

UC SANTA BARBARA

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INVASION OF ALIEN PARASITE HALTED; CALIFORNIA COAST CLEARED OF AFRICAN WORM IN ABALONE

(San Francisco, CA) Hope is a word rarely heard in regard to invading pest species from other continents. This is particularly true in the ocean where biologists have considered attempts to get rid of introduced pests to be futile.

Until now.

Scientists at the University of California, Santa Barbara have solved the problem of the case of an invading worm from South Africa -- one that settles in the shell of the abalone. Now they have hope. They do not accept the prevailing "you'll have to live with it" philosophy.

Scientists had never before eradicated an established pest population, according to Armand M. Kuris, professor of zoology, at UC, Santa Barbara.

(For the squeamish, it should be noted that this parasitic worm does not invade the abalone meat, and has never been a health threat. Instead, it manages to embed itself in the developing shell of the abalone, getting the growing abalone to seal it off into its own tiny fluted home near the opening of the shell where it sticks out a little filter feeding tube into the water.)

In his paper "Beyond Fatalism: The Apparent Eradication of an Established Introduced Marine Pest in California," Kuris will describe the news on Monday, August 16 at, at the conference "Managing for Ecosystem Health, the International Congress on Ecosystem Health."

The story began when Kuris got a distress call from an abalone grower in 1993. Something was desperately wrong with his stock. Abalone shells were becoming deformed. Their growth was stunted. Their respiratory holes were not growing properly. And instead of being one of the hardest materials known to man, these abalone shells were brittle and crumbled easily.

Kuris inspected the ailing abalone and discovered a microscopic worm that settled around the aperture of the abalone. It's never even been named -- it's simply referred to as a type of worm, "the sabellid pest." At first Kuris didn't know if the worm was local or imported.

Eventually he discovered that the worm was imported in the 1980s in a shipment of South African abalone. (The South Africans were not even aware of the worm, partly because their abalones are somewhat more resistant to the pest.)

The worms quickly spread among the 18 or so abalone farms in California. Early on, Kuris and his assistant, graduate researcher Carrie Culver, were not so upbeat about the invasion. Funded by the University of California Sea Grant Program, they set out to study the problem and discovered which types of marine animals were susceptible to worms.

In 1997, Kuris said, "This highly politicized introduced pest from South Africa has caused great economic damage to the California abalone aquaculture industry. Now the sabellid pest poses an environmental threat of unknown magnitude, as it has been released and is established in at least one natural location."

This stimulated a letter to Gov. Pete Wilson, signed by 90 prominent ecologists, calling for immediate action against the sabellid worm and other introduced marine pests.

Meanwhile, the infected abalone from an abalone farm in Cayucos Calif., just north of Morro Bay, had transmitted worms from the farm to the rocky intertidal habitat and over 2.5 million abalone and snails along the shore had become infested with the worms.

Kuris and Culver devised an eradication plan, based on the "epidemic threshold of transmission theory." The results have been very positive. For two years no sabellid worms have been recovered from the formerly heavily infested site.

Kuris says, "Most broadly, as the first successful eradication of a well-established marine pest, this study breaches the defeatist fatalism associated with introduced marine species. Early detection and very aggressive action can lead to eradication of even well-established pests."

The threshold theory of transmission says that a certain density of hosts is required to maintain a rate of transmission sufficient for a parasite population to persist. Kuris and his team broke this threshold by removing large numbers of the most susceptible hosts.

It was determined that in addition to abalone, another mollusk, the black turban snail, was the most abundant and highly susceptible host, and it was found that the larger, older ones were most vulnerable.

So Kuris and his researcher team removed large numbers -- about 1.5 million of these ten-year-old snails -- from their intertidal home, and dumped them on dry land.

"An awful lot of snails died for our sins," said Kuris.

The work took place with the staff of the Abalone Farm, California Department of Fish and Game biologists, and teams of volunteers, many from the University of California, Santa Barbara and Cuesta College in San Luis Obispo. The surveys to check for worm infestations will continue every six months, monitoring the success of the project.

For the abalone growers booklet, Identification and Management of the Exotic Sabellis Pest in California Cultured Abalone written by Armand Kuris, Carolyn Culver and Benjamin Beede contact California Sea Grant at (619) 534-4444 or www-csgc.ucsd.edu

Editors: Photographs of the sabellid, the abalone, and the site at Cayucos are available.

About UC Santa Barbara

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