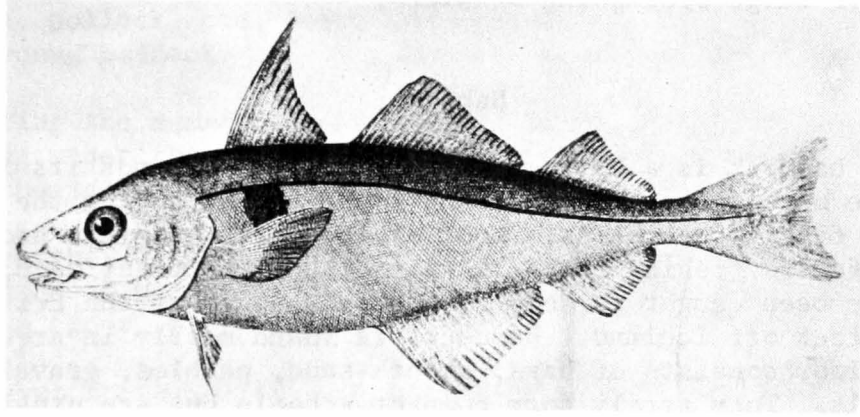


1.52

FL 489

# Haddock



by **Albert C. Jensen**

**Fishery Research Biologist  
Woods Hole, Massachusetts**

## TABLE OF CONTENTS

	<u>Page</u>
Habits . . . . .	2
Growth . . . . .	3
Age determination . . . . .	3
Commercial fishery . . . . .	6
Utilization . . . . .	7
Research . . . . .	7

The haddock (Melanogrammus aeglefinus), is a member of the cod family, which includes also the pollock and the hakes. The black lateral line and black shoulder blotch, called the "Devil's thumb print" or "St. Peter's mark," distinguish the haddock from the cod and the pollock, its closest relatives. The haddock is a streamlined fish, dark purplish gray on the top and sides down to the black lateral line, and below it is silvery gray toned with pale pink.

Haddock are found in the waters of the northwest Atlantic Ocean and off the coasts of northern Europe, the British Isles, and Iceland. In North American waters haddock are found off Newfoundland and Nova Scotia, in the Gulf of Maine, and on Georges Bank.

The haddock is one of the most important food fishes in the North Atlantic. In 1958 over 103 million pounds of haddock, worth more than 11 million dollars to the fishermen, were landed at New England ports. Nearly 80 percent of the catch was landed at Boston, home port of a fleet of large oceangoing trawlers.

### Habits

The haddock is a bottom-dwelling fish and spends its life moving over the ocean floor in search of food, except during the spawning period when feeding decreases. Most of the North American haddock are found on offshore fishing banks in water 150 to 450 feet deep, but haddock have been caught as deep as 720 feet north of the British Isles and in 984 feet off Iceland. Haddock are found mostly in areas where the ocean floor consists of hard, smooth sand, pebbles, gravel, or broken shells. They rarely form compact schools but are usually abundant where found.

Haddock do not make long-distance mass migrations. But tagging and other studies have shown there is some movement, generally of a seasonal nature between deeper and shoaler waters. The seasonal movements presumably are a search for favorable spawning, feeding, or temperature conditions.

Adult haddock feed mostly on slow-moving small animals found on or burrowing in the upper layers of the ocean floor. Food items vary according to location but, in general, consist of crabs, shrimps, clams, snails, worms, starfish, sea urchins, sand dollars, and sea cucumbers. Haddock gorge themselves on burrowing worms which they grub out of the bottom with their muscular lips. The mouth of the haddock is well suited to this type of feeding and they have been called the "carp of the sea" because of their habit of rooting on the bottom for food. Haddock eat squid and occasionally feed on fish, mostly sand lance but, in general, fishes form only a very small part of their diet.

Haddock in New England waters spawn near the bottom from February to May, with the peak of spawning in March and April. A single female, depending on size, may produce from 150,000 to 2 million eggs, each about 1/16 inch in diameter. After they are fertilized, the eggs rise and float on the surface of the sea, drifting with the current. An egg hatches in about 14 days, and the newly hatched haddock, which

is about 3/16 inch long, continues to drift with the current. At this stage in its development, it is nourished by a yolk sac attached to its belly. The yolk is absorbed in about 10 days, after which the little haddock feeds on zooplankton--small feebly-swimming animals.

Although each haddock produces many eggs, very few of the eggs ever survive to become adult fish. Some eggs are eaten by other fishes but many more eggs are carried by currents off the banks and out over the great depths of the sea. Young haddock from such eggs die when they attempt to swim to the bottom. Many small haddock are eaten by silver hake, pollock, cod, hake, and skates, and large haddock sometimes eat young haddock.

During the summer, young haddock up to 3 inches long are often found living under the red jellyfish (Cyanea). Biologists think the fish seek the jellyfish as a refuge from enemies.

When they are about 4 to 5 months old and 3 to 4 inches long, the young haddock begin to descend through the mid-depths of the sea to the ocean floor, where they will spend the rest of their lives.

As yet there is little information on the activities of the young haddock in the mid-depths; however, it is believed the process is not a rapid dive to the bottom, but is more like a gradual swimming downward which may take from 1 to 2 months. The haddock presumably continue to feed on zooplankton during this period.

### Growth

When the haddock reach the bottom (usually sometime in September or October) they are about 5 1/2 inches long. The first 3 years on the bottom is a period of rapid growth; on Georges Bank, 1-year-old haddock average 7 1/2 inches in length, 2-year-old haddock 12 1/4 inches, and 3-year-old haddock 17 inches. Figure 1 shows the growth rate of haddock from Georges Bank, for fish up to 9 years of age. After the third year, haddock grow more slowly and, although a few fish live to be 15 years old, they rarely are longer than 34 to 36 inches. The largest haddock on record was an Icelandic fish 44 inches long.

### Age Determination

The age of a haddock, as with many other species of fish, can be determined by examining its scales under the microscope. Figure 2 is a photograph of a haddock scale showing the features used in to determine a haddock's age. The scale is composed of a horny material formed in a series of roughly concentric rings. Widely spaced rings

form in the summer and early fall when the ocean waters are the warmest and the fish is growing rapidly. Narrowly spaced rings form in the cold months when the fish is growing slowly. One year's growth appears on the scale as a series of wide rings (light band) followed by a series of narrow rings (dark band). The number of zones of narrow rings shows the number of winters through which the fish lived and thus indicates the age of the fish. Marks are also formed on earstones (known as otoliths) found within the skull, on finrays, and on some of the bones.

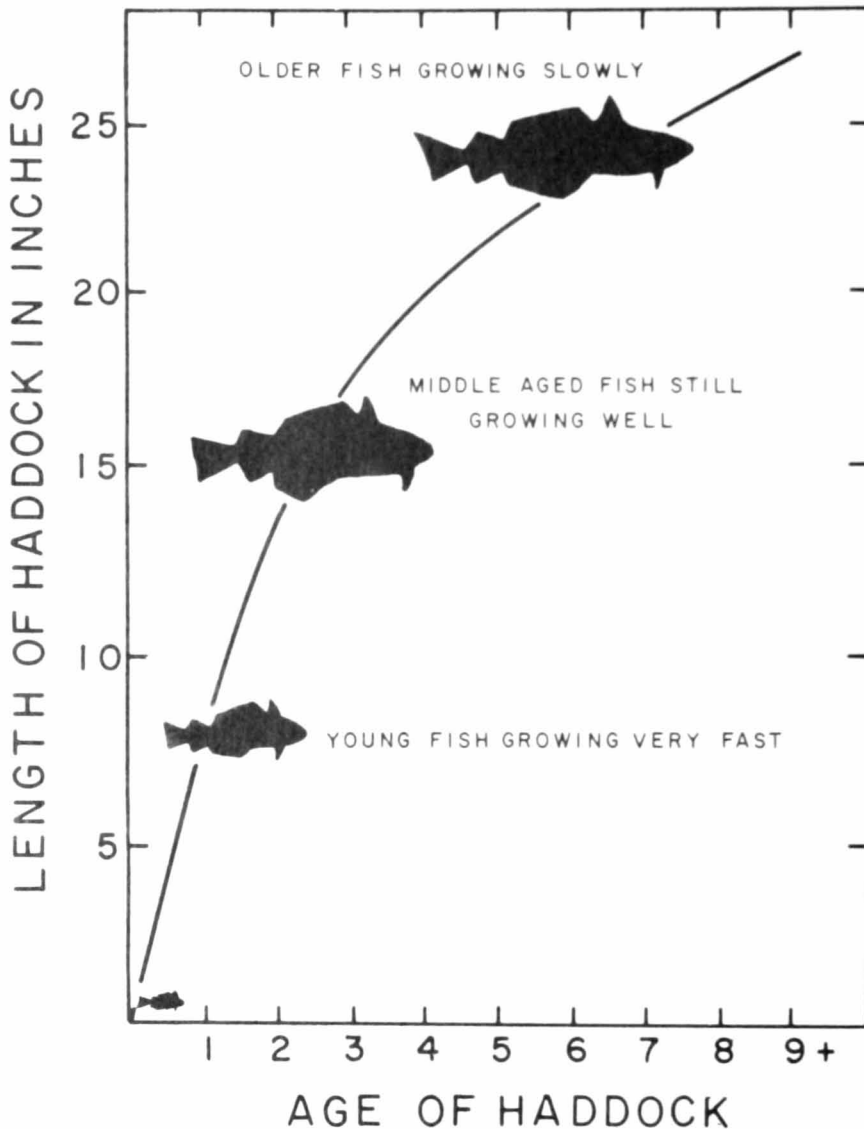


Figure 1. --Haddock grow rapidly until they are about five years old and then their rate of growth begins to slow down.

START OF  
SCALE GROWTH

AGE IN YEARS

1

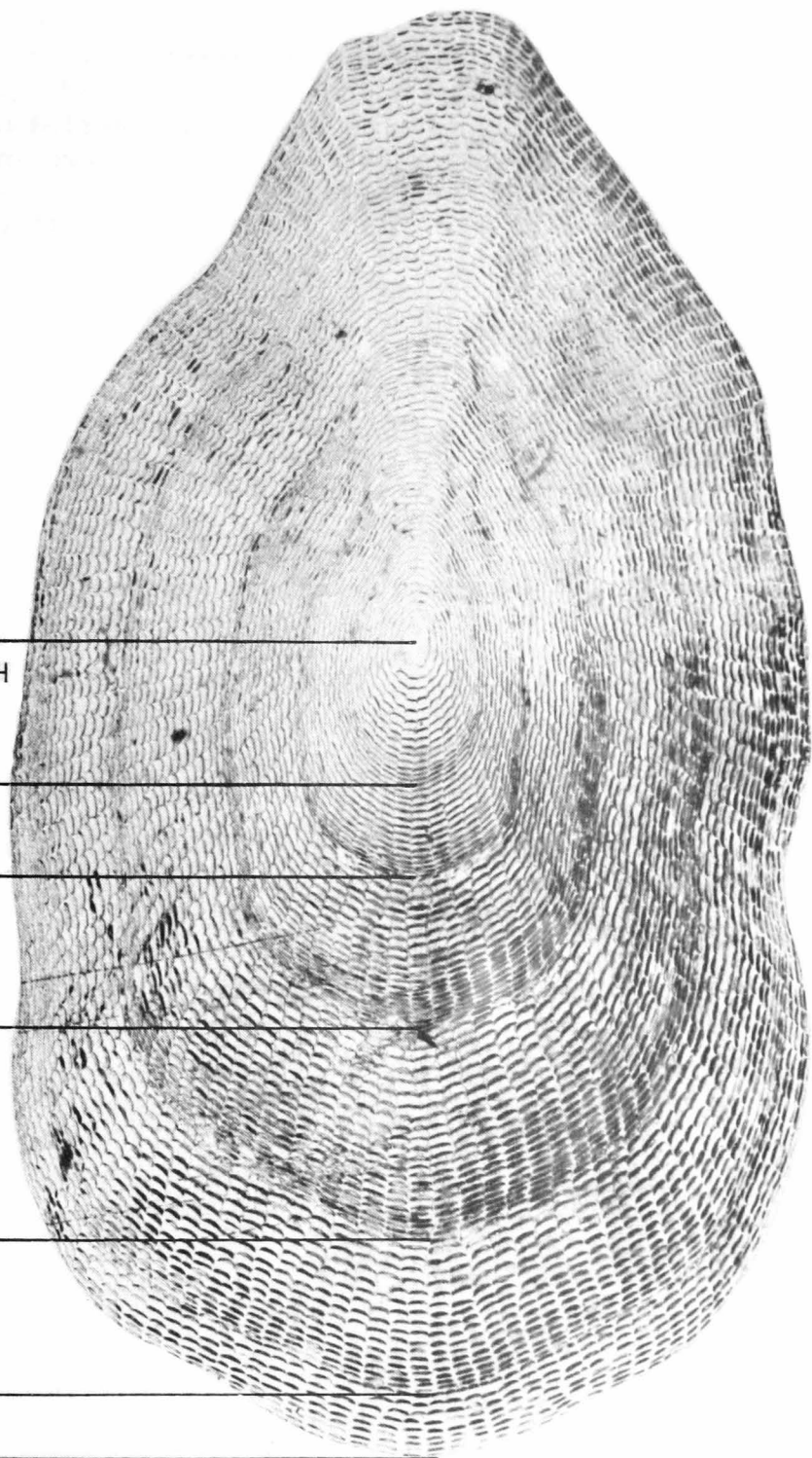
2

3

4

5

6



**Figure 2.** --Photograph of a scale from a 6-year-old haddock. The zone of winter rings, marking the end of one year's growth, are counted to determine the age of the fish.

## Commercial Fishery

The commercial fishery for haddock is carried out by a large fleet of vessels, mostly otter trawlers. They range in size from small wooden draggers, 40 to 50 feet long, up to oceangoing steel trawlers 125 feet or larger (fig. 3). These boats drag an otter trawl (fig. 4), basically a large flattened cone of rope netting, over the ocean floor on known haddock grounds. Small numbers of haddock are also caught by gill nets, fish traps, and longlines.

Longlines, also called line trawls, are sets of lines, each several hundred feet long to which are fastened baited hooks spaced 6 feet apart. The lines are set out to rest on the bottom and remain in place for 1 to several hours after which the lines are hauled back and the haddock removed from the hooks.

In the 1958 New England landings, haddock ranked second in

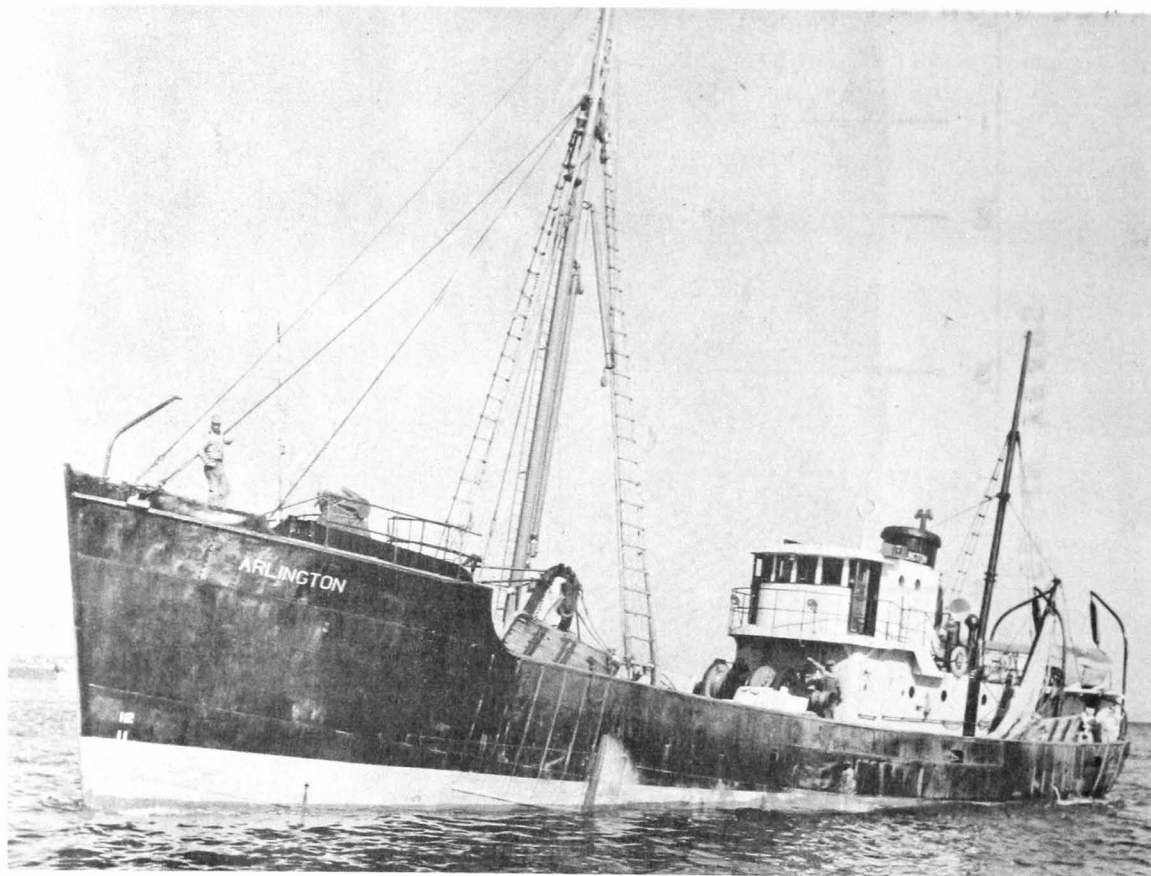


Figure 3. --A typical large trawler, mainstay of the Boston haddock fleet. Vessels such as this travel 150 to 200 miles out to sea to catch haddock.

volume and value, being exceeded in volume only by ocean perch and in value by lobsters. Boston led in haddock landings, followed by Gloucester, New Bedford, and Portland.

### Utilization

Haddock are landed in two market categories; "scrod," which weigh 1 1/2 to 2 1/2 pounds, and "large," which weigh more than 2 1/2 pounds. Most haddock are filleted and sold fresh or frozen. A large volume of haddock fillets are frozen in blocks and processed into fish sticks. The development of precooked, breaded fish sticks as a quick and easy way to serve haddock, has increased the consumption of this species in American homes.

### Research

Present research in haddock biology is concentrated in three main areas. The first is a study of the early life history of the fish, from the time the eggs are spawned, to the time when the young fish first go to the bottom. Biologists believe the fluctuations in haddock abundance result from fluctuations in the number of eggs and the number of larvae that survive to reach the bottom. Thus, by studying the early stages of the haddock's life, it is hoped we may discover the reasons why in 1953, for example, haddock fishermen landed 20 million pounds less than they landed the year before.

Identifying haddock stocks is another area of research. Are the haddock of Georges and Browns Banks and the Gulf of Maine all the

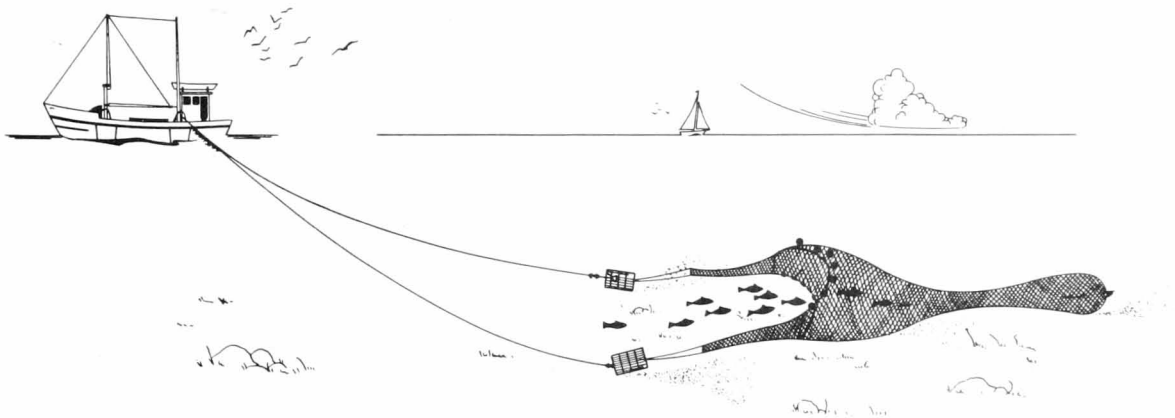


Figure 4. --The otter trawl is dragged over the ocean floor to capture haddock. The large fish are trapped by the net but the small ones escape through the meshes.

same stock of fish? Do they move at will from one bank to another? Or, are the haddock on the several banks separate stocks, each staying pretty much on their own grounds? Tagging studies help find answers to these questions.

Working aboard Fish and Wildlife Service research vessels and chartered fishing vessels, United States biologists have tagged nearly 10,000 haddock. The most commonly used tag has been the Petersen tag. It consists of two thin plastic discs, bearing a serial number and reward message, attached to the gill covers of the fish with a stainless steel pin. This tag is being replaced by the more visible "spaghetti" tag made of bright yellow vinyl plastic tubing on which is printed a message and a serial number. This tag is attached through the back muscles of the haddock. It is harmless to the fish and promises to be very useful for studying the movements and migrations of the haddock. To date, more than a thousand tagged haddock have been recaptured by commercial fishermen. The majority were recaptured in the same general areas where they were released, but a few individuals traveled up to 200 miles.

The ecology of the haddock is the third area of investigation. Ecological studies seek to learn the relation between the haddock and its environment, both biological and physical. The environment includes other animals--prey, predators, competitors, and associates--found living with the haddock. Environment also includes the water--its depth, temperature, and salinity--and the nature of the bottom topography where haddock live. Ecology studies will help give us the answers to some of the questions about haddock, as why haddock are found in one place and not in another, and what fishes are food competitors.

Studies on the haddock resulted in a conservation measure designed to protect the young fish, not yet of marketable size. In 1952, a regulation put a ban on the use of trawl nets with a mesh smaller than 4 1/2 inches. This mesh size retains the marketable scrod and large haddock but allows the smaller haddock to escape and grow to large size.

Haddock studies, as with other fishery research, cannot solve all the problems. The solving of one problem soon reveals new and challenging problems that require answers. But the basic goal of all fishery research is to ensure wise use of a renewable resource.

If you want to know more about haddock, read Fishes of the Gulf of Maine (pages 199-213) by Bigelow and Schroeder, published in 1953 as Volume 53 of the Fishery Bulletin of the U. S. Fish and Wildlife Service. Your local library may have this book; if not, the librarian can borrow it for you. This book may also be purchased from



the Superintendent of Documents, Government Printing Office, Washington 25, D. C. at the price of \$4.25. The volume contains information on more than 200 species of fishes from the northwest Atlantic Ocean and is recommended to anyone interested in the study of fishes.

Ms #928