

**THE ARROWTOOTH FLOUNDER**

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## INFORMATIONAL REPORT - ARROWTOOTH FLOUNDER

### INTRODUCTION

The arrowtooth flounder has been an important flatfish in Oregon's trawl fishery since the late 1930's. However, it primarily has been used as mink food rather than for human consumption. This is because of its soft, fatty flesh, which is difficult to fillet and quickly becomes "mushy". The name arrowtooth is derived from the large arrow-shaped teeth of this species. These large teeth and the very large mouth, along with a left eye situated on the upper margin of the head, are used to identify arrowtooth flounder. This species is also commonly called "turbot", a market name unsuccessfully used in the sale of this product for human consumption in the 1940's.

Oregon trawl landings for mink food of arrowtooth flounder have fluctuated widely over the years. From 1941 to 1953 landings ranged from about 350,000 pounds to 2.8 million pounds. In 1956, landings peaked at 4.2 million pounds and have since declined to only 155,000 pounds in 1974. This decline has been associated with a general downward trend in Oregon mink food landings caused by the decline of the domestic mink ranching industry.

Biological information from arrowtooth flounder landed in Oregon was not gathered until the early 1970's. Information obtained includes weight, length, sex, age, and maturity. The data from this sampling has much expanded our knowledge about this flatfish.

### REPRODUCTION

Off the central Oregon coast, females are 13-3/4 inches in fork length and about 5 years old before they first spawn. Males first reach maturity at 10-1/4 inches long at about 3 years. Fifty percent maturity occurs at 11 inches and about 4 years for males; and 16-3/4 inches and about 8 years for females. Full maturity

is not reached until 15 inches and 6 years for males and 24 inches and 11 years for females.

Little is known about the spawning habits of arrowtooth flounder. This species is known to spawn off central Oregon from December through March in about 200 fathoms. However, the specific spawning sites as well as duration and peak of spawning remain unknown.

The number of eggs produced by arrowtooth flounder has not yet been determined.

#### EARLY LIFE HISTORY

Fertilized eggs of arrowtooth flounder are about 1/10 inch (2.5 millimeters) in diameter. After fertilization the eggs rise into the water column, assuming a planktonic existence. Time to hatching is unknown.

At hatching arrowtooth flounder are called larvae. Few larvae of arrowtooth flounder have been collected off Oregon. The larvae however, are probably pelagic for about a year or less.

Before arrowtooth flounder larvae settle to the bottom they undergo drastic changes in form. When first hatched they have an eye on each side of the head and are characterized by two rows of large spines on each gill cover. As the larva develops, the left eye gradually moves over to the right side of the head and the prominent gill cover spines disappear. The length of most larvae when they assume a bottom life is unknown. However, juveniles have been collected on the bottom in March as small as 3-1/2 inches, fork length, off southern Oregon. They are called juveniles when they establish a bottom life. Off Oregon, this settling out is assumed to occur in the late winter-early spring months on the upper continental slope.

Juvenile arrowtooth flounder apparently occupy the middle to outer continental

shelf off Oregon from about 50-100 fathoms. At age 2 they have grown to about 6-1/2 inches in length.

## ADULT LIFE HISTORY

### Distribution and Abundance

Arrowtooth flounder occur from off central California northward to the eastern Bering Sea. In the Bering Sea this species overlaps with, and is replaced by, the closely related Asiatic arrowtooth flounder. Area of major abundance for the American arrowtooth flounder, however, is from central Oregon to southern Alaska.

Adults occupy a depth range from about 30-400 fathoms. Off Oregon they are most abundant on the edge of the continental shelf at depths of 80-120 fathoms. They show a preference for a mud bottom.

Arrowtooth flounder are abundant off the Oregon coast. From data collected in Oregon groundfish trawl (3-1/2 inch mesh) surveys between the Columbia River and Cape Blanco, in 10-110 fathoms, estimates were made of the total poundage available. In this area we estimated a population of 15-17 million pounds of arrowtooth flounder. Arrowtooth flounder was the fifth most abundant of an estimated total 174-184 million pounds of flatfish in the area.

### Age and Growth

Arrowtooth flounder are known to live to at least 22 years. This fish was a 32 inch female weighing 14 pounds. However, fish of this age and size are rare. Age is ascertained by counting annual winter rings laid down on the otolith (ear bone). These annual rings (called hyaline zones) are narrow transparent bands formed during the winter when the fish grow more slowly than in the other months. Females grow faster and reach a larger size than males.

### Migrations

Nothing is known about the migratory habits of arrowtooth flounder. Small numbers were tagged in the late 1940's and early 1950's but there were no recoveries.

### Feeding Habits

The arrowtooth flounder is a predatory fish. The large mouth and teeth of this species enables it to feed on numerous organisms. Food items include crustaceans, fish, and occasionally annelid worms.

### THE FISHERY

The only trawl fishery for arrowtooth flounder off Oregon currently is for mink food. From a 1974 discard study conducted aboard Oregon drag boats we found that they were catching age 3-19 year old arrowtooth flounder. Most fish were 5-13 years old.