

# Tiny Sea Plankton Proves to Be Major Marine Food Chain

Sheer bulk makes the blue whale an awesome creature; the amiable disposition and cleverness of the porpoise have intrigued man since the days of ancient Greece; and every arm-chair adventurer has thrilled to accounts of the deadliness of sharks, squids, giant clams, and other sinister denizens of the deep.

But from an economic standpoint, the real kings of the salt-water world are the tiny, mindless gypsies of the sea—plankton. On this link of the food chain depend virtually all marine fisheries.

According to the Department of the Interior's Bureau of Commercial Fisheries, plankton range from the simplest one-celled plants and animals to very complex little animals, such as crustaceans and fish larvae.

Most of these swim only very feebly, and must drift aimlessly with the currents—hence the name, which is derived from a Greek word that means "wandering."

Plankton of less than 1/600 of an inch in diameter are called micro-plankton; those large enough to be seen with the naked eye are designated macro-plankton.

Especially dense concentrations of a single species of animal plankton, called zooplankton, are known as

"swarms." Concentrations of microscopic plants, or phytoplankton, are called "blooms" or "flowerings."

One of the best known examples is the deadly "red tide," which blooms most often in subtropical marine waters, such as the Gulf of Mexico or the Pacific Ocean off southern California.

The zooplankton that browse on tiny plant forms become, in turn, food for the young of nearly all species of fish, and of adult fish that remain plankton feeders throughout life. These, in turn, become food for large, flesh-eating fish and for toothed whales.

Many fish prefer one or more groups of plankters to the exclusion of others. Plankton-feeding whales (including the blue whale, the world's largest mammal) are also selective, and roam the seas to locate massive blooms of the preferred varieties.

Among plankton-eating fish are minnows, anchovies, mackerel, menhaden, and herring.

Mackerel and herring have an unfortunate fondness for a small crustacean (Calanus) commonly called "red feed," because it is turned reddish-orange by stomach enzymes.

Fishermen have reported that painful sores develop on the hands after contact with

mackerel containing red-feed—a factor giving rise to the nickname, "red pepper."

The presence of this food in the stomach of mackerel causes rapid and extensive breakdown of surrounding flesh within 24 hours after the fish are caught and packed in ice; heavy losses are occasionally experienced as a result of such spoilage.

When small herring are to be canned as sardines, they must be inspected for red feed in the alimentary tract. If it is present, the fish must be held until stomach and intestine are cleared of the organism.

Sardine herrings also tend to gorge themselves when the planktonic larvae of barnacles are present in abundance. This makes the sardines unmarketable, as processors will not accept fish which have overfed and would tend to break open when canned.

Fish that have drifting eggs must spawn either on the feeding ground for the young, or where winds and currents will take the eggs or young fish to the feeding grounds. The newly-hatched fish is infinitesimally small and will perish unless food of appropriate size and variety is available.

As the fish grows, it eats proportionately larger forms of plankton.

In addition to serving as a vital link in the food chain of the marine world, plankton is considered, from time to time, as a possible direct food source for human beings.

As early as 1939, the German State Biological Institute of Helgoland described the nutritive value of zooplankton as equivalent to that of the best meats, and the nutritive value of phytoplankton as equal to that of rye flour.

In 1891, the English scientist William A. Herdman reported that copepods (a form of zooplankton), when broiled in butter, has a flavor similar to that of lobster.

During World War II, the United States made intensive studies of plankton as food, and recommended its use as food for downed aviators or shipwrecked persons; plankton nets were included in survival kits.

The shrimp-like krill on which the baleen whales feed are being harvested by Soviet vessels in the Antarctic. But the cost of pumping the tremendous amounts of water necessary to catch other kinds of plankton has made plankton harvesting unprofitable so far.