

Bay Invaders

By Monica Allard Cox

“Wow, we’re seeing more jellyfish!”

That observation brought researchers together at an international conference to determine whether increased jellyfish abundance was really a new trend. As it turned out, researchers from around the world reported growing numbers of jellyfish.

Barbara Sullivan, URI Graduate School of Oceanography (GSO) researcher, says that researchers are testing hypotheses about why jellyfish are becoming more abundant, including whether there are fewer predators as fish populations decline from fishing pressures and other causes, or whether nutrient enrichment spurs their growth and reproduction. In any case, Sullivan says she decided to study what she calls the “seasonal invasion” of the comb jelly, a ctenophore known as *Mnemiopsis leidyi*, to determine the causes of its abundance and the potentially significant effects it could have on Narragansett Bay. “I think there are enough indicators of changes in the Narragansett Bay ecosystem that it’s worth looking into,” she says. She and Grace-Klein MacPhee, also a GSO researcher, collaborated with the R.I. Department of Environmental Management and received Sea Grant funding to survey fish eggs and larvae in Narragansett Bay to help determine the impact ctenophores, as predators, are having on the ecosystem.

The warm water-loving comb jelly is in the water column year-round, “hibernating” in the winter, Sullivan says. Prior to the 1990s, the comb jelly was active in the Bay in the late summer and early fall. In 1999, Sullivan observed thousands of comb jellies in the Bay in May. Looking at the temperature record from 1955 to 2000, Sullivan determined that, “We are getting Mays that are warmer than we ever used to get and the cold months aren’t as cold as they used to be.” Looking at the historic record, Sullivan also determined that in years where comb jellies were abundant there was a reduction of zooplankton in the Bay, which led to phytoplankton blooms. Sullivan also observed that when comb jellies peak in abundance, there is a corresponding drop in the number of copepods in the water. Copepods are the comb jelly’s primary food source, for which they compete with fish larvae. The comb jelly creates an imperceptible current of water that draws unsuspecting copepods, and even unlucky fish eggs and larvae, into itself. If the prey touches the jelly, the jelly closes around it. This stealthy predation makes it better than most marine organisms at feeding, says Sullivan. She adds that it is extremely difficult to study the feeding rates of the comb jelly, which feeds 24 hours a day, in the lab, since researchers cannot provide the ctenophores with enough copepods to satisfy their needs.

Those wondering what the potential impacts of a ctenophore invasion might be need only look at what happened in the Black Sea 10 years ago when comb jellies invaded. Their presence precipitated a huge decline in the anchovy fishery as their food source—plankton—decreased. Similarly, Narragansett Bay anchovy numbers have dropped, and there have been 2 to 4-fold reductions in fish eggs and larvae since the early 1970s.

The story of the Black Sea doesn't end there, however. Another jellyfish was accidentally introduced into the Black Sea in 1997, and its only food source is other jellyfish. By 1999, numbers of the comb jelly dropped, zooplankton began returning, and anchovies approached pre-invasion abundance.

Jellyfish predators exist in Rhode Island's coastal ponds, but not in Narragansett Bay. Their introduction to the Bay could alter the ecosystem and decrease the numbers of ctenophores, as could a reduction in nutrient inputs, for as nutrients decrease, so do numbers of ctenophores. As for warmer Bay temperatures, however, Sullivan notes, "You can't change climate change."

Link:

Water temperature, Narragansett Bay

<http://omp.gso.uri.edu/doee/science/physical/chtemp3.htm>