

Grateloupia turuturu: An Invading Red Alga in Long Island Sound



(Above) A *Grateloupia* blade feels slimy to the touch, and in some cases, somewhat grainy. This red alga can be found growing in a few locations in eastern Long Island Sound to about 6 feet in depth. Photo credit: N. Balcom, CT Sea Grant

The first recorded populations of *Grateloupia turuturu* in North America was in outer Narragansett Bay, Rhode Island, in 1994. Ten years later, *Grateloupia* was discovered in Long Island Sound at Millstone Point in Waterford, Connecticut, during the long-term bi-monthly monitoring program conducted by the Environmental Laboratory of the Dominion Power Station.

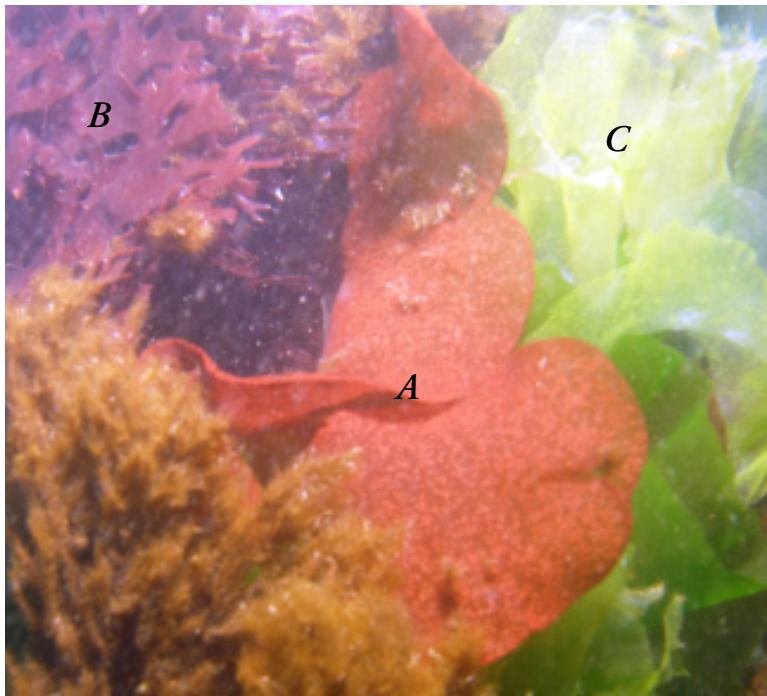
The red alga is a large perennial, native to the Asian Pacific, particularly Japan. It has thick, flat blades that are deep red, burgundy, or maroon in color, and a holdfast for grasping on to firm surfaces. Blade color tends to be lighter in the summer months and a darker color in the colder winter months. Although there are a number of other red algal species in the Sound that look similar to *Grateloupia*, one distinguishing characteristic is that it is very slimy to the touch (as opposed to feeling wet and slippery like the brown kelp). It can grow to several feet in length. In Long Island Sound, it is found in shallow subtidal waters, 3-8 feet in depth at high tide. New blades appear year-round, and the alga can reproduce in several ways, including by spores (comparable to a plant's seeds) and vegetatively from the edges of the blades. It has many of the characteristics of successful invaders, including fast growth and high reproductive output, and grows well in nutrient-enriched waters such as Long Island Sound.

The native range of *Grateloupia turuturu* is the warm temperate shores of Japan. The increase in average water temperature in Long Island Sound over the past quarter century moves local environmental conditions closer to the optimal growth environment for *Grateloupia*.



Preliminary observations suggest that *Grateloupia* may be overlapping *Chondrus crispus* (Irish moss) in distribution, and thus is competing with this native alga for important resources like space, light, and nutrients.

(Left) Numerous new blades are visible growing on the larger blade of *Grateloupia*. This seaweed reproduces readily in a number of ways, one of the characteristics of a successful invader. Photo credit: N. Balcom, CT Sea Grant



Chondrus serves as habitat for blue mussels and other invertebrates, as well as algal epiphytes that provide food for crustaceans. It could cause a shift in the seaweed species present in Long Island Sound, if it displaces Irish moss and possibly even other red algae. It has the ability to cover 100% of the habitat it invades.

Molecular as well as morphological analyses to date suggest that the population in Long Island Sound is identical to that in Narragansett Bay. However, it is unclear how *Grateloupia* arrived in Long Island Sound waters. Ballast water used to stabilize ocean-going vessels, ship hulls, and shipments of shellfish packed in seaweed are all possible pathways by which this red alga may have been transported around the world from its native waters.

(Above) An underwater shot of *Grateloupia* (designated by letter A) shows it living in close proximity to another red alga, *Chondrus crispus* or Irish moss (designated by letter B), and the green alga, sea lettuce (designated by the letter C). Photo Credit: J. Mercer, University of Connecticut, Department of Marine Sciences

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