

Rock Eel

Pholis gunnellus (Linnaeus) 1758

[Jordan and Evermann, 1896-1900, p. 2419.]



Figure 257 - Rock eel (*Pholis gunnellus*), Gloucester, Mass.
From Jordan and Evermann. Drawing by H. L. Todd.

Description

The slender flexible trunk (only about one-tenth as deep as it is long and about one-half as thick as it is deep), short head, and rounded nose of this little blenny suggest an eel, but the spiny nature of its dorsal fin betrays its true relationship. The dorsal fin (73 to 86 spines) extends from the nape of the neck back along the whole length of the trunk to the base of the caudal fin, from which it is marked off by a shallow notch only; and it is of uniform height from end to end. The anal fin (2 very short spines and 37 to 44 rays) originates opposite the mid-length of the dorsal, to which it corresponds in height and outline, and runs back similarly to meet the caudal fin, from which it is marked off by a distinct notch, though there is no free space between the two fins. The caudal fin is small and rounded. The tiny ventrals, set near together close in front of or under the pectorals, are reduced to one very short spine and one rudimentary ray each. The pectoral fins, smaller than in our other blennies, are a little longer than one-half the length of the head. The skin of the trunk is clothed with very small scales, hardly visible, however, through the thick layer of slimy mucus with which the rock eel is covered. The head is naked; the mouth is small and oblique; the upper jaw is armed with several rows of conical teeth, but the lower jaw has a single row only.

Color

A row of about 10 to 14 round, black centered and pale-edged spots, spaced at equal distances along the middle of the back and spreading out onto the dorsal fin, are the most characteristic feature of the color pattern of this fish. The ground tint of the upper part is yellowish, olive brown, reddish, or light red, matching the seaweed or the bottom, with pale, irregularly rounded cloudings on the sides, and with an oblique streak from the eye to the angle of the jaw. The belly varies from pale gray to yellowish white. The pectoral, caudal, and anal fins are yellowish. We have seen a specimen (at Boothbay) that was brick red above and below, light and dark mottled, flecked also with tiny black dots, and with the spots on the dorsal fin dark red instead of black.

Size

The maximum length is about 12 inches but few of those found are more than 6 to 8 inches long

Habits

Rock eels are often found along low tide mark, left by the ebb in little pools of water under stones, or among seaweed, where they await the return of the tide. But they are not confined to very shoal water as formerly supposed, for we have also collected them in considerable numbers both within the Gulf and on the offshore banks down to 40 fathoms, and one has been taken as deep as 100 fathoms (p. 494).

They are rather local throughout their range. In some places one is to be found under almost every stone; on others you may turn rocks in vain; their presence or absence along any particular stretch of shore probably depends on the character of the bottom immediately outside, for this fish prefers pebbly, gravelly, or stony ground, or shell beds, and not mud or eelgrass. Neither have we found them about the steep ledges so [page 493] numerous along the rockbound coasts in the Gulf of Maine. In Scandinavian waters according to Smitt[50] they often take refuge inside large empty mussel shells. But as he remarks, there is no ground for the accusation that rock eels enter live bivalves of any sort to devour them. Whether they seek such places of concealment in deeper waters is not known.

When disturbed they squirm like eels. Eel-like, they swim by sidewise undulations, and they are so active and so slippery (hence the name "butterfish") that it calls for quick work to catch one by hand, even in a very small puddle.

Very little is known of the diet of the rock eel, except that it is carnivorous and that various molluscan and crustacean fragments have been found in their stomachs. Vinal Edwards records small amphipods, shrimps, and worms in the few that he examined at Woods Hole, but we have no first-hand information to offer on this point. In turn, rock eels have been found in the stomachs of various larger fishes, especially of cod, in New England waters.

So far as known the rock eel is resident throughout the year wherever it is found; at most it may move out from the beach into slightly deeper water in winter to escape chilling.

Breeding habits

It is necessary to turn to European sources for information about its breeding habits, for its spawning has not been seen in American waters. In the eastern Atlantic and in the North Sea[51] it spawns from between tide marks down to 12 fathoms or more, from November to February or March. And its spawning season probably is the same in our Gulf, for eggs apparently belonging to the rock eel have been found off Rhode Island late in December.[52] A female from Peconic Bay, N. Y., contained 686 eggs.[53] these, by European accounts, are about 2 mm. in diameter, opaque, whitish, but iridescent on the surface, with a single globule of about 0.6 mm., and they are laid in holes or crannies. In British waters the rock eel usually chooses empty oyster shells, or the holes that are made in the limestone rocks by the boring bivalve *Pholas* for the purpose, but there are no oysters in the Gulf of Maine, except in Cape Cod Bay, and the local *Pholas* is unable to bore into the hard granite rocks of our coast line, so the rock eels must seek other nesting sites. Perhaps large mussel shells may serve them, or any crevice. The eggs are adhesive, and both the parents have been observed rolling them, by coiling around them, into balls or clumps an inch or so across, in which they stick together.

In European waters incubation occupies from 8 to 10 weeks, during which period the parent fish of both sexes have been seen lying close beside the egg clumps. But since Ehrenbaum[54] described the parent as "very negligent" in the aquarium, it seems that they merely seek the nesting holes as convenient shelters, and not that they actually guard the eggs.



FIGURE 258.—Larva (European), 18 mm. After Ehrenbaum.



FIGURE 259.—Larva (European), 20 mm. After Ehrenbaum.

Figure 258. - Larva (European), 18 mm. After Ehrenbaum.

Figure 259. - Larva (European), 20 mm. After Ehrenbaum.

Rock eel (*Pholis gunnellus*).

The larvae are much larger at hatching (about 9 mm.) and further advanced in development than those of most of the fishes that lay buoyant eggs. Older larvae of the rock eel resemble corresponding stages of the launce and of the snake blenny in their extremely slender form. But they are easily distinguishable from both these species by the presence of a row of small black pigment spots below the intestine, instead of above it, and from the herring (the only other very slender larvae apt to be met in any numbers in the Gulf at the same season) by the location of the vent about midway of the body (fig. 259), and by the fact that their tails are rounded, not forked. The 12 black dorsal fin spots so characteristic of the adult are first noticeable against the transparent trunk in young fry of 25 to 30 mm. The [page 494] young fish (previously drifting near the surface) sink to the bottom when 30-40 mm. long, an event that takes place in late summer or early autumn in the Gulf of Maine. Nothing definite is known of the rate of growth of the rock eel after its first autumn.

General range

Shoal waters on both sides of the North Atlantic; from Hudson Strait to the offing of Delaware Bay on the American coast[55] and south to France on the European coast; most numerous north of Cape Cod and north of the English Channel.

Occurrence in the Gulf of Maine

This little fish is to be found all around the shores of the Gulf from Nova Scotia to Cape Cod. Thus it is definitely recorded at Yarmouth (Nova Scotia); at various localities on both sides of the Bay of Fundy where it occurs nearly everywhere (writes Dr. Huntsman); at half a dozen points along the Maine coast; on Cashes Ledge; at Portsmouth (N. H.), where A. H. Clark of the U. S. National Museum reports it plentiful; at Hampton (reported to us by W. F. Clapp); in Ipswich Bay; here and there along the northern shore of Massachusetts Bay; at Cohasset, on the southern shore, where we have seen them; among the stones and boulders of the Gurnet, off Plymouth, where W. F. Clapp informs us that he has found many while shore-collecting for mollusks; also at Provincetown. And doubtless it is more universal than these records indicate, for being of no consequence to the fisherman or to the angler, it comes to notice only when scientific collections are made.

We have taken its pelagic fry (20-39 mm. long) in our tow nets off Seal Island (Nova Scotia); on German Bank; near Mount Desert Island; off Matinicus Island; and off Ipswich Bay, in April, May, June, and August (a total, however, of only 6 stations), while Huntsman states that they are caught in early summer in the Bay of Fundy, evidence that it breeds all around the Gulf from early spring on into the summer.

Recent records show that rock eels also occur in considerable numbers on Nantucket Shoals, as well as on Georges and Browns Banks, where we have trawled a number, down to 40 fathoms, one as deep, even, as 100 fathoms,[56] where many of them have been found in the stomachs of cod and pollock.[57] they are described as common inshore along outer Nova Scotian waters, eastward from our limits;[58] and as "rather common" in the southern side of the Gulf of St. Lawrence,[59] where Huntsman[60] classes them as characteristic of the warm inshore waters, but where they are exposed to temperatures close to the freezing point of salt water in late winter and in spring.

They are reported from the southwest coast of Newfoundland; from the estuary of the St. Lawrence near Trois Pistoles,[61] from Anticosti; from the north shore of the Gulf of St. Lawrence; from both shores of the Strait of Belle Isle; from the southern and eastern parts of the Grand Banks;[62] from Bay Bulls, Conception Bay, and Trinity Bay on the east coast of Newfoundland; from Hamilton Inlet on the Atlantic Coast of Labrador, and from Fort Chimo, Ungava Bay, northern Labrador.

Importance

This little fish is of no commercial interest. But it appears to be of some importance on the offshore banks as food for larger fishes.

[50] Scandinavian Fishes, vol. 1, 1892, p. 223.

[51] MacIntosh and Masterman (Life Histories of British Marine Food Fishes, 1897, p. 210) and Ehrenbaum (Wissenschaftliche Meeresunters., Helgoland, N. Ser., vol. 6, 1904, p. 160) give accounts of its spawning and of its larval development.

[52] Tracy, 40th Rept. Comm. Inland Fish., Rhode Island, 1910, p. 151.

[53] Nichols and Breder, Zoologica, New York Zool. Soc., vol. 9, 1927, p. 159.

[54] Wissenschaftliche Meeresuntersuchungen, Helgoland, N. Ser. vol. 6, 1904, p. 161

[55] In February 1930 Albatross II trawled 2 rock eels, 80 and 84 mm. long, in 23 fathoms and 38 fathoms, at lat. 38° 32' N., long. 74° 24' W., and lat. 38° 18' N., long. 73° 51' W.

[56] One was caught at this depth on the northeastern part of Georges Bank August 5, 1932 (Schroeder, Bull. 66, Boston Soc. Nat. Hist., 1933, pp. 5-6).

[57] We once found one alive in the mouth of a pollock caught at 34 fathoms on Browns Bank.

[58] Vladykov and McKenzie, Proc. Nova Scotian Inst. Sci., vol. 19, 1935, p. 103.

[59] Cox, Contrib. to Canadian Biol. (1918-1920) 1921, p. 112.

[60] Trans. Roy. Soc. Canada, Ser. 3, vol. 12, Sect. 4, 1918, p. 63.

[61] Vladykov and Tremblay, Natural. Canad., vol. 62 (Ser. 3, vol. 6), 1935, p. 81.

[62] the pelagic larvae.

Fishes of the Gulf of Maine by Bigelow & Schroeder is the seminal work on North Atlantic fishes. It was originally published in 1925 with William Welsh, a Bureau of Fisheries scientist who often accompanied Henry Bigelow on his research cruises. In the late 1920's, Bigelow began a long association with William C. Schroeder, publishing a number of papers and reports on fishes of the North Atlantic, including the first revision of *Fishes of the Gulf of Maine*. This excerpt is from that 1953 edition.

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