



THE NORTHERN SHRIMP

(Pandalus borealis)

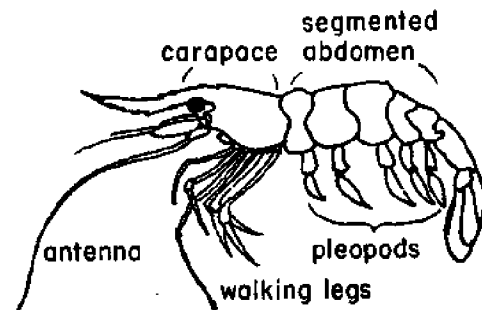
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The small shrimp (*Pandalus borealis*) is translucent pink in color and lives in boreal and sub-arctic waters; the Gulf of Maine is the southernmost sea where this shrimp is found. The small shrimp found off the coasts of Oregon and Washington is similar but a different species (*P. jordani*). Commercial fisheries for the northern shrimp (*P. borealis*) are conducted off the coasts of Norway, Sweden, Alaska, Korea, Greenland, Iceland, Denmark and New England.

Besides size (shrimp from the Gulf of Mexico average about twelve to a pound while the northern shrimp average about forty to a pound). The northern shrimp is very different from its southern cousins off the coasts of Florida, Texas and Louisiana. The southern shrimp live only a year, never carry eggs on their abdomens and never change sex; while the *P. borealis* live about 5 years, carry eggs on their abdomen for about 6 to 8 months and are protandric hermaphrodites which means that they mature as males and then transpose into adult females.

The shrimp breed during the summer. During the fall females migrate to inshore waters, carrying the eggs under their abdomens. The shrimp hatch in the early spring and are shed by the females; then the females and grown males migrate to offshore waters. As shrimp tend to be cannibalistic, the larvae are given, therefore, a better chance for survival. The larvae grow rapidly and are able to defend themselves when the adults return in the fall. After their first year the young shrimp make the summer migration to offshore waters; in the third summer they are mature males and capable of fertilizing mature female shrimp. The following winter the male shrimp do not migrate but stay offshore where they make the transition from male to female. Water temperature is very important at this time of their growth because the larger they grow, the more eggs they will produce as females. If the water is too cold their growth is slowed. Sixteen hundred to 3000 eggs will be carried by one female, depending on her size.



The egg development is also very dependent upon temperature. If the water temperature is too warm (above 48°F) or fluctuates greatly, the eggs will not hatch; shrimp landing three years later will be adversely affected. The optimum water temperature seems to be between 45.3°F and 47.9°F.

In order to grow, the shrimp, like other crustaceans, must cast off its outer shell (molt). It has long legs, weak claws and a laterally compressed abdomen. It swims forward with the use of its pleopods or abdominal feet. When frightened or when rapid movement is desired, it flexes its powerful muscular abdomen and can move itself backward with remarkable speed.

The shrimp migrates daily up and down. They rise off the bottom at dusk and swim toward the surface of the water to feed, mostly on krill (planktonic shrimp). They return to the bottom at dawn. The egg-bearing females do not move up and down because they are hampered in their movement by the eggs on their pleopods. They stay on the bottom and feed mainly on marine worms and mollusks.

Most Maine shrimp are caught by otter trawls. The size of the mesh has been regulated as a conservation measure by Maine, Massachusetts and New Hampshire so that the proportion of small shrimp caught would decrease. The majority of shrimp now caught are three and four years old. In addition to large vessels equipped for dragging in depths up to and over 100 fathoms, many lobstermen convert their boats to shrimpers in the wintertime. However, during the winter of 1975-76 many did not rig up as the shrimp stock has been seriously depleted.....Maine shrimpers operate between Jeffreys Ledge off New Hampshire and Mt. Desert Island.

Shrimp landing records in Maine date from 1938. A small shrimp industry was supported until 1953 when no shrimp were landed. None were seen until 1958 when 5,000 pounds were brought in. After that year there was a steady increase (1969 was the best year with 24,235,340 lbs., valued at \$3,044,948) until 1970 when shrimp landings decreased. Landings have been on the decrease ever since. This past winter (1975-76) showed a sharp drop from the 7,105,132 lbs. caught the previous year (worth \$1,976,571) to 1,812,475 lbs. (worth \$605,519). Much of the Maine shrimp were exported to Scandinavia.

Maine, New Hampshire and Massachusetts set up a federally-assisted shrimp management program in 1973. Besides an agreement on minimum mesh size, they closed the season last year from July 5th through September 27th. This year the season was closed on April 15th. No opening date has been set as it depends on the availability of shrimp.

Biologists believe that an increase in water temperature, the intensity of the fishing and biological factors have contributed to the scarcity of the shrimp at this time. The abundance of shrimp has always been cyclical.

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