. 0.5 – 70 m depth.

Butterfly rays can easily be recognized by their peculiar body shape. They are often buried in the sand, sometimes already in a few cm water depth. They are related to sting rays and have two short spines on a very short tail. After a gestation period of about six months, two to seven young are born. Photo Pedro Monteiro.

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### **Eagle rays (Myliobatidae)**

#### **Eagle ray (*Myliobatis aquila*)**

Up to 1.1 m wing span. Madeira, Canary Islands, Azores. 1 – 200 m depth.

Like sting rays, eagle rays carry one to two poisonous spines on the tail. The tail of the eagle ray is particularly long; a small dorsal fin stands at its beginning (absent in sting rays). Eagle rays move through the water beating their „wings“. They dig in sand and mud, in search of bivalves, which they can crush with their strong tooth plates. They probably can smell bivalves that are buried in the substrate. Females are larger than males; they give birth to five to seven young. Photo Peter Wirtz.

### **Duck-billed ray (*Pteromylaeus bovinus*)**

Up to 2.2 m wing span. Madeira, Canary Islands. 10 – 150 m depth.

Duck-billed rays have snouts projecting even more forward than those of eagle rays. The species can also be recognized by the stripes on its back. At Madeira and the Canary Islands, duck-billed rays are much rarer than eagle rays. Like eagle rays, they dig in sand, in search of bivalves and snails. The young are born with a wing span of already 30 to 45 cm. Photo Peter Wirtz.

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### **Skates (*Rajidae*)**

#### **Madeira ray (*Raja maderensis*)**

Up to 80 cm long. Madeira, Azores. 1 – 200 m depth.

The Madeira ray looks quite similar to the Thornback ray (*Raja clavata*), which is common in the Northeastern Atlantic and it probably originated from this species. New, genetic research indicates that it should perhaps only be considered a colour variant of the Thornback ray. At the Azores, it can be locally common. It feeds on bivalves, crabs and small fish. Skates do not have stings on their tail Madeira rays have a row of thorns along their tail. Like all skates, they lay eggs that are surrounded by a horny pouch. Photo Peter Wirtz

### **Electric rays (*Torpedinidae*)**

#### **Marbled electric ray (*Torpedo marmorata*)**

Up to 55 cm long. Madeira, Canary Islands. 5 – 500 m depth.

To stun their prey or to defend themselves, electric rays can emit electric pulses of up to 220 V. Divers who touch an electric ray, also receive a current impulse which subjectively corresponds in strength to that of an electric cow fence. Electric rays are night active; they are usually buried in the sand during the day and only the outline of the body can be seen (or nothing at all). The almost circular body shape and two small fins on the tail are typical for electric rays. After a gestation period of nine months, three to 16 live young are born in autumn. Photo Peter Wirtz.

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### **Whale sharks (Rhincodontidae)**

#### **Whale shark (Rhincodon typus)**

Up to 12 m long. Madeira, Canary Islands, Azores. 0 – 150 m depth.

Whale sharks are tropical animals. In the area from the Canary Islands to the Azores, they have been seen more and more frequently during the last years, probably because of global warming, which of course also affects the sea. The Whale shark is the largest fish of the world. It is an inoffensive plankton eater, which does, however, not reject a school of small fish that happens to get into its mouth. It can easily be recognized by the many small white spots on its body. Whale sharks are ovoviviparous, that is the young hatch out of the egg still inside the body of the female, just before being born. Pilot fish are swimming in front of the whale shark in the photo. Photo Aschi Haas.

### **Angel sharks (Squatinae)**

#### **Angel shark (Squatina squatina)**

Up to 1.8 m long. Canary Islands. 1 – 150 m depth.

The distinctly flattened angel sharks are night active. During the day, they are mostly buried in sand. They feed on fish and bivalves. In early summer, the female gives birth to 7 to 25 live young. Do not be deceived by the harmless appearance and sluggish lifestyle of angel sharks: divers who pulled an angel shark's tail were bitten by the shark that quickly turned around. Photo Peter Wirtz.

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### **Moray eels (Muraenidae)**

#### **Black moray (*Muraena augusti*)**

Up to 90 cm long. Madeira, Canary Islands, Azores. 2 – 130 m depth.

As the name indicates, Black morays usually are black. However, young animals in particular can also bear many small white spots. The white eyes are conspicuous and typical for the species. Some time ago, the Black moray was considered a mere colour form of the Mediterranean moray (next page) but a detailed study found many differences. The Black moray, which is quite common in the area, reaches sexual maturity with a size of about 55 cm and an age of 5 years; it probably attains 18 years of age. Reproductive season in August. Photos Peter Wirtz.

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#### **Mediterranean moray (*Muraena helena*)**

Up to 1.3 m long. Madeira, Canary Islands, Azores. 1 – 800 m depth.

The Mediterranean moray differs from the Black moray not only in colour but also in many other traits. It reaches sexual maturity with about 75 cm length (at an age of 7 years) and probably reaches 35 years of age.

Reproduction in May. The golden pattern on the body may consist of small points or larger spots. Photo Peter Wirtz.

### **Fangtooth moray (*Enchelycore anatina*)**

Up to 1 m long. Madeira, Canary Islands, Azores. 1 – 50 m depth.

The long, thin, glass like teeth give a particularly menacing appearance to the Fangtooth moray. Obviously, this species does not eat hard-shelled animals (like the Brown moray on the next page), but soft prey like fish and cephalopods. Photo Peter Wirtz.

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### **Brown moray (*Gymnothorax unicolor*)**

Up to 1.1 m long. Madeira, Canary Islands, Azores. 1 – 80 m depth.

This species can be recognized by its short snout and the dark „bank-robber-mask“ on its head. The Brown moray has short stout teeth because it feeds mainly on crabs (compare the photo of the Fangtooth moray on the previous page!). Peacock wrasses are often sleeping in the caves of Brown morays at night. Photo Rainer Holland.

### **Golden-tailed moray (*Gymnothorax miliaris*)**

Up to 60 cm long. Canary Islands. 1 – 30 m depth.

The Golden-tailed moray is a tropical species. At the Canary Islands it mainly lives at El Hierro and La Palma, where the water is warmer than around the more easterly islands. Photo (bottom left) Rogelio Herrera.

### **Bacallado's moray (*Gymnothorax bacalladoi*)**

Up to 45 cm long. Madeira, Canary Islands. 5 – 20 m depth.

This small moray is only rarely seen. Young animals (like that in the photo) have a light ring behind the head which disappears in the adult animal. Photo (bottom right) Peter Wirtz.

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### **Conger eels (*Congridae*)**

#### **Conger eel (*Conger conger*)**

Up to 3 m long. Madeira, Canary Islands, Azores. 5 – 2000 m depth.

The Conger eel differs from the true freshwater eel two pages further on), which can only rarely be seen in the sea, by having the upper jaw slightly longer than the lower jaw (i.e. the reverse of the freshwater eel). A night-active species, which hides in dark places during the day. Males reach sexual maturity with 55 - 70 cm length, females only with 2 m length. Large females can produce up to 8 million eggs. Occasionally, one can see a conger with circular white rings on the head, the marks of the suction cups of an octopus that tied not to be eaten by a Conger. Photo Peter Wirtz.

#### **Garden eel (*Heteroconger longissimus*)**

Up to 60 cm long. Madeira, Canary Islands. 10 – 40 m depth.

This tropical species lives on both sides of the Atlantic. In the eastern Atlantic, it reaches its northern limit at Madeira Island (like many other tropical species). The tube in the sand is solidified with a gluey secretion produced by the tail of the eel. During the day, Garden eels pick drifting plankton out of the water. At night,

they sleep in their tubes. At dawn, the first thing they do is to throw out the sand that has fallen into the tube with a vehement snake-like movement. Photos Peter Wirtz.

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### **Golden Balearic conger (*Ariosoma balearicum*)**

Up to 50 cm long. Madeira, Canary Islands, Azores. 10 – 700 m depth.

The Golden Balearic conger is, one might say, the small, sand-bottom version of the Conger eel. During the day, it is buried in the sand; at night it swims over sandy bottom. If frightened, it rapidly buries itself in the sand, tail first. A few minutes later, it cautiously looks out again. Large photo Artur Silva, small photo Peter Wirtz.

### **Bigeye conger (*Paraconger macrops*)**

Up to 50 cm long. Madeira, Azores. 15 – 100 m depth.

At first glance, the Bigeye conger looks very similar to the Golden Balearic conger. But it not only has larger eyes but also much thicker lips. It is also night active. During the day, only the head can be seen projecting out of the sand. Photo Peter Wirtz.

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### **True eels (*Anguillidae*)**

#### **European eel (*Anguilla anguilla*)**

Up to 1.4 m long. Madeira, Canary Islands, Azores. 0 – 7000 m depth.

The European eel is only rarely encountered in the sea (the photo was taken in a large tide pool at the Azores).

The lower jaw of the European eel is clearly longer than the upper jaw the contrary of the situation in the Conger eel). Photo top right Peter Wirtz.

### **Sorcerer eels (Nettastomidae)**

are animals of the deep sea. But – as is the case for several deep sea species – juveniles (up to about 30 cm length) of the **Sharpnose sorcerer eel (Faciolella oxyrhyncha)** (insert) can be found in caves in shallow water (the living conditions in caves are somewhat similar to those in the deep sea). The body of these animals is so transparent that one can see the vertebrae and the gills. The Sharpnose sorcerer eel grows to 70 cm length and lives down to 750 m depth. Photo insert Peter Wirtz.

### **Snake eels (Ophichthidae)**

#### **Golden spotted snake eel (Myrichthys pardalis)**

Up to 65 cm long. Canary Islands. 2 – 20 m depth.

The Golden spotted snake eel is active during the day and crawls over the bottom rather like a snake, putting its head into cracks and crevices, in search of crustaceans and small fish. There are no sea snakes in the Atlantic Ocean! Photo bottom right Rogelio Herrera.

#### **Finless snake eel (Apterichtus caecus)**

Up to 60 cm long. Madeira, Canary Islands, Azores. 1 – 40 m depth.

As the name implies, this fish has no fins whatsoever and looks more like a worm than a fish. During the day it is hidden in the sand. At night, the head is looking out of the sandy bottom. Photo insert Peter Wirtz.

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### **Tarpons (Megalopidae)**

#### **Tarpon (*Megalops atlanticus*)**

Up to 2.5 m long. Madeira, Canary Islands, Azores. 2 – 20 m depth.

This tropical species lives on both sides of the Atlantic. It looks like a gigantic herring but is more closely related to the eels, as shown by a similar larval stage. Near Madeira, the Canary Islands and the Azores it can be seen only very rarely. The tarpon hunts for fish and cephalopods at night. Photo (from Curacao Island) Peter Wirtz.

### **Herring (Clupeidae)**

**Round sardinella (*Sardinella aurita*)** photo bottom Peter Wirtz

**Madeira sardinella (*Sardinella maderensis*)** insert Peter Wirtz

Up to 25 cm long. Madeira, Canary Islands, Azores. 1 – 50 m depth.

The three pilchard species in the area are very difficult to tell apart under water. The Madeira sardinella has a black dot behind the opercle and black tips of the tail fin. The Round sardinella has a black dot behind the opercle. The third species, the true Pilchard (*Sardina pilchardus*), does not have a black dot behind the opercle and is more elongate than the other two species.

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## **Lizard fishes (Synodontidae)**

### **Green lizard fish (*Synodus saurus*)**

Up to 40 cm long. Madeira, Canary Islands, Azores. 1 – 400 m depth.

Lizard fishes are lurking predators. The two species in the area have divided the space between themselves:

The Green lizard fish lives mainly on sand and muddy bottom. It is greenish with blue lines and does not have a black spot on the tip of the upper snout. Photo Peter Wirtz.

### **Brown lizard fish (*Synodus synodus*)**

Up to 40 cm long. Madeira, Canary Islands. 1 – 400 m depth.

The Brown lizard fish mainly lives on rocky bottom and rubble, almost never on soft bottoms (where the Green lizard fish lives). It lives on both sides of the Atlantic but not at the Azores (where only the Green lizard fish can be encountered). It differs from the Green lizard fish not only in the colour of the body but also by a small dark spot on the tip of the upper snout. Photo Peter Wirtz.

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## **Oar fishes (Regalecidae)**

### **Oar fish (*Regalecus glesne*)**

Up to 11 m long. Madeira, Canary Islands, Azores. 0 – 1000 m depth.

The largest bony fish of the world (up to 11 m length!), it is a truly rare sight. It lives in the open sea and feeds on krill, small fish and cephalopods. The first rays of the dorsal fin begin directly over the eye and are brilliantly red. The ventral fins consist of a single, very long fin ray each. Oar fish may have given origin to

the myth of giant sea snakes. Photo João Monteiro. The **Scalloped ribbon fish** *Zu cristatus* (Family Trachipteridae) also lives in the open sea. It looks like a short Oar fish and grows to 1 m length. The singular photo of a juvenile of this species (insert) was taken by Robert Minderlein at the Azores.

### **Frogfishes (Antennariidae)**

#### **Coin-bearing frog fish (Antennarius nummifer)**

Up to 9 cm long. Madeira, Canary Islands, Azores. 10 – 300 m depth.

Frogfish are difficult to detect. The animals lie motionless on rocky bottom and look rather like a sponge. The pectoral fins are modified into strong arms, used to cling to the bottom and also to crawl over the bottom.

With a small fishing rod – the modified first ray of the dorsal fin – and a movable piece of skin on its tip, the frog fish entices small fish and shrimps in front of its mouth. When the prey is close enough, the frog fish sucks it in by suddenly opening its very large mouth. This movement is so fast that it cannot be seen by the human eye. Photos Peter Wirtz.

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### **Clingfishes (Gobiesocidae)**

#### **Small-headed clingfish (Apletodon dentatus)**

Up to 4 cm long. Canary Islands. 2 – ? m depth.

The comparatively short head is typical for the species, which is quite variable in colour. It can, for instance, also be brightly yellow. Photo top right Arturo Telle.

#### **Purple clingfish (Mirbelia candolii)**

Up to 7 cm long. Madeira, Canary Islands. 2 – ? m depth.

The ventral fins of clingfish are modified into a sucking disk. The Purple clingfish is the most common clingfish species in the area. Males are more reddish in colour, females brown. Photo bottom right Peter Wirtz.

### **Shore clingfish (*Lepadogaster lepadogaster*)**

Up to 8 cm long. Madeira, Canary Islands. 1 – ? m depth.

The largest clingfish species in the area. The two small, blue spots on the head are typical for the species. Photo bottom Rogelio Herrera.

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### **Cod fishes (*Gadidae*)**

#### **Larger forkbeard (*Phycis phycis*)**

Up to 75 cm long. Madeira, Canary Islands, Azores. 15 – 600 m depth.

With its long, forked pelvic fins, the Larger forkbeard feels for food. During the day, it hides in dark places (in caves or below large boulders), at night it hunts. At the Azores, it is a common shore fish, not quite as common at Madeira and the Canary Islands. The Larger forkbeard reaches an age of 18 years. Photo Peter Wirtz.

#### **Spotted rockling (*Gaidropsarus guttatus*)**

Up to 32 cm long. Madeira, Canary Islands, Azores. 1 – 20 m depth.

The first dorsal fin of rocklings is modified into a sensory organ. The fin rays are very short and lie in a groove. The fin permanently performs a rapid, undulatory movement that draws water through the groove. Sensory cells then test the odorous substances in the water. During the day, rocklings hide in caves or below boulders. The Spotted rockling mainly feeds on crustaceans. Reproductive season is in early summer. Photo Peter Wirtz.

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### **Needle fishes (Belonidae)**

#### **Garfish (*Belone belone*)**

Up to 90 cm long. Madeira, Canary Islands. 0 – 10 m depth.

Needle fishes usually swim directly below the surface of the water, in small groups or alone. Both jaws are greatly elongated. Needle fish capture their prey, mainly small fish, with a lightning-fast sideways movement of the jaws. Reproductive season in the summer. The eggs are glued to plants by small, sticky threads. Photo Peter Wirtz.

### **Sand smelts (Atherinidae)**

#### **Sand smelt (*Atherina* sp.)**

Up to 10 cm long. Madeira, Canary Islands, Azores. 1 – 30 m depth.

The different Sand smelt species in the area (*Atherina hepsetus*, *Atherina presbyter*, possibly also *Atherina boyeri*) cannot be told apart on first glance. Sand smelt are frequently confused with sardines. But they do not have a silvery body, only a silvery line along the body. Also they have two small dorsal fins, not only one. Sand smelt often form very large schools in shallow water. They are important food for many predatory fish

species and live to only three or four years of age. The sticky eggs are spawned over marine plants. Large photo Peter Wirtz, insert Pedro Monteiro.

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### **Dories (Zeidae)**

#### **John dory (Zeus faber)**

Up to 80 cm long. Madeira, Canary Islands, Azores. 10 – 400 m depth.

The greatly elongated dorsal fin rays are typical for the species. The German name “Heringskönig”, i.e. king of the herrings, originated from the idea that this species leads schools of herring. It is often caught together with herring because it preys on them (and on other fish). It slowly approaches and suddenly sucks them up with its greatly protruding mouth. Young animals live in groups, adults are solitary. Photo Peter Wirtz.

### **Boar fishes (Caproidae)**

#### **Boarfish (Capros aper)**

Up to 15 cm long. Madeira, Canary Islands, Azores. 25 – 600 m depth.

Boar fishes usually live below 50 m depth, most commonly between 100 and 400 m. Divers therefore rarely see them. Occasionally, however, large schools turn up in shallow water. The large eyes of this species are one of the features indicating that it normally lives in dark areas. Photo Peter Wirtz.

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### **Snipe fishes (Macroramphosidae)**

#### **Snipefish (Macroramphosus scolopax)**

Up to 15 cm long. Madeira, Canary Islands, Azores. 5 – 600 m depth.

The very long snout makes this species unmistakable. Young animals form large silvery schools in the open water. Adults are a red-silvery colour and live in small groups over the bottom. Frequently they swim head-down. Snipefish occasionally swim in mixed groups with Boarfish. Photo Peter Wirtz.

### **Trumpet fishes (Aulostomidae)**

#### **Trumpetfish (*Aulostomus strigosus*)**

Up to 75 cm long. Madeira, Canary Islands. 10 – ? m depth.

There are only three species in the family Trumpet fishes. *Aulostomus strigosus* lives in the Eastern Atlantic and – like many other tropical species - reaches its northern limit at Madeira. Trumpet fishes are predators that feed on small fish and crustaceans. The long, thin, elongated snout enables them to reach into narrow cracks that are unreachable for other predatory fish. The colour is quite variable, from red-brown and yellow to grey. Photo Peter Wirtz.

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### **Pipefish and Seahorses (Syngnathidae)**

#### **Short-snouted seahorse (*Hippocampus hippocampus*)**

Up to 12 cm long. Madeira, Canary Islands, Azores. 3 – 30 m depth.

At Madeira and the Canary Islands only this sea horse species can be seen whereas at the Azores one may also see the **Long-snouted seahorse (*Hippocampus guttulatus*)**, which reaches 14 cm length and frequently has small white spots. Both are quite variable in colour. In summer, they come into shallow water. In pipefishes

and seahorses, it is the male that carries the eggs, in a pouch or a fold on the belly. Bony rings or half-rings protect the body, instead of scales; this, however, reduces flexibility. Pipefishes and seahorses use their long snout to suck up small animals as if it were a pipette. The “gestation period” of our seahorse species is only three to five weeks (any time between April and October). The babies hatch with a length of about 15 mm.

Photo Peter Wirtz.

### **Great pipefish (*Syngnathus acus*)**

Up to 46 cm long. Madeira, Canary Islands, Azores. 3 – 30 m depth.

The Great pipefish has a particularly long snout, by which it can be told apart from other pipefish species. Males reach sexual maturity with about 30 cm length and carry the eggs on the belly, protected on the left and right by a skin fold but open to view. The babies are born with a length of about 25 mm. Like most other pipefishes, the Great pipefish mainly lives in **sea grass** meadows, but also between other plants on rock or sand. Photo Peter Wirtz.

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### **Scorpion fishes (*Scorpaenidae*)**

#### **Madeira-scorpionfish (*Scorpaena maderensis*)**

Up to 15 cm long. Madeira, Canary Islands, Azores. 2 – 40 m depth.

Scorpion fishes owe their name to the many poisonous spines carried on the body. It is better to not touch **them!** The sting hurts but is not really dangerous. The Madeira-scorpionfish is one of the most common fish species on hard bottoms from the Azores to the Canary Islands. It can be recognized by the many small black dots and the small white skin flaps on the head. The quite similar looking Canary-scorpionfish (see next page)

also has such white skin flaps but lacks the small black dots. The ground colour of the body can vary from light gray to dark red. The Madeira-scorpionfish reaches an age of up to five years. Photo Peter Wirtz

### **Red scorpionfish (*Scorpaena scrofa*)**

Up to 65 cm long. Madeira, Canary Islands, Azores. 2 – 300 m depth.

The largest scorpionfish species in the area. If you see a scorpionfish larger than 25 cm it must be this species. However, in shallow water you are likely to see only young individuals (to about 30 cm length) of this species; adult animals live in deeper water. The colour varies from light pink to dark red, occasionally yellow. Photo Peter Wirtz

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### **Brown scorpionfish (*Scorpaena porcus*)**

Up to 32 cm long. Madeira, Canary Islands, Azores. 2 – 800 m depth.

The Brown scorpionfish has longer tentacles over the eyes than the similar looking Small scorpionfish. It reaches an age of eight years. Photo top right Peter Wirtz.

### **Small scorpionfish (*Scorpaena notata*)**

Up to 20 cm long. Madeira, Canary Islands, Azores. 2 – 700 m depth.

The small scorpionfish has shorter tentacles over the eyes than the similar looking Brown scorpionfish or even lacks such tentacles. Almost always a dark spot on the first dorsal fin. Photo bottom right Peter Wirtz.

### **Canary-scorpionfish (*Scorpaena canariensis*)**

Up to 25 cm long. Madeira, Canary Islands, Azores. 2 – 800 m depth.

In contrast to the quite similar looking *S. maderensis*, this species does not have small black spots on the body. Photo Peter Wirtz.

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### **Gurnards (Triglidae)**

#### **Streaked gurnard (*Chelidonichthys lastoviza*)**

Up to 40 cm long. Madeira, Canary Islands, Azores. 5 – 150 m depth.

The first two to three pectoral rays of gurnards are freely moveable like fingers. Gurnards use them to crawl over sandy or muddy bottom and to feel for prey. There are taste buds on the tips of these fin rays so that the animals can immediately taste what they touch. The German name “Knurrhahn” comes from the animal’s ability to produce grunting noises. When the Streaked gurnard feels threatened it spreads its large, conspicuously blue-spotted and blue-rimmed pectoral fins. It is by far the most common gurnard species in our area and can also be encountered over gravel bottoms. Photos Peter Wirtz.

#### **Longfin gurnard (*Chelidonichthys obscura*)**

Up to 35 cm long. Madeira, Canary Islands. 5 – 170 m depth.

In theory, this species can easily be recognized by the very long second dorsal fin ray. However, the dorsal fin is usually folded against the body, so that the elongated fin ray cannot be seen. The Longfin gurnard is much

lighter in colour and much rarer than the Streaked gurnard. It swims and “crawls” over sandy bottom. Pedro Monteiro.

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### **Wreckfish (Polyprionidae)**

#### **Wreckfish (*Polyprion americanus*)**

Up to 2 m long. Madeira, Canary Islands, Azores. 1 – 1000 m depth.

Adult Wreckfish are a dark silvery colour and live in a depth of far more than 100 m. Divers or snorklers do not see them. Young Wreckfish, however, live in shallow water in the open sea, usually below floating objects. The animal shown here had a length of about 30 cm and was swimming near the Azores – together with two more individuals of the same species – below a loose, floating buoy. Photo Peter Wirtz.

### **Groupers (Serranidae)**

#### **Swallowtail seaperch (*Anthias anthias*)**

Up to 25 cm long. Madeira, Canary Islands, Azores. 20 – 300 m depth.

Usually, swallowtail seaperch can only be encountered in at least 30 m depth. There they can form very large groups. Most animals in the swarm are females, only a few – the largest – are males. If one of the large males dies, the largest of the females changes sex and turns male. As can be seen in the photo, the third ray of the dorsal fin and the pelvic fins are elongated. Photo Peter Wirtz.

**Comb grouper (*Mycteroperca fusca*)**

Up to 85 cm long. Madeira, Canary Islands, Azores. 10 – 100 m depth.

The large photo on the right shows the normal colour of the species, gray-brown with silvery spots or silvery with gray-brown spots. Occasionally, however, one can encounter yellow individuals of this species. A yellow colour in fish that usually look different („xanthochromism“) is as common in fish as is the exceptional black colour of many mammals („melanism“). The animal shown below can be recognized individually by its white spots (see also the title picture, by Pedro Monteiro). During more than 20 years, we could observe that this individual left the bay of Garajau, Madeira, around April and returned the following September or October. It is, of course, known, that many fish species perform annual migrations but it was not known that an individual fish returns to the same place every year, like a migratory bird. Photos Peter Wirtz.

**Blacktail comber (*Serranus atricauda*)**

Up to 35 cm long. Madeira, Canary Islands, Azores. 3 – 100 m depth.

All *Serranus* species are simultaneous hermaphrodites, i. e. they are male and female at the same time. The Blacktail comber is one of the most common shore fish in the area. These highly intelligent fish are quite inquisitive. Juveniles may have a striped colour pattern (insert). Photos Peter Wirtz.

**Comber (*Serranus cabrilla*)**

Up to 35 cm long. Madeira, Canary Islands, Azores. 3 – 500 m depth.

At Madeira and the Azores, this species lives only in deep water, at the Canary Islands it can also be encountered in shallow water. Attains up to eight years of age. In very deep water, this species can be yellow.

Photo P. Wirtz.

### **Painted comber (*Serranus scriba*)**

Up to 35 cm long. Canary Islands, 3 – 150 m depth.

The Painted comber has blue markings looking like Arabic letters on the gill covers. Atlantic animals are so different in colour and body shape from Mediterranean ones that they probably will turn out to be a separate species. Photo Rogelio Herrera.

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### **Dusky grouper (*Epinephelus marginatus*)**

Up to 1.5 m long. Madeira, Canary Islands, Azores. 3 – 200 m depth.

Like all big grouper species (*Epinephelus* and *Mycteroperca*), this species also changes sex: juveniles turn into females at a size of about 40 cm; with a size of at least 80 cm, they then turn into males. One of the largest shore fish species. Large individuals are 40 to 50 years old. Photo Peter Wirtz.

### **Bluefish (*Pomatomidae*)**

#### **Bluefish (*Pomatomus saltator*)**

Up to 1.1 m long. Madeira, Canary Islands, Azores. 0 – 200 m depth.

A species of the open sea that can only rarely be seen at the coast. Bluefish are predators that hunt in groups or alone. They are notorious for being particularly “blood thirsty”. Bluefish preying on a school of fish allegedly kill more animals than they can eat and leave behind „a cloud of blood“. Photo Peter Wirtz.

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### **Bigeyes (Priacanthidae)**

#### **Glasseye (*Heteropriacanthus cruentatus*)**

Up to 30 cm long. Madeira, Canary Islands. 5 – 300 m depth.

With their large, strongly reflecting eyes, Bigeyes are typical fish that are active during the night. During the day, they hide in caves and in other dark places. The colour of the Glasseye can be completely red, red-spotted (photo) or silvery. Glasseye are often plagued by parasitic isopod crustaceans; the animal in the photo has several individuals of *Nerocila acuminata* on its tail. Photo Peter Wirtz.

#### **Atlantic bigeye (*Priacanthus arenatus*)**

Up to 30 cm long. Madeira, Canary Islands, Azores. 10 – 200 m depth.

On first glance, this species is very similar to the previous one. Looking closer, however, one can see quite a few differences. The Glasseye has a higher back and only the Atlantic bigeye has a black spot at the base of the pelvic fins. The colour of the Atlantic Bigeye can also vary from red to silvery but the pattern with the drop-shaped red spots (above) is never seen in this species. In our area, the Atlantic bigeye is rare; at the Cape Verde Islands, one can often see schools of juveniles numbering several thousand individuals in the open water. Photo Peter Wirtz.

**Cardinal fishes (Apogonidae)****Cardinalfish (*Apogon imberbis*)**

Up to 13 cm long. Madeira, Canary Islands, Azores. 5 – 200 m depth.

In the Cardinal fishes, it is the male that carries the eggs in the mouth; they form a ball-shaped mass and may consist of 20.000 minute eggs. The male cannot feed when he has his mouth full of eggs. It takes about a week until the larvae hatch. To aerate the eggs, the male occasionally “chews” the egg-ball. Egg-carrying males can be recognized by their bulging throats. During the end of the reproductive season, the males are starved and may sometimes eat the egg-ball of a female instead of guarding it. This night-active species hides in dark places during the day, sometimes in large groups. The Cardinalfish is the only species of its family (which has many more species in the tropics) in our area. It reaches sexual maturity with an age of just one year and may become five years old. Photo Pedro Monteiro.

**Sharksuckers (Echeneidae)****Common remora (*Remora remora*)**

Up to 80 cm long. Madeira, Canary Islands, Azores. 1 – ? m depth.

This is the most common sharksucker species in the area. The dorsal fin of all Sharksuckers is modified into a sucking disk. They use it to attach themselves to large fish, occasionally also to turtles, whales and ships. The **Striped sharksucker *Echeneis naucrates*** (insert) reaches a length of one meter. In our area, one can also see ***Remora albescens***, the **White Sharksucker**. As the name implies, it can be recognized by its white colour; it grows up to 80 cm length. Juvenile sharksuckers can be cleaner fish for their carriers; adult sharksuckers are predators. Large photo Peter Wirtz, insert Rogelio Herrera.

**Jacks (Carangidae)****Guelly jack (*Pseudocaranx dentex*)**

Up to 80 cm long. Madeira, Canary Islands, Azores. 2 – 200 m depth.

Despite their German name “Stachelmakrelen” (i.e. spiny mackerels), jacks are not related to mackerels (just as the guinea pig is not a pig). Guelly jacks move in small groups or in large schools of several thousand animals, close to the bottom and through the open water. Young animals have conspicuously yellow fins and like to sieve through the sand for edible stuff. Searching for small crustaceans and molluscs, they can even turn over stones! The yellow colour of the fins is much less conspicuous in adult animals (see insert). A small black spot at the rear of the gill cover. Photos Peter Wirtz.

**Blue runner (*Caranx crysos*)**

Up to 55 cm long. Madeira, Canary Islands, Azores. 10 – ? m depth.

Blue runners move in schools through the open water, occasionally near the shore. They can be recognized by their dark tail fins and a silvery double-line behind the gill covers, which, however, can be seen only when the light is right. The **Black jack** *Caranx lugubris* (insert) can easily be recognized by its steep head profile. It can be seen in the open water and in caves. It is a tropical species, that may occasionally be encountered at the Canary Islands and (only very rarely) at Madeira. It grows to 90 cm length. Photos Peter Wirtz.

### **Pompano (*Trachinotus ovatus*)**

Up to 60 cm long. Madeira, Canary Islands, Azores. 0 – 200 m depth.

Pompanos swim close to the surface of the water, often in loose groups. Photo Peter Wirtz.

### **Pilotfish (*Naucrates ductor*)**

Up to 60 cm long. Madeira, Canary Islands, Azores. 0 – ? m depth.

Pilotfish swim close to large fish, whales and turtles (see also the photo of a whale shark on page 18). Photo bottom right Peter Wirtz.

### **Horse mackerel (*Trachurus picturatus*)**

Up to 50 cm long. Madeira, Canary Islands, Azores. 0 – 400 m depth.

The Horse mackerel can be told apart from true mackerels by its strongly curved lateral line. They can reach an age of nine years. Reproductive season is January to April. The very similar species *Trachurus trachurus* cannot be told apart in photos. Large photo bottom Peter Wirtz, insert Pedro Monteiro.

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### **Greater amberjack (*Seriola dumerili*)**

Up to 1.9 m long. Madeira, Canary Islands, Azores. 20 – 300 m depth.

One of the largest shore fish species. (Faint) diagonal line through the eye, slender. Photo Pedro Monteiro.

### **Lesser amberjack (*Seriola fasciata*)**

Up to 90 cm long. Madeira, Canary Islands, Azores. 20 – 200 m depth.

Slightly higher back than the previous species; no line through the eye. Often a faint yellow line along the body. Photo bottom right Peter Wirtz.

### **Almaco jack (*Seriola rivoliana*)**

Up to 90 cm long. Madeira, Canary Islands, Azores. 20 – 200 m depth.

Strong diagonal line through the eye. Much higher back than the previous two species. Photo Nuno Sá.

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### **Grunts (*Haemulidae*)**

#### **African striped grunt (*Parapristipoma octolineatum*)**

To 50 cm long. Madeira, Canary Islands. 5 – 200 m depth.

Grunts can produce distinctly audible noises when feeling threatened by grating their pharyngeal teeth. Four white lines on each side of the body have given the species its German and Latin name meaning “Eight-striped grunt”. Like most grunts, this species mainly feeds on molluscs and crustaceans. It lives in small groups or large schools. Photo Peter Wirtz.

#### **Bastard grunt (*Pomadasis incisus*)**

Up to 36 cm long. Madeira, Canary Islands. 10 – 100 m depth.

One of the most common shore fish that can form very large schools. These are often at the edge of rocky to sandy bottom. The yellow colour of the fins can be quite distinct or rather faint. Photo Peter Wirtz.

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## **Breams (Sparidae)**

### **Two-banded bream (*Diplodus vulgaris*)**

Up to 45 cm long. Madeira, Canary Islands, Azores. 3 – 150 m depth.

According to their feeding habits, breams can have quite different jaws, with different numbers and different sizes of incisor-like, canine and molar teeth (i.e. jaws similar to those of mammals). In contrast, most other fish have jaws consisting of a single type of usually conical teeth that simply differ in size. The two bream species on this page belong to the most common shore fish species in the Eastern Atlantic (and the Mediterranean Sea). They live in groups and reach sexual maturity at an age of two years, with a size of 15 to 20 cm. The Two-banded bream has only recently turned up at the Azores, where it is becoming more common now. Photo Peter Wirtz

### **White bream (*Diplodus sargus*)**

Up to 45 cm long. Madeira, Canary Islands, Azores. 3 – 150 m depth.

The Eastern Atlantic subspecies *Diplodus sargus cadenati* differs from the Mediterranean (and Black Sea) subspecies *Diplodus sargus sargus* by having (sometimes only faint) dark bands on the body. White bream eat plants and animals; large White bream feed on sea urchins to a large degree. They reach sexual maturity with an age of two years and a size of about 16 cm. Photo Peter Wirtz.

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**Zebra bream (*Diplodus cervinus*)**

Up to 45 cm long. Madeira, Canary Islands. 3 – 200 m depth. Photo top right Peter Wirtz.

**Annulated bream (*Diplodus annularis*)**

Up to 25 cm long. Madeira, Canary Islands. 1 – 50 m depth.

Quite rare at Madeira, more common at the Canary Islands. Pelvic fins and the beginning of the anal fin yellow. Photo bottom right Peter Wirtz.

**Sharpsnout bream (*Diplodus puntazzo*)**

Up to 60 cm long. Canary Islands. 3 – 150 m depth.

Can be told apart from the White bream by its pointed snout. Photo bottom Peter Wirtz.

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**Saddled bream (*Oblada melanura*)**

Up to 30 cm long. Madeira, Canary Islands. 3 – 30 m depth.

The white-rimmed black spot on the base of the tail is typical for the species. Mouth pointed upwards. Often forming large groups in the open water over rocky bottom. Spawning season April to July. Photos Peter Wirtz.

**Striped bream (*Lithognathus mormyrus*)**

Up to 50 cm long. Madeira, Canary Islands. 3 – 150 m depth.

Striped bream swim in groups over sandy bottom. They can be recognized by their elongated body shape and the stripes. Striped bream feed on bivalves and worms which they dig out of the sand. At Madeira, they used

Kommentar [Unknown A1]: Around ?

to be very rare but have now increased in numbers. A protogynous sex-changer, i. e. all juveniles turn into females (at an age of two to three years and a size of about 16 cm) and later into males (at an age of four to nine years and a size of 22 to 30 cm). They can reach an age of eleven years. Photo Peter Wirtz.

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### **Bogue (Boops boops)**

Up to 30 cm long. Madeira, Canary Islands, Azores. 2 – 200 m depth.

Bogue form schools of many hundred individuals in the open water over rocky bottom. They mainly feed on plankton but also take food from the bottom. From the distance, the yellow lines on the body cannot be seen and the animal appears silvery. Only from close up, the two to three thin, longitudinal lines are visible. Bogue reach sexual maturity with a length of about 13 cm and an age of one year. They can reach six years of age.

Photo Peter Wirtz.

### **Lump-headed bream (Dentex gibbosus)**

Up to 1 m long. Madeira, Canary Islands. 10 – 300 m depth.

In shallow water, only young animals of the Lump-headed bream can be seen. The third ray of their dorsal fin is elongated. They reach sexual maturity with about 35 cm length. Adult animals live far below the limits of SCUBA diving. They owe their name to the massive lump on the head of large males (insert from Funchal fish market). Photos Peter Wirtz.

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### **Pandora (Pagellus erythrinus)**

Up to 50 cm long. Madeira, Canary Islands. 5 – 200 m depth.

Pandora have many small blue spots on the upper part of the red-silvery body, which are, however, not visible from a distance. Upper edge of the gill cover often red. Pandora swim over sandy bottom, occasionally also over rocky bottom. They are protogynous sex changers: all juveniles become females and only much later in life, with an age of three years and a size of about 16 cm, they turn into males. Photo Peter Wirtz.

### **Axillary bream (*Pagellus acarne*)**

Up to 40 cm long. Madeira, Canary Islands, Azores. 10 – 300 m depth.

A conspicuous dark spot at the base of the pectoral fins has given this species its name. It can form large schools. In shallow water, one usually sees only young animals (large picture). At Madeira, this species is rare. Large photo Rogelio Herrera, insert Peter Wirtz.

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### **Common bream (*Pagrus pagrus*)**

Up to 90 cm long. Madeira, Canary Islands, Azores. 5 – 300 m depth.

Silvery-red, appearing silvery from a distance. Tips of the tail fin white. Young animals in shallow water, large ones much deeper. The Common bream feeds on crustaceans, molluscs and small fish. Sexual maturity with about 25 cm length. Photo Peter Wirtz

### **Red-banded bream (*Pagrus auriga*)**

Up to 80 cm long. Madeira (?), Canary Islands. 10 – 200 m depth.

Young animals (insert, below) are conspicuously red-banded, Their third to fifth dorsal fin rays are elongated. They live in shallow water. Adult females (photo below) and males (photo bottom right) live in deeper water. A photographic proof of the existence of this species at Madeira is needed; if you have it, please send a copy to [peterwirtz2004@yahoo.com](mailto:peterwirtz2004@yahoo.com) . Photo insert Peter Wirtz, the other two Rogelio Herrera.

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### **Cow bream (*Sarpa salpa*)**

Up to 45 cm long. Madeira, Canary Islands, Azores. 0 – 40 m depth.

The species can easily be recognized by its colour. The eyes are also golden-yellow! The English name is quite apt: Cow bream move in groups through shallow water and feed on plants. They are protandric sex changers: all juveniles turn into males with a size of about 20 cm; later they change sex and turn into females. This is the opposite of many other bream species, which are protogynous sex changers (female first, male later). Cow bream can reach an age of 15 years. Photo Pedro Vasconcelos.

### **Black bream (*Spondylisoma cantharus*)**

Up to 55 cm long. Madeira, Canary Islands. 5 – 300 m depth.

Females of the Black bream look silvery from a distance; the thin yellow lines can only be seen from close up. During the spawning season (April to July), the males clean large horizontal rocky areas in a depth of usually below 20 m and guard the eggs that the females glue there in a light, single layer. In the Eastern Atlantic, territorial males are black with a white vertical band. In the Mediterranean Sea, territorial males are coloured quite differently: light blue with dark blue bands. Photos Peter Wirtz.

**Goatfishes (Mullidae)****Striped mullet (Mullus surmuletus)**

Up to 35 cm long. Madeira, Canary Islands, Azores. 1 – 300 m depth.

With their long barbels, goatfish feel for food on soft bottoms. Sometimes, they dig deep holes into the sand or mud. Digging goatfish attract many other fish species (pufferfish, wrasses, breams) that try to pick up organisms uncovered by the goatfish. The barbels can be folded into a groove on the throat. The animal figured in the photo is being cleaned by a juvenile rainbow wrasse (*Coris julis*). The Striped mullet attains sexual maturity with a size of about 15 cm and reaches an age of up to five years. Photo Peter Wirtz.

**West-African goatfish (Pseudupeneus prayensis)**

Up to 50 cm long. Canary Islands. 5 – 300 m depth.

The West-African goatfish lives like the Striped mullet (see above). It is a tropical species, known from southern Morocco to Angola and the Cape Verde Islands. Nowadays, one can also encounter it at the Canary Islands but it is (still) quite rare there. It is unknown if this fish made the jump over the open ocean by itself or if it has been transported to the Canaries by man. Photo (from the Cape Verde Islands) Peter Wirtz.

**Sea chubs (Kyphosidae)****Bermuda sea chub (Kyphosus sectatrix)**

Up to 70 cm long. Madeira, Canary Islands, Azores. 1 – 30 m depth.

Usually silvery but they can also be black, completely or partially yellow and bearing a checker-board pattern.

Sea chubs feed on plants which they digest with the help of gut bacteria. Photo top right Peter Wirtz.

## **Drums (Sciaenidae)**

**Canary drum (*Umbrina canariensis*)** photo bottom right

**Fusca drum (*Umbrina ronchus*)** photo bottom

Up to 70 cm long. Canary Islands. 10 – 300 m depth.

Drums are night-active animals which hide in dark places during the day. Both species have a small barbel on the chin. They can be told apart easily by their different colours. Photos Peter Wirtz

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## **Damsel fishes (Pomacentridae)**

**Atlantic Damsel fish (*Chromis limbata*)**

Up to 14 cm long. Madeira, Canary Islands, Azores. 5 – 45 m depth.

Damsel fishes are a family with many different species, among them the clown fishes of the tropics. At Madeira, the Canary Islands and the Azores, there are only two species, this one and the one on the next page. The Atlantic Damsel fish forms big swarms over rocky bottoms and feeds on plankton. It has long been confused with the Mediterranean Damsel fish (*Chromis chromis*). The colour of the juveniles is one of the many differences: they are blue in the Mediterranean damselfish, green in the Atlantic damselfish (insert below). Juveniles like to hide between the spines of long-spined sea urchins. During the spawning season, males defend a piece of rock surface and court females with conspicuous “signal jumps”. The females deposit

eggs in the territory of the male and swim away. Territorial males (picture below) are coloured more conspicuously than non-territorial males and females (picture right). Photos Peter Wirtz.

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### **Bluefin damselfish (*Abudefduf luridus*)**

Up to 15 cm long. Madeira, Canary Islands, Azores. 3 – 30 m depth.

Damsel fishes are a family with many different species, among them the clownfish of the tropics. At Madeira, the Canary Islands and the Azores, there are only two species. The Bluefin damselfish owes its name to the brilliant blue margins of the fins of adult animals. Very small juveniles are also blue. The lower photo shows two young animals, on their way to becoming adults. The colourful juveniles like to hide between the spines of long-spined sea urchins.

Males defend a piece of vertical or overhanging rock surface, which they have cleaned previously. Females glue the eggs onto the rock in a single layer and then swim away. Behind the male in the top right picture, three spawns of different age and therefore different colour can be seen. Territorial males sometimes even attack the hand of a diver. Single fish that try to steal some eggs are successfully driven away by the guarding male. However, occasionally one can see a group of several Turkish wrasses (*Thalassoma pavo*) entering the territory of a Bluefin damselfish and avidly feeding on the eggs; against so many intruders at the same time, the male cannot defend the territory. Photos Peter Wirtz.

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### **Barracudas (*Sphyraenidae*)**

#### **Striped barracuda (*Sphyraena viridensis*)**

Up to 1 m long. Madeira, Canary Islands, Azores. 0 – 50 m depth.

Barracudas are predatory fish resembling pike. Young animals live in large groups, older ones in small groups or alone. The dark bands on the upper body are typical for the Striped barracuda. It is still unclear if there is a second barracuda species in the area. It could well be that the tropical **Greater Barracuda** (*Sphyraena barrakuda*), which reaches a length of 1.8 m, occasionally strays as far north. It does not have dark bands but irregular dark spots. If you should have a photo of such an animal taken in the area treated in this book please send it to [peterwirtz2004@yahoo.com](mailto:peterwirtz2004@yahoo.com). Photo Peter Wirtz.

### **Mullets (Mugilidae)**

#### **Boxlip mullet (Chelon labrosus)**

Up to 90 cm long. Madeira, Canary Islands, Azores. 0 – 25 m depth.

Mullets are group-living fish that gather food somewhat like vacuum cleaners. With their thick lips, they move over muddy, sandy and rocky bottom and over plants; then they sort the particles sucked up in their mouth. They also enter caves. The different mullet species living in the area of this book are very difficult to tell apart. *Chelon labrosus* reaches an age of up to 25 years. Photo Peter Wirtz.

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### **Wrasses (Labridae)**

#### **Red hogfish (Bodianus scrofa)**

Up to 65 cm long. Madeira, Canary Islands, Azores. 10 – 200 m depth.

Within the family wrasses, the hogfishes form their own sub-family. Only this species can be seen in the subtropical Eastern Atlantic. Hogfishes are protogynous sex changers: juveniles (photo below) always turn into females (photo bottom right). In a certain area, there are several females but only one male (photo top right), the largest individual of all. Only when this animal disappears, the next-largest animal, that is the largest of the females, turns into a male. The teeth of large males project somewhat like the tusks of a boar. The colour of juveniles varies from dark red (almost black) to light red, with light spots. Photos Peter Wirtz.

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#### **Cuckoo wrasse (*Labrus mixtus*)**

Up to 40 cm long. Madeira, Canary Islands, Azores. 10 – 100 m depth.

Males (top right) and females (bottom right) of the Cuckoo wrasse are coloured quite differently. In the area from the Azores to the Canary Islands, this species mainly lives in deep water, more to the north also in shallow water. Several other “northern” species go into deeper (colder) water towards the south of their area of distribution. The Cuckoo wrasse reaches an age of up to 17 years. Photos Peter Wirtz.

**Ballan wrasse (*Labrus bergylta*)** Up to 60 cm long. Madeira, Canary Islands, Azores. 10 – 100 m depth.

The thick, fleshy lips are typical for the species. A light stripe along the midline of the body is often present, but not always. Ballan wrasse reach an age of up to 18 years. Sea urchins are their main food; they also feed on many other small invertebrates. Photos (below) Peter Wirtz.

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#### **Green Atlantic wrasse (*Centrolabrus trutta*)**

Up to 18 cm long. Madeira, Canary Islands. 2 – 15 m depth.

Territorial males are conspicuously green during the spawning season (early spring to early summer). Females and non-territorial males are brown-spotted (insert). Territorial males build a nest from plant material that looks like a small bird nest. Females spawn their tiny eggs into these nests. The eggs are then guarded by the male. Photos Peter Wirtz.

### **Blue Atlantic wrasse (*Centrolabrus caeruleus*)**

Up to 23 cm long. Azores. 2 – 20 m depth.

This species lives only at the Azores. It has long been confused with the species shown above. Territorial males are conspicuously blue during the spawning season (early summer). Females and non-territorial males are brown-spotted (insert). Territorial males build a nest from plant material that looks like a small bird nest. Females spawn their tiny eggs into these nests. The eggs are then guarded by the male until the larvae hatch. The two species differ not only in colour but also in body size. Photos Peter Wirtz.

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### **Cleaver wrasse (*Xyrichtys novacula*)**

Up to 30 cm long. Madeira, Canary Islands, Azores. 5 – 50 m depth.

Cleaver wrasses hover over sandy bottom. When feeling threatened, they can disappear lightning-fast into the sand – but not everywhere, only at places specially prepared in advance. Test it yourself: put your finger into the sand where the Cleaver wrasse disappeared and then again 10 cm beside it. Where the fish has disappeared, the sand is almost “liquid”. Juveniles (insert) always turn into females (bottom right), later into males (top right). Photos Peter Wirtz.

### **Mediterranean wrasse (*Symphodus mediterraneus*)**

Up to 20 cm long. Madeira, Canary Islands, Azores. 2 – 50 m depth.

A dark spot at the base of the tail. A yellow ring around the dark base of the pectoral fins. Territorial males are red (photo below), females and non-territorial males reddish brown. The Mediterranean wrasse can reach an age of 8 years. Photo Peter Wirtz.

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### **Rainbow wrasse (*Coris julis*)**

Up to 20 cm long. Madeira, Canary Islands, Azores. 1 – 150 m depth.

Rainbow wrasses have three sexes! Juveniles (small photo) either grow into females (lower photo) or so-called “primary males” that look like females but produce sperm. Some of the females later in life change sex and turn into so-called “secondary males” that are much larger and more colourful (upper photo). Secondary males are also called supermales. During the reproductive season (the whole summer), they defend territories of 200 to 800 sqm and do not tolerate other secondary males in them. They continuously swim through the territory with conspicuous wavelike movements. The brightly coloured beginning of the dorsal fin is fully displayed like a flag. When a female is ready to spawn it swims a bit upwards into open water. Immediately the large male joins it closely and both quickly swim up one to three meters. At the highest point, they eject eggs and sperm, which are visible for a few moments as a milky cloud. The fertilized eggs drift away in the current. So what about the primary males, the third sex? Primary males can reproduce only in a parasitic way: they rush towards spawning pairs of supermales and females and eject sperm close to them! Occasionally not only one but two to four primary males attempt to profit from the spawning of a supermale with a female. As females never spawn with primary males, primary males are entirely dependent on spawning supermales to

reproduce. Juvenile Rainbow wrasses often act as cleaner fish (see page 90).

In the Mediterranean Sea, the supermales of the rainbow wrasse have a different colour. The Atlantic colour morph has also entered the western Mediterranean Sea through the Strait of Gibraltar. Photo supermale and juvenile Peter Wirtz, photo female Pedro Monteiro.

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### **Turkish wrasse (*Thalassoma pavo*)**

Up to 20 cm long. Madeira, Canary Islands, Azores. 1 – 150 m depth.

Females and young of the Turkish wrasse swim alone or in groups over rocky bottom. Males have wavy blue lines on the head, females a dark rectangular spot on the back. Juveniles pick parasites off other fish; in the photo on the next page, they are cleaning a male parrot fish. Young Turkish wrasses are the main cleaner fish in our area. Like all wrasses and parrot fishes, they swim with “wingbeats” of their pectoral fins. When spawning, a dense group of several females and one or several males swim up into the open water for about one meter; there they suddenly disperse and leave behind a cloud of sperm and eggs that is visible for a few moments. Like many other juvenile fishes, young Turkish wrasses often hide between the spines of long-spined sea urchins (photo below). All photos Peter Wirtz.

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### **Parrot fishes (Scaridae)**

#### **European parrotfish (*Sparisoma cretense*)**

Up to 52 cm long. Madeira, Canary Islands, Azores. 2 – 40 m depth.

There are about 80 species in the family parrot fishes. In almost all of them, the male is colourful and the female drab grey or brown or green. It is the opposite in the European parrotfish: the male is gray (upper photo, in the foreground, being cleaned by two young Turkish wrasses), while the female is colourful (upper photo in the background and lower photo). The colour of juveniles (below) is quite variable. The teeth of parrot fishes have fused to form a beak resembling that of a parrot. With these beaks they are able to bite off fairly hard organisms (animals and plants). Most parrot fishes are protogynous sex changers (female first, later in life male) but the European parrot fish is not: juveniles turn into either females or males. Large territorial males own a harem of females. Non-territorial males occasionally move in groups. Reproductive season July to September. All photos Peter Wirtz.

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### **Weevers (Trachinidae)**

**Greater weever (Trachinus draco)** photo top right

Up to 35 cm long. Madeira, Canary Islands. 1 – 200 m depth.

**Streaked weever (Trachinus radiatus)** photo bottom right

Up to 42 cm long. Canary Islands. 1 – 100 m depth.

**Lesser weever (Echiichthys vipera)** photo below

Up to 15 cm long. Madeira, Canary Islands, Azores. 1 – 20 m depth.

Weevers usually are buried in the sand and wait for fish to catch. The Streaked weever also often lies quite openly on sandy bottom. The first dorsal fin of weevers consists of strong spines with poison glands at the base. Normally, to be stung by a weever is not dangerous but incredibly painful. Photos Peter Wirtz.

**Stargazers (Uranoscopidae)****Stargazer (*Uranoscopus scaber*)**

Up to 35 cm long. Madeira, Canary Islands. 10 – 400 m depth.

Usually, stargazers are buried in sand and very difficult to see: only the eyes and the mouth are discernible (small photo). To attract small prey, the Stargazer uses a small red or white skin flap on the lower lip (not the tongue, as one can sometimes read) that can be moved like a wriggling worm. It can even wipe its head with this skin flap. Stargazers can produce electric shocks of up to 50 Volt to stun the prey. The spines at the rear of the gill cover are poisonous but the sting normally is not dangerous. Photos Peter Wirtz.

**Triplefins (Tripterygiidae)****Yellow Triplefin (*Tripterygion delaisi*)**

Up to 7 cm long. Madeira, Canary Islands, Azores. 5 – 40 m depth.

Triplefins are related to blennies (next pages). In contrast to the scaleless blennies, however, triplefins do have scales. They owe their name to the presence of three dorsal fins (a short and two long ones). This is the only triplefin species at Madeira, the Canary Islands and the Azores. During the reproductive season, in spring and early summer, territorial males are a bright yellow with a black head. Females and non-territorial males are grayish brown. After depositing the eggs in a male's territory, the female leaves. It is the male that cleans and defends the eggs until the larvae hatch. The larvae drift in the plankton for about two months, before they change to a bottom-living lifestyle. The Yellow triplefin reaches an age of only two and a half years. Photo Peter Wirtz.

**Scaled blennies (Labrisomidae)**

**Hairy blenny (*Labrisomus nuchipinnis*)**

Up to 21 cm long. Madeira, Canary Islands. 1 – 15 m depth.

The Hairy blenny is lurking predator that is well camouflaged and difficult to see. It feeds on small fish and invertebrates. Territorial males are more distinctly banded than females and have a red throat (insert). There is a row of short, thin, hairy tentacles on the nape, in front of the dorsal fin. Photos Peter Wirtz.

**Blennies (Blenniidae)**

**Montagu's blenny (*Coryphoblennius galerita*)**

Up to 8 cm long. Madeira, Canary Islands, Azores. 0 – 2 m depth.

The Montagu's blenny lives in the surf zone, often so high that it sits in dry air between two waves. Photo Peter Wirtz.

**Red blenny (*Parablennius ruber*)**

Up to 15 cm long. Madeira, Azores. 2 – 20 m depth.

Females of the Red blenny are coloured a reddish brown, territorial males conspicuously red. Photo Peter Wirtz.

**Morocco blenny (*Parablennius parvicornis*)**

Up to 15 cm long. Madeira, Canary Islands, Azores. 0 – 3 m depth.

Most blennies feed on small animals. The Morocco blenny, however, grazes on green algae in very shallow water. One is therefore more likely to see it when snorkling than when diving. Photo Peter Wirtz.

### **Brown blenni (*Parablennius incognitus*)**

Up to 7 cm long. Madeira, Canary Islands, Azores. 0 – 10 m depth.

At Madeira, the Canary Islands and the Azores, this is not a common species. The tentacles over the eyes are much longer in the male than in the female. A light, diagonal line below the dark spot on the cheeks. The Brown blenny can reach an age of seven years. Photo Peter Wirtz.

### **Gray blenny (*Lipophrys trigloides*)**

Up to 12 cm long. Madeira, Canary Islands, Azores. 0 – 2 m depth.

During the day Gray blennies sits in the splash zone or in large tide pools. At night, they sometimes sleep above (!) the water line, where they are moistened only occasionally by a wave. Photo Peter Wirtz.

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### **Redlip blenny (*Ophioblennius atlanticus*)**

Up to 20 cm long. Madeira, Canary Islands, Azores. 1 – 15 m depth.

The Redlip blenny is the largest of the blennies in the Atlantic. It feeds on plants, which it scrapes off the rock with a comb of many small teeth. In the first ten meters water depth it can be quite common. In summer, males defend a cavity or depression in the rock as a territory and court passing females by vigorous nodding of the head. Females deposit eggs in the territory and leave. It is the male that cleans and defends the eggs and continues to attract females during all of summer. The male in the photo sits on several egg clutches, which differ in colour, depending on their age and thus the developmental stage of the larvae inside the eggs. After hatching, the larvae spend several weeks in the plankton before they settle to a bottom-living lifestyle on

rocky shores. The small photo shows a transparent larva that has recently arrived from the plankton. Photos Peter Wirtz.

### **Butterfly blenny (*Blennius ocellaris*)**

Up to 18 cm long. Azores. 10 – 450 m depth.

The Butterfly blenny holds the depth record among the blennies in our area: it has been caught in more than 400 m depth. Above 30 m depth it can only rarely be seen. The beautiful, high dorsal fin with its eye-spot, that can be raised to impress, has given the species its name. It mainly feeds on snails. Photo Peter Wirtz.

124

### **Gobies (*Gobiidae*)**

#### **Goldspot goby (*Gnatholepis thompsoni*)**

Up to 15 cm long. Madeira, Canary Islands. 1 – 20 m depth.

In contrast to blennies, gobies do have scales. Most species of gobies live on soft bottoms. The Goldspot goby is a tropical species that has extended its area of distribution in the last decades towards the north: The Cape Verde Islands used to be the northern limit for this species but several years ago it appeared at the Canary Islands and multiplied there. A few years ago, it also appeared at Madeira and here, too, it is increasing in frequency. Probably, the species was able to extend its area of distribution because of Global Warming. The golden spot behind the gill cover has given the species its name. Photo Pedro Monteiro.

#### **Rock goby (*Gobius paganellus*)**

Up to 12 cm long. Madeira, Canary Islands, Azores. 1 – 10 m depth.

With more than 1500 species, the gobies are the largest fish family in the sea. In gobies of the genus *Gobius*, the pectoral fins are united to form a sucker-like structure. As the name implies, the Rock goby lives on rocky bottoms. The upper edge of the first dorsal fin frequently has a light to orange margin. Rock gobies can reach an age of up to ten years. The closely related and on first glance very similar **Madeira goby (*Gobius maderensis*)** (insert) has the same area of distribution and reaches the same size. It lives in very shallow water, frequently in tide pools. Photos Peter Wirtz.

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#### **Black goby (*Gobius niger*)**

Up to 15 cm long. Canary Islands. 3 – 75 m depth.

The Black goby can be locally common on sandy bottom and in sea grass meadows. Territorial males are pitch black. The Black goby reaches sexual maturity with two years and can attain five years of age. Photo Peter Wirtz.

#### **Yellowhead goby (*Gobius xanthocephalus*)**

Up to 10 cm long. Canary Islands. 3 – 15 m depth.

On rocky and on soft bottoms; also in sea grass meadows. Photo Pedro Monteiro.

#### **Steven's goby (*Gobius gasteveni*)**

Up to 12 cm long. Madeira, Canary Islands. 5 – 100 m depth.

This species was believed to live only in deep water but at Madeira it is quite common in shallow water, on sandy bottom in protected bays. Because of its inconspicuous colour, it has probably been overlooked in the past. Photo Peter Wirtz.

128

**Leopard spotted goby (*Thorogobius ephippiatus*)**

Up to 13 cm long. Madeira, Canary Islands, Azores. 5 – 40 m depth.

The spotted colour makes this species unmistakable. It lives in dark places, mainly in caves, on sandy and rocky bottom. It reaches sexual maturity with three to four years and can attain nine years of age. Photo Peter Wirtz.

**Canary goby (*Vanneaugobius canariensis*)**

Up to 5 cm long. Madeira, Canary Islands. 2 – 20 m depth.

Easily overlooked! The first rays of the dorsal fin of males are elongated. Photo Peter Wirtz.

**Painted goby (*Pomatochistus pictus*)**

Up to 5 cm long. Madeira, Canary Islands, Azores. 2 – 50 m depth.

This species forms schools over sandy bottom. These usually contain females and small males, whereas large males sit on the bottom below the schools (insert). Reaches an age of only two to three years. Photos Peter Wirtz.

130

**Mackerels and Tunas (*Scombridae*)**

**Wahoo (*Acanthocybium solandri*)**

Up to 2.1 m long. Madeira, Canary Islands, Azores. 0 – 15 m depth.

On first glance, this species looks like a very fat barracuda. It usually swims directly below the surface and can only rarely be seen near the coast. Photo Christina Ludwig.

### **Atlantic Bonito (*Sarda sarda*)**

Up to 80 cm long. Madeira, Canary Islands, Azores. 0 – 50 m depth.

This small tuna species can easily be recognized by the stripes on the back. A quite similar species (on first glance), the **Skipjack tuna (*Katsuwonus pelamis*)**, has stripes on the belly, not on the back. Both species move in groups through the open sea and hunt fish, mainly sardines and mackerel. The body is torpedo-shaped and the tail fin deeply forked. In coastal waters, you are more likely to see the Atlantic bonito, which is even quite common at the Azores. Large Tunas, like the **Atlantic bluefin tuna (*Thunnus thynnus*)** (insert), which can reach a size of 2.8 m, can almost never be seen near the coast. Photo Sarda Peter Wirtz; photo Thunnus Christina Ludwig.

132

### **Atlantic chub mackerel (*Scomber colias*)**

Up to 42 cm long. Madeira, Canary Islands, Azores. 3 – 100 m depth.

Mackerels form big schools in the open water. The small photo shows the similar **Chub mackerel *Scomber japonicus***. These two species can often not be told apart under water. *S. colias* is more common in our area.

Both reach an age of up to four years. Photo *S. colias* Rogelio Herrera, photo *S. japonicus* Peter Wirtz.

### **Blackfish (Centrolophidae)**

### **Imperial blackfish (*Schedophilus ovalis*)**

Up to 1 m long. Madeira, Canary Islands, Azores. 0 – 500 m depth.

Adult animals live in deep water, usually below 70 m depth; juveniles (photo below) live in shallow water, often near jellyfish, on which they feed. Photos Robert Minderlein (bottom right) and Peter Wirtz (below).

134

### **Left-eye flounders (*Bothidae*)**

#### **Wide-eyed flounder (*Bothus podas*)**

Up to 40 cm long. Madeira, Canary Islands, Azores. 3 – 300 m depth.

Left-eyed flounders are one of six flatfish families. Left-eyed flounders have both eyes on the left side of the body. Soles (next page) have both eyes on the right side of the body.

Strangely, the sexes of the Wide-eyed flounder differ in the distance between the eyes: in males (upper photo) the eyes are much more distant from each other than in females (lower photo). Nobody knows why this is so. The territory of large males contains the territories of several females. The animals spawn at dawn during summer (July to September). As “opportunists”, Wide-eyed flounders sometimes swim behind other species, i.e. large starfish or digging mullets, and pick up prey that has been stirred up by them.

Like many other flatfish species, wide-eyed flounders can change their colour to resemble that of the bottom on which they rest. Usually they are seen on sandy bottom, occasionally on gravel. Wide-eyed flounders reach sexual maturity with an age of two years and a length of about 15 cm and can reach an age of up to six years. Photos Peter Wirtz.

136

## **Soles (Soleidae)**

### **Four-eyed sole (*Microchirus ocellatus*)**

Up to 20 cm long. Madeira, Canary Islands. 15 – 300 m depth.

This night-active species can easily be recognized by its colour pattern. Photo top right Peter Wirtz.

### **Bastard sole (*Microchirus azevia*)**

Up to 40 cm long. Canary Islands. 15 – 250 m depth.

On sandy and muddy bottoms. Feeds on worms and crustaceans. Photo bottom right Rogelio Herrera.

## **Tonguesoles (Cynoglossidae)**

### **Spotted tonguesole (*Symphurus insularis*)**

Up to 8 cm. Madeira, Canary Islands, Azores. 10 – ?? m depth.

Tonguesoles have both eyes on the left side of the body. The Spotted tonguesole lives on sandy and rocky bottoms and is night-active. It can crawl on its finrays like a centipede. Photo (below) Peter Wirtz.

138

## **Triggerfishes (Balistidae)**

### **Gray triggerfish (*Balistes capriscus*)**

Up to 60 cm long. Madeira, Canary Islands, Azores. 5 – 100 m depth.

The first dorsal fin of Trigger and File fishes has an ingenious locking mechanism: a small projection of the second dorsal fin clicks into a groove in the erected first dorsal fin. The very strong first dorsal fin is thus securely fastened in an upright position and for many predatory fish the triggerfish is now too difficult to eat. The eggs are deposited in a crater-like depression in the sand and guarded by the female (below right). The male cruises over the female and guards the “airspace”. Triggerfish are very inquisitive: to explore interesting objects (not out of aggression !), they bite into all shiny and strange things, including ears and other parts of divers. Photo Peter Wirtz

### **Ocean triggerfish (*Canthidermis sufflamen*)**

Up to 55 cm. Madeira, Canary Islands. 5 – 40 m depth.

This is a tropical species that has only recently appeared at Madeira (because of global warming ?). The dorsal and anal fins are much longer than in the Gray triggerfish. Photo (below) Peter Wirtz.

140

### **Filefishes (*Monacanthidae*)**

#### **Broomtail filefish (*Aluterus scriptus*)**

Up to 90 cm long. Madeira, Canary Islands. 5 – 50 m depth.

The Broomtail filefish is a tropical species that has been encountered only a few times at Madeira until now. It may be in the process of extending its area of distribution to the north, perhaps due to Global Warming. It is more common at the western Canary Islands. The Broomtail filefish swims – frequently in a head down position – solitarily or in groups. The tail fin is surprisingly large. The blue lines on the body can look like letters; thus the Latin name „scriptus“. Photo Peter Wirtz.

### **Brown filefish (*Stephanolepis hispidus*)**

Up to 18 cm long. Madeira, Canary Islands, Azores. 5 – 50 m depth.

Filefishes have small scales with tiny spines; their skin feels like sand paper and, indeed, was used as such in old times. The pelvic fins are even more reduced than in trigger fishes. Like trigger fishes, they swim with rowing movements of the dorsal and anal fins. The Brown filefish lives between plants over rocky and soft bottoms. In the male, the first ray of the dorsal fin is elongated (insert; spotted night time colour of the animal) but not in the female (photo bottom right). At the Azores, this species is only known from two animals seen in a harbour, that is, it was probably transported there by man. Photos Peter Wirtz.

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### **Pufferfishes (*Tetraodontidae*)**

#### **Sharpnose puffer (*Canthigaster capistrata*)**

Up to 10 cm long. Madeira, Canary Islands, Azores. 2 – 40 m depth.

The scientific name of the Pufferfishes is *Tetraodontidae*, which means „having four teeth“. The teeth have fused into two large teeth, in the upper and in the lower jaw. When feeling endangered, Pufferfishes can inflate themselves by swallowing water (insert, below).

The Eastern Atlantic Sharpnose puffer is now recognized as a valid species; previously, it was thought to be the same as that in the Western Atlantic (*Canthigaster rostrata*). Females defend their territories against other females and also against small males. Large males defend a territory that contains those of several females. Juveniles (insert) like to hide between the spines of long-spined sea urchins. A very rare species at the Azores (more records from there are needed). Photos Peter Wirtz.

### **Brown puffer (*Sphoeroides marmoratus*)**

Up to 25 cm long. Madeira, Canary Islands, Azores. 2 – 60 m depth.

Pufferfish are protected from most predators not only by their ability to inflate themselves (insert) but also by containing a strong poison, Tetrodotoxin. It is concentrated in the inner organs, mainly the liver. The presence of this poison may be one of the reasons why pufferfish are comparatively fearless and even approach divers. Like the Sharpnose puffer, the Brown puffer has a very similar „sister species“ in the Western Atlantic, *Sphoeroides spengleri*. Photos Peter Wirtz.

144

### **Porcupine fishes (*Diodontidae*)**

#### **Spotted burrfish (*Chilomycterus reticulatus*)**

Up to 60 cm long. Madeira, Canary Islands, Azores. 5 – 60 m depth.

All puffer fishes and porcupine fishes can inflate themselves to a ball-shape by rapidly swallowing water. The spotted burrfish has very short spines. It is a tropical species that is not rare at the Canary Islands but has been seen only a few times at Madeira and at the Azores (more records of this species from there are needed). An inoffensive, slowly swimming species. Photo Peter Wirtz.

### **Sunfishes (*Molidae*)**

#### **Ocean sunfish (*Mola mola*)**

Up to 3,3 m long. Madeira, Canary Islands, Azores. 0 – 400 m depth.

Sunfishes are unmistakable. But look at the tail: If it is round, you are seeing *Mola mola*, but if it ends with a tip it is the much rarer **Sharptail sunfish** *Masturus lanceolatus* that reaches the same size. Sunfishes live in the open ocean and mainly feed on jellyfish and on salps. Often they sun themselves by lying on their side, directly at the surface. Sunfishes can reach a weight of two tons. They produce up to 100 million eggs – the highest value know for fish. Sunfishes are related to Puffer fishes and Porcupine fishes. Their teeth have fused into plates. Photo Nuno Sá.

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