

MARINE BIOINVASIONS FACT SHEET:

NEW ENGLAND MARINE BIOINVADERS



It is always difficult to know whether a species is native or introduced. In New England, this is especially difficult because international shipping traffic has been providing material for biological invasions for over 500 years. The following are conspicuous organisms that have been introduced in the last century.

EUROPEAN OYSTER (*OSTREA EDULIS*):

The European oyster, *Ostrea edulis*, is native to the western coast of the Atlantic ocean from Norway to Spain. The oyster is considered a delicacy to some, especially in Europe, and a desirable product for aquaculturists in Northern New England. Because American oysters do not grow in the cooler waters of the Gulf of Maine, the Maine Department of Sea and Shore Fisheries imported the European oyster to Maine in the 1950's. The oyster spread to Massachusetts waters in the 1980's either through an accidental release or by traveling south on ocean currents. The current populations of European oysters in Casco Bay, Maine and in Salem Sound, Massachusetts are both large enough to support small fisheries. While the oysters in Maine are harvested, the ones in Massachusetts are not because harvesting of shellfish is prohibited in Salem Sound.

The ecological effects of the European oyster in Maine and Massachusetts are not yet determined. It is possible that the European oyster has filled a niche that was not occupied by native mollusk species. However, there may be competitive interactions between the European oyster and native species that have yet to be observed.

CARCINUS MAENAS, THE EUROPEAN GREEN CRAB

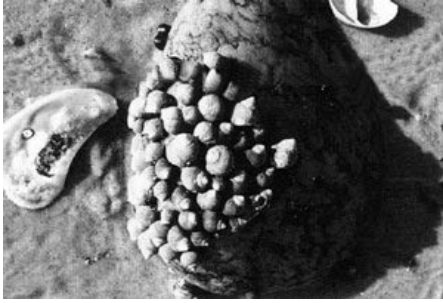
The European Green Crab invaded the Atlantic coast of the United States in the 1950's from Europe, where it was probably introduced in the late 1700's. Because it has been here so long, it has become a naturalized species and is rarely considered an invader anymore, although it is one of the most dominant predators on the New England shore. The green crab has very powerful claws and is able to consume shellfish including the economically valuable soft shell clams, quahogs, and

scallops. During the 1990's the green crab invaded San Francisco Bay and has begun to spread north to Oregon and Washington. Marine scientists and natural resource managers in these areas are concerned that the green crab will harm their profitable shellfish industry and damage native ecosystems.

HEMIGRAPUS SANGUINEUS, THE JAPANESE SHORE CRAB

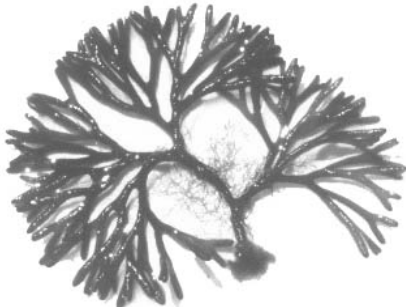
The first sighting of *Hemigrapsus sanguineus* in the United States was in 1988 near Cape May, New Jersey. Currently the crab ranges from Boston, Massachusetts to North Carolina and has been spreading northward. This crab lives in the rocky intertidal zone and can be found under rocks during low tide at very high densities. McDermott relates, "On 30 January 1996 from beneath a triangular rock covering .18m² of relatively flat, solid surface in the middle intertidal, 56 crabs... were collected. This represents 320 crabs m⁻², a minimum value because several crabs escaped." The effects of this invasion are not yet determined, though it poses similar threats as the green crab because of its eating habits and population density. *H. sanguineus* voraciously consumes many different types of food, including diatoms, all common algae, and small mussels and other small animals. In the lab, specimens could consume 150 juvenile of *Littorea* sp. and 170 small mussels (*Mytilus* sp.) per square meter in a day. In another experiment, (McNamee,) *H. Sanguineus* was given a choice of various *Littorina* species, and *L. Littorea*, a nonindigenous species, was not eaten though others were consumed at a high rate. This suggests that the impact of this crab will be much harder on the native species. There do not seem to be any natural predators of *Hemigrapsus* in the area it has invaded. The parasites found on *Hemigrapsus* in its native range in Japan, such as the parasitic barnacle, *Sacculina*, are not present along the Atlantic coast of the United States and no Atlantic parasites have yet been found to affect this crab. In northern New England, its only potential native competitor, xanthid crabs, generally prefer lower intertidal zones. Also in a similar niche, however, the non-native *C. Maenus* is a major competitor, though it prefers a slightly more northern range. Also helping the crab to succeed is its four month spawning season.

LITTORINA LITTOREA, THE NORTHERN PERIWINKLE



Native to Europe, the Northern periwinkle was introduced to Canada through ballast water or intentionally for food, as it is eaten in parts of Northern Europe. It spread through the US through shipping in the 19th century. This periwinkle can populate rocks very densely. According to Edwards, "It has been estimated that one square mile of rocky shoreline had 860,000,000 periwinkles." Interesting, this periwinkle has been found to prevent the non-native alga, *Ulva lactuca* from completely dominating the intertidal zone of Massachusetts. *L. Littorea* is an example of an invasive species that caused damage by bringing with it disease, the marine blackspot, which may be harmful to important fisheries.

CODIUM FRAGILE, DEADMAN'S FINGERS ALGA



C. fragile is a dominant species among the algae of the intertidal region. The subspecies *tomentosoides* is native to the Pacific and spread to Eastern US from Europe. It was first found on the eastern coast of the US in New York in 1957. Since then, it has spread rampantly, partially due to heavy shipping traffic. It has now been found as far south as North Carolina and as far north as Nova Scotia. *C. fragile* has replaced the native eelgrass beds in some areas, displacing other native species dependent on the beds, including economically important oysters. Its success is partially due to the major herbivore, the green sea urchin, (*Strongylocentrotus droebachiensis*'s) preference for other algae.

MEMBRANIPORA MEMBANACEA, THE WHITE LACE BRYOZOAN

M. membranacea is an epiphyte, (it grows on algae, using them mostly for structural support,) now dominant on laminarian kelps in the New England coastal waters. Having no natural predators in the area, it has killed large areas of kelp forests by encrusting the algae. It has spread from Maine to New York.

STYELA CLAVA, THE ASIAN TUNICATE; AND BOTRYLLOIDES DIAGENSIS

These two tunicates have become common in New England, but so far are relatively unobtrusive. Since their introduction in 1973, their numbers have increased, though they are not competitively dominant. They cause damage mostly by displacing other organisms in shallow rocky areas.

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