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Chinese Mitten Crabs Appear Free of Lung Flukes

Results of a study by researchers at the University of California, Santa Barbara suggest that Chinese mitten crabs (*Eriocheir sinensis*) in the San Francisco Bay estuary are not infected with a dangerous human parasite that has caused deaths in Asia.

With funds from California Sea Grant, biologists Jenifer Dugan, Mark Walter and Carrie Culver of the Marine Science Institute at UC Santa Barbara analyzed tissue samples from more than 800 mitten crabs collected in the bay -- not a single crab was shown to be infected with either Asian or North American lung flukes. The crabs were collected at 15 to 20 sites over a two-year period beginning in 1999.

"We have not found any evidence of lung flukes," Dugan said. There have been a few other parasites found, but only in a couple of specimens. The crabs seem to be healthy and thriving. Nonnative species may flourish in a new habitat because they have escaped many of their native predators and parasites."

Lung flukes are parasites with a complex life cycle that requires them to infect two intermediate hosts before they mature into adults inside a warm-blooded animal or person.

Flukes in their "larval" form infect snails, then crustaceans, such as mitten crabs and crayfish. In mammals, they attack the respiratory system as they breed.

In Asia, where mitten crabs are a delicacy, people regularly suffer lung damage from eating infected seafood. The flukes can also spread to the brain.

State health officials have been concerned that mitten crabs in the San Francisco Bay area might also be carrying lung flukes and putting recreational fishers at a health risk. Although commercial fishing for the crabs is prohibited, sport fishing is allowed, and people do eat the crabs. Live females with eggs can sell for more than \$20 per crab in Asian markets, although the sale and transport of live mitten crabs is illegal in California, an effort to curb their spread.

Chinese mitten crabs are native to China and Korea but are a highly invasive nuisance species elsewhere. The crabs were first identified in California in 1992, after a shrimp trawler working the South San Francisco Bay hauled up a strange looking crab with fuzzy claws.

However, the crab most likely was introduced to San Francisco South Bay much earlier, in the late 1980s. A hearty and fecund invader, the crab has multiplied to such numbers that it now overruns parts of the bay. In 1998, state workers hauled away about 50 tons worth of mitten crabs that had clogged fish screens at state water pumps near Tracy. Besides clogging fish salvage tanks, mitten crab burrows undermine banks and levees, accelerating erosion and unwanted slumping.

To date, there are no strategies in place for controlling the crabs' numbers. Fishers are suggesting that the crab population be culled by opening the mitten crab to commercial fishing, but this is problematic, too. Dugan said, "The idea is to figure out a way to get rid of the crabs. If you open a fishery, suddenly, they have a value."

Another concern is that parasites could spread like fire in a hayloft through the bay at some later date, because of the sheer number of crabs. Not just people but also raccoons and other animals that feed on mitten crabs could be infected. Because crayfish are a potential intermediate host for the flukes, the scientists also dissected more than 400 crayfish from the estuary. Like the crabs, all the crayfish appear free of lung flukes. Despite their findings, the scientists are cautious about concluding that eating the crabs is safe now or in the future.

"Until we finish our survey of the region's snails," Walter said, "we can't assess the risk of future introductions of lung flukes." The scientists are in the process of analyzing hundreds of fresh water snails from the area to look for evidence of lung flukes. Even if the snails turn up clean, Culver said, there are other major health

concerns - such as bioaccumulation of contaminants like mercury, selenium, arsenic and DDE (a byproduct of DDT) within the crabs.

The nation's Aquatic Nuisance Species Task Force has federal jurisdiction over the problem. Culver sits on the Task Force's Mitten Crab Control Committee, which has been asked to develop and oversee the implementation of a management plan. She said the committee is addressing four main issues:

- Preventing the crabs' spread;
- Detecting new populations;
- Reducing its negative effects; and
- Controlling its numbers.

The California Sea Grant College Program is a statewide, multi-university program of marine research, extension services, and educational activities administered by the University of California.

It is headquartered at the Scripps Institution of Oceanography at the University of California, San Diego.

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JPEG Images Available on Request from Christina Johnson, Communications, California Sea Grant 858-822-5334, csjohnson@ucsd.edu

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