Title
Aquatic Nuisance Species: An Investigation of a Biological Control Agent for the Green Crab

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Aquatic Nuisance Species: An Investigation of a Biological Control Agent for the Green Crab

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Background

Since their first sighting in San Francisco Bay in 1989, European green crabs (*Carcinus maenas*) have undergone what can truly be called a population explosion. In 11 years, they have spread south to Morro Bay and north to British Columbia, Canada. Untold millions now live under rocks in mud-bottomed areas of the state's estuaries. Although they have not yet become established on the outer shoreline—perhaps because they cannot tolerate heavy wave action—some biologists believe it is just a matter of time before they spread to the coast.

Because green crabs eat native shellfish and small crustaceans, including juvenile Dungeness crabs, green crabs threaten to further stress California's estuarine ecosystems.

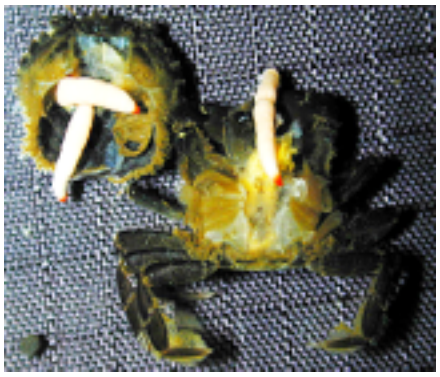
Biologists looking at strategies for eradicating the crabs note that California's green crabs are larger and more numerous than their relatives in Europe. One reason may be the absence in California of the crab's native parasites.

The Project

Dr. Armand Kuris of the University of California, Santa Barbara was funded to investigate the feasibility of using the parasite *Sacculina carcini*, a barnacle, as a "biological control agent" for reducing green crab numbers.

Findings

Dr. Kuris' experiments showed that *Sacculina carcini* infects not only green crabs but also native shore crabs. The pathology of the barnacle is markedly different in the two crabs, however. Whereas the parasite blocks reproduction in green crabs but is never lethal to its host, the parasite is always fatal to shore crabs. Even though the parasite cannot complete its life cycle in shore crabs, the fact that it can infect them at all makes the parasite a poor candidate for release in the wild.



Green crabs infected with parasitic worms. Photo: University of California, Santa Barbara.

In the second part of the project, Dr. Kuris and colleagues went to Great Britain in search of other, more host-specific, green crab parasites. They found one that shows promise: a rose-colored flatworm with a bright crimson head. The flatworm (*Fecampia erythrocephala*) infects small shore crabs, at maturity bursting through their exoskeletons. Because most reports on the worm's biology predate the 1950s, the scientists decided to document its habitat distribution, abundance, host specificity and its effect on host growth. Their work suggests that the worm is an important contributor to crab mortality in Europe. To further evaluate its potential as a biological control agent in the United States, the scientists recommend that future work focus on the flatworm's host specificity.

The European green crab is just one of many aquatic nuisance species to have invaded degraded habitats along the coast. Photo: University of California, Santa Barbara.

Cooperating Organizations

Centre for Research on Introduced Marine Pests, Australia
Universidade da Coruna, Spain
Universidade de Evora, Portugal
University of Copenhagen

University of New Hampshire
University of Oregon

Publications

Kuris, A.M., and K.D. Lafferty. 1999. Can biological control be developed as a safe and effective mitigation against established introduced marine pests? In: Proceedings, 1st International Marine Bioinvasions Conference, January 1999, Boston, Massachusetts.

Presentations

Annual Meeting of Pacific Coast Shellfish Growers Association, Warm Springs, Oregon, October 2000.

92nd Annual Meeting of the National Shellfish Association. and Green Crab Workshop, Seattle, Washington, March 2000.

Annual meeting of the Western Society of Naturalists, Monterey, California, December 1999.

International Organization for Biological Control Symposium, Montpellier, France, November 1999.

Trainee and Thesis

Torchin, Mark E., Ph.D. in Ecology, Evolution and Marine Biology, University of California, Santa Barbara, anticipated September 2002, “Role of Parasites in the Invasion Success of Exotic Species.”

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