

# EELS

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There are many kinds of eels, but when you hear the word "eel" alone in the United States you can be fairly sure that what is meant is the common eel, called by scientists Anguilla rostrata. If the eel in question comes from fresh water, you can be sure that this is the one. (Eels are sometimes confused with parasitic lamprey "eels", but eels have pointed snouts and real jaws; the lamprey has a sucking disk for a mouth.)

Eels have been known to man for thousands of years and have been a mystery for almost the whole time. The ancient Greeks and Romans were fond of eels as food even though they thought them to be related to snakes or worms. This is not correct, for eels are true fish with fins and tiny scales. Many people still believe as the ancients did, for the truth about eels and their way of life has only been revealed in the last 60 years or so by Italian and Danish biologists.

From the earliest recorded times in Europe, people have known that eels are found in lakes and rivers and in the sea near the mouths of rivers. They have also noticed that some, but not all, of the eels in fresh water leave each autumn to swim down the rivers and off to sea. And in the spring, tiny eels, "elvers", can be seen swimming up streams by the millions. But no one had ever seen an eel ready to breed either in fresh water or along the sea-coast. In fact, no one was really sure that there were two sexes, for the internal organs show little if any difference of the sort that is seen in most other animals and fish. Early American settlers found eels in this country but knew no more about them than the Europeans did.

In 1856 a German naturalist described a little transparent leaf-shaped fish that he had found at sea, and following that many of these little fish were found. Scientists believed that this was a new sort of fish entirely and called it a "leptocephalus". Two

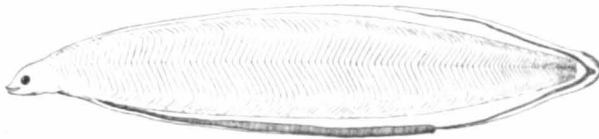


Figure 1.--A leptocephalus.

Italians were the first to suspect that these 3-inch leaf-shaped fishes were related to eels. They noticed that the leptocephalus has the same number of muscle segments in its body as the eel has

bones in its backbone, that there is a striking similarity between the tail of the leptocephalus and that of the eel, plus some other similarities. All of these things did not add up to proof, though, that the leptocephalus is an eel which has not grown up yet. Many scientists believed that the resemblance was accidental or that the leptocephalus was a deformed or diseased young eel.

In 1896, Grassi and Calandruccio, the men who had first noticed the resemblance of the leptocephalus to the eel, announced that they had -- (1) seen a leptocephalus in an aquarium change gradually into a tiny eel, and (2) caught at sea a form about halfway between the leptocephalus and the eel.



Figure 2.--A late-stage leptocephalus.

That settled the argument about the identity of the leptocephalus and the eel. Still nothing was known about the breeding place except that it was somewhere in the sea, and this had been suspected even by the ancient Greeks.

In 1904 a Danish research ship found a leptocephalus north of England, the first ever found outside the Mediterranean. The Danish Government offered Johannes Schmidt, at the time only 27, the job of discovering the breeding place of the eel. Schmidt said many years later that he did not realize that this would take years of work at sea from America to Egypt and from Iceland to Africa.

Schmidt found thousands of leptocephalus forms all over the North Atlantic and noticed that the farther away from the coast of Europe he found them, the smaller they were. He traced them farther and farther until he found leptocephali less than 1/2 inch long. Finally in 1922 he announced that the breeding place of the European eel is about 1500 miles off the coast of Florida, deep in the famous Sargasso Sea.

During his work Schmidt undertook to explain the differences observed in fresh-water eels. Eels come in various shades of olive or muddy brown, sometimes nearly black. Large eels vary in the shape of the head and eyes and also in the appearance of the digestive organs. Schmidt decided to work with something which never varies throughout the life of an individual fish and showed that all European eels (Anguilla vulgaris) are the same with about

115 bones in the spinal column, but that the American eel is different, with only about 107. Each of the two kinds varies in color depending upon what part of its life it is in and what sort of bottom it is living on. The shape of the head and eyes and the internal organs also changes in individuals, depending on whether or not the eel is getting ready to go back to the sea to breed.

The differences between the European eel and the American eel go deeper than the number of bones, however. Schmidt showed that both kinds breed pretty much in the same place at about the same time. But after the early spring and summer breeding in the Sargasso Sea, it takes just about 2 1/2 years for the European leptocephalus to drift and swim back to Europe. The American eels, however, have a much shorter distance to travel and start up the fresh-water streams the spring after they have hatched out of the egg. Each kind of leptocephalus swims and is transported by the currents of the ocean; however, not only does each kind find its way into the right currents, but also the timing of the change from leptocephalus to eel form must be appropriate. The American eel takes a few months for the change while the European eel takes 2 1/2 years.

Let us review what we know about our own American eel. The eels found in fresh water are usually females. Any eel more than 18 inches long is probably a female -- one more than 24 inches long is certainly a female. After living several years in a lake or stream, the female stops feeding and starts back toward the sea. At this time she becomes nearly black in color and her digestive organs begin to degenerate.

On the way to the breeding grounds, the males join the females. Many of the males, which have only grown to a foot or so in length, have been living near the river mouths. Now they, too, become nearly black and their eyes enlarge as they become ready to go to the Sargasso Sea.

In the depths of the Sargasso Sea, probably down a quarter mile or more, the eels breed and die, just about the same time as the European eels which have come from the other side. The young eels hatch out of the eggs in the leptocephalus form, then swim and drift toward the coast, growing as they go. Just before they enter the rivers they change into tiny transparent "glass eels" and then to elvers.

The males mostly stay near the sea, while the females swim upstream to lakes and ponds where they spend probably 5 to 20 years before the urge to migrate to the sea and breed becomes too powerful to resist.

Eels are rugged animals and can survive several hours out of water. In their migration into fresh water they travel over damp rocks and through underground waterways. This explains why they are found in ponds and lakes that appear to have no inlet or outlet. They live on or even burrow into muddy bottoms. Eels feed mainly at night on almost any animal food, living or dead. They are found in America from northern Canada to Panama and the West Indies, but never on the West Coast (lampreys often occur in salmon streams, but they are not eels).

Not many eels are eaten in this country, but Europeans have large and profitable fisheries for them and know many ways to prepare delicious dishes from eels. Roast eels, which many Italians eat on Christmas Eve, or the smoked eel which is a favorite of Germans and Scandinavians (you can get this in most delicatessens) are well worth sampling.

If you want to know more about eels, try:

"Eels" by Leon Bertin, published in 1956 by Cleaver-Hume Press of London,

and

"Fishes of the Gulf of Maine" (pages 150-160) by Bigelow and Schroeder, published in 1953 as Volume 53 of the Fishery Bulletin of the Fish and Wildlife Service.

Your local librarian may have these; if not, she can borrow them for you.