

## Sand Launce

*Ammodytes americanus* De Kay 1842 [34]  
[Jordan and Evermann, 1896-1900, p. 833.]

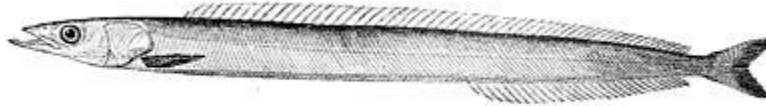


Figure 254 - Sand launce (*Ammodytes americanus*),  
Nantucket. From Goode. Drawing by H. L. Todd.

### Description

The sand eel is a slender fish, its body about one-tenth as deep as it is long (not, counting caudal fin), with long head and sharply pointed nose, wide gill openings, and large mouth with the lower jaw projecting far beyond the upper. The jaws are toothless, and there are no teeth on the roof of the mouth. There is one long low dorsal fin, soft-rayed (59 to 64 rays; no spines), rising somewhat in front of the tips of the pectorals and running back along the whole length of the body nearly to the base of the caudal fin. The anal (28 to 32 rays), similar in outline and equally lacking spines, originates slightly behind the middle of the dorsal and runs equally far back. The tail is forked. The pointed pectorals are set very low down on the body, and there are no ventral fins. The scales are small, lying in cross series on the sides of the body between numerous skin folds that run obliquely downward and backward, and there is a low ridge of skin on either side along the belly.

The readiest field marks for the sand eel among Gulf of Maine fishes are its slender form and sharply pointed snout, coupled with long dorsal fin (separated from the caudal) and the absence of ventral fins. The only fishes with which one would be apt to confuse it are young eels, but in these the dorsal, caudal, and ventral fins are confluent, not separate, and the tail is rounded, not forked.

### Color

Authors differ in their accounts of the colors of the sand eel, probably because its iridescent luster fades at death and because it varies in shade on different bottoms. The many we have handled have been olive, brownish or bluish green above, with silvery lower sides and a duller white belly. Some have a longitudinal stripe of steel-blue iridescence[35] along each side, but others lack this.

### Size

Mature sand eels run from about 4 inches to about 6 inches in length as a rule, with a few as long as 7 inches.[36]

### Habits

Sand eels are found chiefly along sandy foreshores, also over the shoaler parts of the offshore fishing banks; they are seldom seen off rocky parts of the coast, or over muddy bottoms in deep water. They usually congregate in dense schools, often of thousands of individuals, and they swim as an eel does, by sidewise undulations that run along the body from front to rear, which makes them easy to recognize in the water.

The most interesting habit of the sand eel is the custom it has of digging itself several (4 to 6) inches deep in the sand, into which it burrows [page 489] with great speed, opening the way with its sharp-pointed snout. It often does this above low water mark at high tide to await the return of the tide. We have often seen them vanish with surprising rapidity when alarmed by clam diggers, and we cannot improve on Goode's[37] account of seeing "a great section of the beach" in Provincetown harbor become "alive with dancing forms of dozens of these agile fishes" when he stuck his clam-hoe into the sand. It has been suggested that they spend a large part of the time so buried, and that their sudden appearances and disappearances are to be explained thus, rather than as evidence of their wanderings or migrations. It is not known whether they follow this habit only in shoal water where they come under direct observation, or whether they also burrow into deeper bottoms. If the burrowing habit is for refuge, it is not always successful, for, as Smitt[38] remarks, porpoises have been seen rooting them out of the sand.

In Scandinavian waters sand eels feed on all sorts of small marine animals, but chiefly on small Crustacea, especially on copepods, and on fish fry, including their own kind. Worms have also been found commonly in the stomachs of sand eels, but it is not likely that they catch these while burrowing, as some writers have suggested.

The sand eel plays a very important role in the economy of northern seas as food for larger animals. Finback whales devour them greedily when they find them in abundance, as happened in Cape Cod Bay in June 1880, when lance appeared in swarms early in the month followed by finbacks a few days later. Porpoises, too, find them a staple article of food, and sundry predaceous fish such as cod, haddock, halibut, silver hake, salmon, mackerel, striped bass, and bluefish. When sand eels are fleeing from their pursuers especially from the silver hake, which does not hesitate to follow them up on the sand, they often strand in such numbers as to cover the flats.

Sand eels' noses are so sharp that when they are swallowed by cod, and perhaps by other fish, they sometimes work right through the stomachs and into the body cavities of their captors, to become encysted in the body wall.

The spawning of the American sand eel has not been observed so far as we can learn.[39]

Ripe specimens of the European species (*tobianus*), both male and female, have been taken throughout the year, a phenomenon that has given rise to widely differing views as to its spawning season. But the chief production of its eggs takes place in autumn and early winter, at least in the southern part of the North Sea, as Ehrenbaum[40] demonstrated, both by dredging them in large numbers, and by the fact that its larvae are extremely abundant there from January to March, but have seldom been taken at other seasons.

The occurrence of larvae suggests that the season is about the same for the American form in the Gulf of Maine. Thus the Fish Hawk towed numbers of larval lance (identified by R. A. Goffin of the Bureau of Fisheries and by Mrs. C. J. Fish) near Provincetown and in Cape Cod Bay, during December, January, and February, 1924-1925, evidence both that this part of the Gulf of Maine (where adults are abundant) is the site of considerable reproduction, and that spawning commences as early as November there. Fry have been taken in March at Woods Hole while the Albatross towed a number of larvae of 11 to 17 mm. on the western part of Georges Bank on February 22, 1920. It seems that the spawning season is progressively later, however, to the northward, for we took larvae only a few days old (7 to 8 mm. long), with the yolk still showing, off Newburyport, Mass., on March 4 in 1921, while the Canadian Fisheries Expedition of 1915 obtained an abundance of slightly older stages (7 to 15 mm. long) off the southeast coast of Nova Scotia in May.

Evidently the sand eel breeds successfully throughout the more northern part of its range, for its larvae have been found, widespread, over the Nova Scotian Banks, in the Gulf of St. Lawrence northward nearly to the Strait of Belle Isle, throughout the Grand Bank region, off the east coast of Newfoundland and off the outer coast [page 490] of Labrador, north to Sandwich Bay.[41] How far south it may do so is not known.

Sand eels were formerly thought to spawn on sandy beaches above low-water mark while burrowing in the sand, but their eggs have never been found in such a situation, and Ehrenbaum proved, by dredging them in large numbers, that those of the European species (*Ammodytes tobianus*) are actually deposited in depths of 10 fathoms or so, on sandy bottom where they stick fast to the grains of sand. His experience also suggests that they resort to very definite grounds for spawning, all of which probably applies as well to the American form as it does to the European.

The eggs of the American launce have not been seen. Those of the European *tobianus* are oval, 0.72 to 0.97 mm. in greatest diameter, with a yellow oil globule of 0.25 to 0.31 mm., and they are described as of an orange tint. The larvae are very slender, and about 7 mm. long by the time the yolk is absorbed. The dorsal and anal fin rays are visible when the larva is about 18 mm. long, but it is not until the little fish is upward of 25 mm. long that the tail begins to assume its forked outline; this is a convenient field mark for distinguishing between the launce and the herring, in which the tail is deeply forked from a much earlier stage. The early larval stages are easily recognizable by their slender form combined with the fact that the vent opens at one side, just as among the cod tribe, not at the margin of the larval fin fold, so that it apparently ends blind.



FIGURE 255.—Larva of European *A. tobianus* 6.6 mm.  
After Ehrenbaum and Strodtman.



FIGURE 256.—Larva of European *A. tobianus*, 20.5 mm.  
After Ehrenbaum and Strodtman.

Figure 255.—Larva of European *A. tobianus* 6.6 mm.  
Figure 256.—Larva of European *A. tobianus* 20.5 mm.  
After Ehrenbaum and Strodtman.  
Sand launce (*Ammodytes americanus*).

The older larvae resemble the corresponding stages of the rock eel (p. 493) in their slim form, and in the location of the vent slightly behind the middle of the trunk (it is located farther back in the similarly slender larvae of the herring tribe), but may be recognized by the row of black pigment cells along the dorsal side of the intestine instead of along the ventral side, and by their pointed noses.

The rate of growth of our launce has not been studied. But it is probable that the small ones of 3 to 4 inches, which are plentiful from July until September, are yearlings; those of 4 inches and upward probably are 2 years old, or more.

### General range

Atlantic coast of North America from Cape Hatteras to the Gulf of St. Lawrence, northern Newfoundland and northern Labrador, perhaps to Hudson Bay (p. 491). Its European relative, *A. tobianus*, occurs from Greenland, Iceland, northern Scandinavia and the White Sea south to Spain.

## Occurrence in the Gulf of Maine

The sand eel is very plentiful along the coast from Cape Cod to Cape Sable wherever there are sandy shores, but it is seldom seen off the rocky parts of the coast line. Thus it is rather scarce in the Bay of Fundy except locally, but is common on the sandy beaches that break the bold northern shores of the Gulf here and there. They swarm on the strands of Cape Cod Bay, a phase of their distribution associated with their burrowing habit. Here one may see schools of them throughout the summer in shoal water close in to tide mark, swimming with the curious undulating motion so characteristic of them; and they continue plentiful there in some years during the winter, when great numbers are sometimes cast on the beach in stormy weather. Sand eels are to be taken in shallow water on sandy flats throughout the year about Woods Hole also, but they are never so plentiful there in winter as they are in fall and spring. And since a general decrease in their numbers close inshore seems to take place during the cold months in the more northern part of their range as well, it is probable that a considerable proportion of the local stock moves out into deeper water for the winter, to return in spring, as most of the lance do in north European seas.

In Scandinavian waters this vernal inshore movement takes place in May as the coast waters warm up, and it is probable that the seasonal schedule is much the same in the Gulf of Maine, judging from its temperature. The sand eels may also be expected to leave some of the shallowest [page 491] bays of our Gulf in midsummer, when the water is at its warmest, to work in again in early autumn, such being their custom near Woods Hole.

There is no reason to suppose that they inhabit the central deeps of the Gulf of Maine regularly unless some of them repair thither in winter, though it would not be astonishing to find an odd sand eel in deep water at any time; in fact, we towed a young one about 1¼ inches long over the deep basin southeast of Grand Manan on June 10, 1915. But they must be plentiful on Nantucket Shoals, for they were found in the stomachs of cod caught there by the *Halcyon* and by the *Albatross II*, from time to time throughout the springs and summers of 1928-1930. There are also sand eels over the shallows of Georges and Browns Banks, whence they have been brought to the Bureau of Fisheries by fishermen on several occasions.[42]

Further northward, fishermen are familiar with them all along the outer coast of Nova Scotia and on the Scotian Banks; they are so common near Canso that a seine, dragged on a sandy beach there "captured hundreds in a short time";[43] they are reported from Prince Edward Island[44] and from the Magdalens in abundance[45] here and there along the north shore of the Gulf; from the Strait of Belle Isle; also from Sandwich Bay and Sloop Harbor in southeastern Labrador; and they are to be expected all along the outer Labrador coast, for we have seen one taken at Eclipse Harbor, near Cape Chidley.[46] Sand eels have also been found on the southern side of Hudson Strait, and in the southern and western parts of Hudson Bay.[47] But these northern specimens may represent a distinct race for they have more fin rays (63-67 dorsal, 28-33 anal); Vladykov, in fact, has classed them as a new subspecies (*hudsonicus*) of the Greenland lance (*A. dubius*).

Sand eels are locally plentiful southward as far as northern New Jersey where we have seen squirrel hake gorged with them; they are reported as "common" as far as Cape May at the entrance to Delaware Bay,[48] and have been reported as far south as Cape Hatteras.[49]

## Importance

It is only for bait that sand eels are of any commercial value in our Gulf, for which purpose 67,800 pounds were landed from the traps in Massachusetts in 1919, 20,000 pounds in 1946.

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[34] Our sand eel is so closely allied to the common European launce (*Ammodytes tobianus*) that we doubt whether the distinction between the two (more slender form and longer head of *americanus*) will stand the test of time.

[35] In the European sand launce (*Ammodytes tobianus*), the sides are described as with lines of tiny brown dots and the tip of the snout as blackish, especially in the young fish.

[36] According to Bean (Bull. New York State Mus. 60, Zool. 9, 1903, p. 376) the majority are from 4 7/8 to 7 inches; and the largest we measured was about 7 inches long. Storer (Fishes of Mass., 1867, p. 217) credits them with a maximum length of 12 inches; seemingly this was an error.

[37] Fish. Ind. U. S.; Sect. 1, 1884, p. 214.

[38] Scandinavian Fishes, vol. 2, 1895, p. 579.

[39] Hind (Fish. Comm. Halifax, 1877, Pt. 2, p. 7) describes the launce in the Gulf of St. Lawrence as "depositing their large reddish-colored ova on the sand between high and low water." This account, however, is widely at variance with the spawning habits of their European representative (*Ammodytes tobianus*) and with the seasonal occurrence of their larvae; and was probably borrowed from the larger European sand eel (*Ammodytes lanceolatus*).

[40] Wissenschaftliche Meeresuntersuchungen, Helgoland, Neue Folge, vol. 6, 1904, p. 184.

[41] Dannevig, Canadian Fish. Exped. (1914-1915) 1919, p. 29; Frost, Res. Bull. 4, Newfoundland Dept. Nat. Res., 1938, Chart 8.

[42] Rept. U. S. Comm. Fish. (1879) 1882, pp. 808, 812, 814, 817.

[43] Cornish (Contrib. Canadian Biol. [1902-1905] 1907, p. 84.)

[44] Leim, Proc. Nova Scotian Inst. Sci.; vol. 20, Pt. 2, 1940, p. 39.

[45] Cox, Contrib. Canadian Biol. (1918-1920) 1921, p. 111.

[46] This specimen about 3 inches long, collected by C. O. Iselin, now in the Museum of Comparative Zoology, appears to be a typical *americanus*, for it has 30 anal fin rays, and only 59 dorsal rays.

[47] Vladykov, Contrib. Canadian Biol., N. Ser., vol. 8, No. 2, 1933, pp. 23-25.

[48] Fowler, Rept. New Jersey State Mus. (1905) 1906, p. 411.

[49] Jordan and Evermann, Bull. 47, U. S. Nat. Mus., Pt. 1, 1896, p. 833.

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**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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