Chinese Mitten Crab (*Eriocheir sinensis*)

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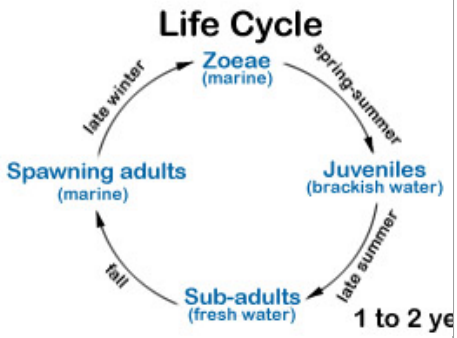
Credit: This web page was first developed by **Jennifer L. Metzler**.

Introduction

DESCRIPTION

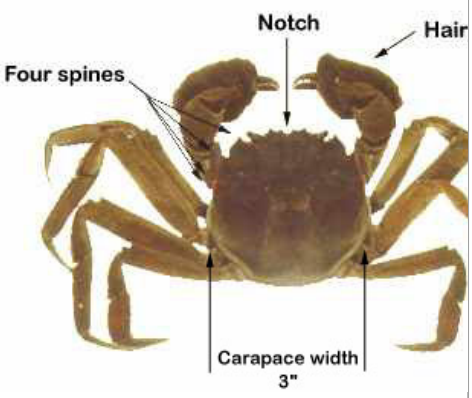
The **Chinese Mitten Crab** (*Eriocheir sinensis*), named for the dense patches of hair on its claws that r mittens, is native to the coastal rivers and estuaries of the Yellow Sea. It has now spread throughout I and California. Mitten crabs are omnivores, eating both plants and animals, although the juveniles eat primarily vegetation such as alga and aquatic plants. As they mature, the crabs begin to prey on smal invertebrates, such as clams and worms.

Chinese Mitten Crabs are catadromous, migrating downstream to reproduce in the brackish waters of estuaries. Females carry 250,000 to one million eggs, and both sexes die soon after reproduction. After a 1-2 month period as planktonic larvae, the juvenile crabs settle in salt or brackish water in late spring, then migrate to freshwater to reproduce.



Identification (for Adult)

- hairy claws with white tips, normally equal in size
- notch between the eyes
- four lateral carapace spines (fourth spine is small)
- smooth, round carapace or body shape
- maximum carapace width (distance across the back) is approximately 80 mm (3 inches)
- legs over twice as long as the carapace width



- light brown color

(Source: 1. Chinese Mitten Crabs: California Department of Fish and Game, Central Valley Bay-Delta Branch, http://www.delta.dfg.ca.gov/mittencrab/; 2. Non-Indigenous Species Facts: Chinese Mitten Crab, http://www.wsg.washington.edu/outreach/mas/nis/mittencrab.html)

IMPACTS

An expanding mitten crab population poses several ecological, economic and human health threats. The chinese mitten crab may have a profound effect on biological communities through predation and competition, and could change the structure of fresh and brackish water benthic invertebrate communities in areas they invade. Also of concern is potential predation on salmonid and sturgeon eggs and juveniles. In tidal areas, mitten crabs burrow into banks for protection from predators and desiccation during low tides.

Ecological: The burrowing activity of the crabs could accelerate the erosion of banks and reduce leeve stability. The crabs could also damage the aquatic food chain of the bay-estuary ecosystem. They are omnivorous, consuming both plants and animals, and they are not discriminatory in their diet. They will eat a variety of benthic (bottom-dwelling) animals from shrimp to shad, which could alter the estuary's fresh and brackish water invertebrate communities. The Chinese Mitten Crab could also affect other species though competition, overlapping in dietary and habitat preferences. The ecological implications of the Mitten Crab is the least understood of all potential impacts.

Economic: Mitten crabs have affected commercial and recreational fishing. Crabs caught in the nets can damage the nets and kill the shrimp caught making them unsuitable for the bait market. They also are responsible for bait loss and damage to fishing gear. Another economic impact is the crabs consumption of rice crops. In native China, crabs consume the rice shoots, but so far no crop damage has occurred in the United States. But no one is aware of the damage they could potentially do in the future.

Public threat: The mitten crab is the secondary intermediate host for the Oriental lung fluke, with mammals, including humans, and the final host. Humans can become infested by eating raw or poorly cooked mitten crabs. However, neither this human parasite nor its primary snail host have been found in California.

Endangered Fish Salvaging: During 1998, large numbers of migrating adult crabs disrupted endangered fish salvage operations at water diversion facitlities in Tracy, California. The crabs followed the moving water into the facility and clogged the holding tanks of the fish they were trying to salvage. Many fish suffocated because it took too long to separate the fish from the crabs. Those that did survive were put in transport trucks, but most eventually suffocated because the crabs obstructed the opening that the fish are released though.

In China and Korea, juvenile mitten crabs have been reported to damage rice crops by consuming the young rice shoots and burrowing in the rice field levees. Rice fields in tidally influenced areas apparently are most subject to damage. In Europe, the most widely reported economic impact of mitten crabs has been damage to commercial fishing nets and to the catch when the crabs are caught in high numbers. In San Francisco Bay, removing the crabs from the nets has been time-consuming and costly to shrimp trawlers (one trawler has reported catching over 200 crabs in a single tow several times), damaging or killing the catch. Another significant problem in California has been the impact on diversion and fish salvage facilities. Mitten crabs have clogged pumps, screens, and intakes and have damaged and killed fish at salvage facilities associated with water diversions. With the declines in salmon and trout populations, any further disruption or damage to fish passage is a major concern.

(Source: 1. Non-Indigenous Species Facts: Chinese Mitten Crab, http://www.wsg.washington.edu/outreach/mas/nis/mittencrab.html; 2. Invasion of the Chinese Mitten Crabs, Department of Water Resources News, http://wwwdwr.water.ca.gov/DWRNews/spring99/crabs.html)

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Geographic Information

ORIGIN

Chinese mitten crabs are native to mainland China and coastal areas along the Yellow Sea. Mitten crabs were introduced into German waters during the early 1900's, most likely via ballast water carried on large ships coming from China. The crabs did very well in German waters and quickly expanded their range outside of Germany. Mitten crabs were a big nuisance in Germany and elsewhere during the peak of their invasion. Now they have since spread to Portugal, southern France and rivers as far up as Prague.

A Chinese mitten crab was first collected in South San Francisco Bay by commercial shrimp trawlers during the winter of 1993. The discovery of the mitten crab in San Francisco Bay caused a big stir. Although mitten crabs had previously been found elsewhere in the U.S., San Francisco Bay was the first place where the crab could feasibly reproduce and increase its numbers. It is reasonable to assume that there was deliberate human introduction for the purpose of establishing the mitten crab as a food source in the 1980 - 1990's. In 1998, the mitten crab had spread through out the bay and well up the Sacramento river system. Currently the mitten crab is poised to invade Oregon, Washington and British Columbia from trade with California.

Chinese mitten crabs spread quickly because they are able to walk over land to invade neighboring river systems. In their upstream migration, they readily move across banks or levees to bypass obstructions, such as dams. In Germany, crabs have been reported wandering the streets at night and even entered homes when they encountered a barrier.

(Source: 1. Chinese Mitten Crab Monitoring, Marine Science Institute, http://www.sfbaymsi.org/mcrab.htm; 2. Chinese Mitten Crabs, www.delta.dfg.ca.gov/mittencrab/life_hist.html)

DISTRIBUTION

Link to Europe and the U.S. Distribution Maps by The Natural History Museum , London, UK Link *http://www.nhm.ac.uk/zoology/crab/#Distribution*

	**Distribution of the crab in Europe, 1912-1938** Link		**Distribution of the crab in the U.S., since 1973** Link

Link to Distribution Map by **California Department of Fish and Game, Central Valley Bay, Delta Branch** Link *http://www.delta.dfg.ca.gov/mittencrab/*

		The mitten crab was first collected in 1992 in South San Francisco Bay and has spread rapidly throughout. the estuary. Mitten crabs were first collected in San Pablo Bay in fall 1994, Suisun Marsh

	**1992 Distribution and potential spread**	in February 1996, and the Delta in September 1996. As of August 1998, the known distribution of the Chinese mitten crab extends north of Colusa to Hunter's Creek (near Delevan National Wildlife Refuge) in the Sacramento River drainage, east to Roseville (Cirby Creek) and eastern San Joaquin County near Calaveras County (Mormon Slough and Littlejohns Creek) and south in the San Joaquin River to Hiway 165, near San Luis National Wildlife Refuge.

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Control Methods

Control Chinese Mitten Crab

Physical Control
Extensive physical controls were attempted in Germany in the 1920 - 1930's but with no success. England and the Netherlands have also attempted physical controls. Although crabs have been trapped by the hundreds of thousands on migration up rivers.

Chemical control
Chemical control has never been a realistic option due to species dispersal. However, current research on a lethal fungi in mitten crabs may offer hope of a future biological control.

Legislative
Legislative measures are also being taken to control the spread of mitten crabs. In early 1999, state and federal agencies began to develop a mitten crab management plan. In California it is illegal to posess/transport a live mitten crab and it is illegal to import mitten crabs without a permit. United States federal regualtions require ships to change ballast water in open ocean before arriving in U.S. ports. However, it is not required between U.S. ports. Washington and Oregon are pushing to close this loophole to prevent invasion of the mitten crab to their states.

(Source: 1. Paul Heimowitz (Author), The Aliens are here (and more are coming) - A look at aquatic nuisance species; http://www.seagrantnews.org/news/aliens_010213/20010213_aliens_heimowitz.html; 2. Chinese Mitten Crabs - Frequently Asked Questions, Department of Fish and Game; http://www.dfg.ca.gov/coned/mitten_crab.html;

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Useful Picture Collections

	Credit & Org: **California Department of Fish and Game, Central Valley Bay, Delta Branch** (Chinese Mitten Crab)		Credit & Org: **California Department of Fish and Game, Central Valley Bay, Delta Branch** (Chinese Mitten Crab)
	Credit & Org: **California Department of Fish and Game, Central Valley Bay, Delta Branch** (Chinese Mitten Crab)		Credit & Org: **California Department of Fish and Game, Central Valley Bay, Delta Branch** (Two Chinese Mitten Crabs)
	Credit & Org: **California Department of Fish and Game, Central Valley Bay, Delta Branch**		Credit & Org: **California Department of Fish and Game, Central Valley Bay,**

	(Chinese mitten crabs walking over a dam)		Delta Branch (Chinese Mitten Crab)

Related Sites

Chinese Mitten Crab: California Department of Fish and Game, Central Valley Bay, Delta Branch
http://www.delta.dfg.ca.gov/mittencrab/
This websites include useful information about life history, identification, pictures, regulations, and report a sighting.

Invasion of the Chinese Mitten Crabs, Department of Water Resources News
http://wwwdwr.water.ca.gov/DWRNews/spring99/crabs.html
This page primary describe about impacts of the mitten crabs, such as Salvage Obstacle, Levee and Ecological Concerns, Economic Impacts, and other impacts.

Chinese mitten crab: Gulf Coast Research Laboratory (GCRL) Museum
http://lionfish.ims.usm.edu/~musweb/nis/Eriocheir_sinensis.html
This page introduces about crab's identification, biology, distribution, status, and references.

Chinese mitten crab: The Natural History Museum
http://www.nhm.ac.uk/zoology/crab/
This site gives a description of their research project, crab's classification, life history, distribution, and environmental problems.

***Eriocheir sinensis* (Chinese mitten crab): Global Invasive Species Database**
http://www.issg.org/database/species/ecology.asp?si=38&fr=1&sts=
http://www.issg.org/database/species/list.asp
This site allows for searching of the ecology, distribution, habitats of all invasive species. Also gives references, contacts, and other links for more information.

Volunteer Opportunities - Washington Department of Fish and Wildlife
http://www.wa.gov/wdfw/volunter/zebramitten.htm
The Washington Department of Fish and Wildlife (WDFW) is seeking volunteers to assist in sampling and monitoring programs for zebra mussels and/or the Chinese mitten crab.

Chinese mitten crabs (*Eriocheir sinensis*) -a threat to Washington State waters?
http://www.seerecht.org/wegelein/course/group/crab1.htm
This site provides a management model of problems, goals, and actions and regulations relevant to the possible spread of Chinese Mitten Crabs to the state of Washington.

Chinese Mitten Crab: Ministry of Fisheries, New Zealand
http://www.fish.govt.nz/sustainability/ballast/pests/mitten.htm
This site contain a brief explanation about the crab's overview, description, and key features

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Educational Resources

Non-indigenous species facts: Chinese Mitten Crab, Washington Sea Grant Program
Link *http://www.wsg.washington.edu/outreach/mas/nis/mittencrab.html*

ID Booklet: Illegal Aquatic Plants of South Carolina (*Free*, PDF file): South Carolina Dept. of Natural Resources, Aquatic Nuisance Species Program
Link *http://water.dnr.state.sc.us/water/envaff/aquatic/lettuce.html* Get Acrobat Reader

Help Prevent the Spread of Aquatic Plants and Animals (IL-IN-SG-98-1, *Free*): Illinois-Indiana

Sea Grant

- Link *http://www.iiseagrant.org/publication/br.htm*

Fact sheet describes how exotic aquatic species are spread by boaters. Provides easy steps boaters can take to prevent spread of exotics when transporting watercraft. 4p.

Slide presentation: Chinese mitten crab, friend or foe? (*Free*): Michael Creighton (Author)

- Link *http://instruct.uwo.ca/envir-sc/494g/Creighton3/*
- Download presentation source

Slide presentation: Chinese mitten crab, coming to grips with a migratory invader (*Free*): Paul Heimowitz (Oregon Sea Grant Extension)

- Link *http://www.seagrantnews.org/news/aliens_010213/Mitten%20Crab_files/frame.htm*

References

References related to Chinese Mitten Crab (provided by **California Department of Fish and Game, Central Valley Bay, Delta Branch**) *http://www.delta.dfg.ca.gov/mittencrab/*

- Link

References related to Chinese Mitten Crab (provided by **Gulf Coast Research Laboratory (GCRL) Museum**) *http://lionfish.ims.usm.edu/~musweb/nis/Eriocheir_sinensis.html*

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