Eriocheir sinensis 简体中文 正體中文

System: Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Malacostraca	Decapoda	Grapsidae

Common name Kinijos krabas (Lithuanian), krab welnistoszczypcy (Polish), villasaksirapu (Finnish), Kinesisk ullhandskrabba (English), Kitajskij mokhnatorukij krab (Russian), Kinas cimdinkrabis (Latvian), Shanghai crab (English), Kinesisk ullh�ndskrabbe (English), Chinese mitten crab (English), Chinese freshwater edible crab (English), Chinese river crab (English), crabe Chinois (French), hiina villk�pp-krabi (Estonian), Chinesische Wollhandkrabbe (German), Chineesche Wolhandkrab (Dutch)

Synonym *Eriocheir japonicus* , de Haan
Eriocheir leptognathus , Rathbun

Similar species *Eriocheir japonicus, Eriocheir leptognathus, Eriocheir rectus*

Summary *Eriocheir sinensis (the Chinese mitten crab) is a migrating crab which has invaded Europe and North America from its native region of Asia. During its mass migrations it contributes to the temporary local extinction of native invertebrates. It modifies habitats by causing erosion due to its intensive burrowing activity and costs fisheries and aquaculture several hundreds of thousands of dollars per year by consuming bait and trapped fish as well as by damaging gear.*

[view this species on IUCN Red List](https://www.iucnredlist.org)

Species Description
The square shaped carapace clearly distinguishes this invasive species from other European brachyuran crabs. It can reach a carapace width of 5cm to 7cm, but the maximum carapace width of the adult mitten crab is approximately 10 cm (Czerniejewski *et al*. 2003, in Gollasch 2006). One key identification feature is the hair-like covering on the claws, especially well developed in male individuals. The colour varies from yellow to brown, rarely purple. After reaching a size exceeding approximately 1cm to 2cm in carapace width, the male and female crabs can be differentiated by the shape of the abdomen which in the female is rounded and occupies most of the area of the thorax. In the male, the abdomen is narrower and shaped like an inverted funnel. (Description notes from Gollasch 2006).

Notes
Taxonomy of mitten crabs has been problematic and confusing. *Eriocheir* was considered to comprise four species (*E. japonica*, *E. sinensis*, *E. recta*, and *E. leptognathus*) (Chu *et al*. 2003). However, recent taxonomic revision has recognised five species and three genera, Eriocheir being restricted to *E. sinensis*, *E. japonica*, and *E. hepuensis*, and the establishment of two genera for *Neoeriocheir leptognathus* and *Platyeriocheir formosa*, however, Chu and colleagues (2003) believe the genetic divergence among the crabs provides no support for separating *Eriocheir* s.l. into three different genera. They suggest to retain the mitten crabs in a single genus until more evidence is available. A sixth species, *E. ogasawaraensis*, was recently identified by Komai and colleagues (2006, in Veilleux & de Lafontaine 2007).
Eriocheir sinensis has hairy claws with white tips which make the crab appear to be wearing \"mittens\", hence its common name (Gollasch, 2006). Its scientific name *Eriocheir sinensis* means \"\"Chinese woolen hand\"\" (The Natural History Museum, 2005).
Native European crabs lack the mitten crab's dense hairy claw covering and square-shaped carapace; no similar species occurs in Europe (Gollasch, 2006).

Lifecycle Stages
The Chinese mitten crab spends most of its life in fresh or brackish waters (Veilleux & de Lafontaine 2007). Mature adults migrate downstream during the fall to reproduce in brackish or salt waters (Veilleux & de Lafontaine 2007). Both males and females are thought to die following reproduction (Panning 1938, in Veilleux & de Lafontaine 2007). Females brood the eggs and, upon hatching, larvae are planktonic for one to two months. During this marine free-swimming phase, larvae pass through a series of developmental stages: a brief non-feeding pre-zoea stage, five zoea stages and one megalopea stage (Anger 1991, Montú *et al*. 1996, in Veilleux & de Lafontaine 2007). Following the megalopal stage, the larvae metamorphose into juvenile crabs that settle to the bottom, usually in late summer or early fall (Rudnick < i>et al. 2005a, in Veilleux & de Lafontaine 2007).

Uses
The Chinese mitten crab is a traditional food source in China, where it supports an important aquaculture industry yielding high annual production (200 000 tons in 2000; Chen & Zhang, 2006 in Veilleux & de Lafontaine, 2007), worth approximately $1.25 billion (Hymanson *et al*., 1999 in Veilleux & de Lafontaine, 2007). The reproductive tissues are the most prized parts of the crab, although the muscles are also consumed. The preferred crabs are those captured during the fall, as they have full gonads prior to reproduction and stored energy for the coming winter (Hymanson *et al*., 1999). A positive effect of the crabs is their market value as they were and continue to be sold for 1 to 3 € /kg for industrial use and for direct human consumption to Asian markets. During 1994 to 2004 crabs in the value of approximately 3 to 4.5 million € were sold in Germany (Gollasch & Rosenthal, 2006).
Crab specimens have also been used as bait for eel fishing, food for cattle and chicken, fertiliser for agriculture and material for the production of cosmetics (Gollasch 1999, in Veilleux & de Lafontaine 2007).

Habitat Description
The Chinese mitten crab is a large, catadromous crab, moving from freshwater habitats where it spends its juvenile years to saltwater habitats in order to reproduce (Rudnick Halat & Resh 2000). Estuaries supporting large mitten crab populations are all characterised by large brackish waters for embryonic and larval development and large shallow productive waters for the growth of juveniles (Cohen and Weinstein 2001, in Veilleux & de Lafontaine 2007). The Yangtze River, one of the major rivers of the mitten crab in its native China, is an ideal habitat for the crab, characterised by a long freshwater drainage with warm, slow moving water and a large estuary (Hymanson *et al*. 1999, in Veilleux & de Lafontaine 2007).
Throughout its life, the Chinese mitten crab will occupy different ecosystems depending on its life stage (Veilleux & de Lafontaine 2007). Adult crabs are found in fresh, brackish and salt waters, but oviparous females are normally found in greatest number in saltwater (Rudnick *et al*. 2003, Veilleux & de Lafontaine 2007). Larval stages are found in the open water of bays and estuaries. Juvenile crabs are uncommon in open water but are found in tidal tributaries within a few kilometres of open water and in freshwater (Rudnick *et al*. 2003, in Veilleux & de Lafontaine 2007). Around the world, the highest densities of crabs are principally found within estuaries and the lower part of rivers (Cohen & Weinstein 2001, Rudnick *et al*. 2003, in Veilleux & de Lafontaine 2007).

Reproduction
Although the Chinese mitten crab spends most of its life in freshwater, it needs saltwater to reproduce (Veilleux & de Lafontaine 2007). The reproduction involves a succession of events occurring at various times of the year and at different water salinities (Veilleux & de Lafontaine 2007). The development of gonads seems to be quite variable (Panning 1938, Rudnick *et al*. 2005a, in Veilleux & de Lafontaine 2007). So far, the smallest reproductive crabs observed in various populations ranged between 30 and 42 mm (Jin *et al*. 2001, Rudnick *et al*. 2000 2003, in Veilleux & de Lafontaine 2007). Ovigerous females can brood between 250 000 to 1 million eggs (Cohen & Carlton 1997, in Veilleux & de Lafontaine 2007). Mating usually takes place during late fall and winter and varies little between geographic regions. It occurs in November to March in Chinese rivers, from October to January in the Elbe River in Germany and from October to February in the United Kingdom (Panning 1938, Zhang *et al*. 2001, Herborg *et al*. 2006, in Veilleux & de Lafontaine 2007). In the San Francisco Bay estuary, the majority of ovigerous females are usually caught between November and March, with a small proportion between April and June (Rudnick *et al*., 2003, in Veilleux & de Lafontaine 2007).

Nutrition
Chinese mitten crabs feed on a wide variety of plants, invertebrates, fishes and detritus (Gollasch 2006). The mitten crab is known to be predominantly omnivorous, although feeding habits may shift throughout the life cycle (Rudnick Halat & Resh 2000). The larvae feed on phytoplankton and zooplankton, while the diet of newly settled juveniles consists mostly of aquatic plants (Veilleux & de Lafontaine 2007). As they grow, crabs become more carnivorous (Hymanson *et al*. 1999, in Veilleux & de Lafontaine 2007). A feeding study on crabs from San Francisco Bay using stable isotopes, mesocosms experiments and gut content analysis demonstrated that algae and detritus were the major components of the species’ diet (Rudnick and Resh 2005, in Veilleux & de Lafontaine 2007). This was consistent with previous gut content analyses showing that freshwater crabs relied mostly on the plant kingdom for food (Panning 1938, in Veilleux & de Lafontaine 2007). The major vegetation types consumed were filamentous algae, *Potomogeton*, *Elodea* and *Lemna* (Veldhuizen and Stanish, 1999, in Veilleux & de Lafontaine 2007). In its native range in Asia the crab shifts toward a more carnivorous diet as it ages, incorporating items such as shrimp and other benthic invertebrates into its diet (Dan *et al*. 1984, Zhao 1999, in Rudnick Halat & Resh 2000). Panning's (1938, in Rudnick Halat & Resh 2000) statement that mitten crabs \"eat whatever they can get\" is probably an accurate description of the plasticity of this crab's eating habits. It is likely that the crab's eating habits are dominated by scavenging and detritivory (Rudnick Halat & Resh 2000).

General Impacts
For a detailed account of the environmental impacts of *E. sinensis* please read: *Eriocheir sinensis* (Chinese Mitten Crab) Impacts Information. The information in this document is summarised below.
Ecosystem Change: Adult crabs migrate out of freshwater systems to reproduce and die in estuaries. This may constitute a substantial vehicle for exporting biomass out of the freshwater ecosystems, which may impact the food web, particularly when very large densities of crabs are migrating (Rudnick and Resh 2005)
Reduction in Native Biodiversity: is an opportunistic omnivore which will consume aquatic plants, algae, detritus, fish eggs and a variety of macroinvertebrates (Panning 1939; Hoestlandt 1948; Gollasch 1999; Rudnick *et al*. 2003).
Predation: The predation on fish eggs might be of concern (CMCWG 2003, in Veilleux & de Lafontaine 2007); however, given that fish material made up only 2.4 % of crab gut contents analyzed in Germany (Thiel 1938, in Veilleux & de Lafontaine 2007), the impact on adult fish populations is presumably low. *E. sinensis* could also reduce populations of native invertebrates through predation and alter the structure of benthic communities (Normant *et al*. 2002).
Competition: The crab's consumption of native species, including macroalgae, invertebrates and fish may result in significant declines in these species as well as in the crab's competitors (Gollasch 2006). Crayfish species, particularly rare or endangered ones, could be negatively affected by very abundant crab populations because of the freshwater habitat and diet shared by both species (Veldhuizen and Stanish 1999, Rudnick *et al*. 2000, in Veilleux & de Lafontaine 2007).
Threat to Endangered Species: The Chinese mitten crab's impact on endangered salmonids in California is of concern (IEP undated).
Physical disturbance: Burrowing activity of crabs results in damage to dikes and increased river embankment erosion (Gollasch 2006). The significant amount of sediment removed in areas with high densities of burrows can cause weakening and even collapse of banks (Panning 1938, D. Rudnick Pers. Obs., in Rudnick Halat & Resh 2000). This burrowing is of particular concern where waterways are controlled by human-made levees; weakening or destruction of such levees from extensive burrowing could pose serious threats to flood control and water supply efforts (Rudnick Halat & Resh 2000).
Economic/Livelihoods: The monetary impact caused by this invader in German waters is approximately 80 million Euro since 1912 (cost calculation adjusted from Fladung Pers. Comm., in Gollasch 2006). In general economic concerns arise over the stealing of bait by the crab and the damage to fishing gear (Panning 1939; Rudnick & Resh 2002). In California (USA) *E. sinensis* has become a major nuisance to anglers, taking a variety of baits including ghost shrimp and shad (Washington Sea Grant Program 2000). *E. sinensis* reproduces and migrates in such numbers as to block water intakes in irrigation and water supply schemes. Large numbers of downstream migrating crabs become trapped in holding tanks meant to keep fish out of turbines of water diversion plants. This has increased fish mortality and high costs are required to prevent the crabs' entry (Siegfried 1999).
Human Health: Effects on human health in Europe are not reported, however, the crab is the second intermediate host for human lung fluke parasite (*Paragonimus westermanii*) in Asia (Gollasch 2006).
Bioaccumlulation: *E. sinensis* has the potential to bioaccumulate inorganic and organic contaminants that then may be passed up the food chain (Rudnick Halat & Resh 2000). This type of bioaccumulation has been documented in *E. sinensis* populations in Asia (Che and Cheung 1998, in Rudnick *et al* 2000).

Management Info
Control of the Chinese mitten crab is difficult because of its abundance, ubiquity, high reproductive rate and wide range of physiological tolerances (Deborah *et al*. 2003). It seems that eradication programmes are unsuccessful once the crab has established self-sustaining populations (Gollasch 2006). The \"catch as many as you can\" strategy shows limited success (Gollasch 2006). Despite the best efforts, no effective management approach has been developed and all eradication efforts have shown limited efficiency (Gollasch 2006).\r\n
Preventative Methods:\r\nMethods to minimise future spread of the mitten crab are quite limited (Gollasch, 2006). Migration barriers and eradication programmes have shown limited success (Gollasch 2006). Certain guidelines and regulatory instruments may however be applied in areas where the species does not yet occur (Gollasch, 2006). For further details see the Ballast Water Management Convention of the International Maritime Organization (www.imo.org) and the Code of Practice for the Introduction and Transfer of Marine organisms of the International Council for the Exploration of the Sea (www.ices.dk).\r\n
Physical Control: Trapping of crabs has not been found effective in reducing the damage caused to river banks and the feeding on trapped fish (Gollasch, 2006). In order to prevent the migration of the crab up rivers in Germany electrical screens were installed on the river bottom in the 1930s to 1940s and pulses were used to disable and kill the crabs, but this met with little success (McEnnulty *et al*., 2001).\r\n
Information and awareness:\r\nThis invader has occurred in Europe for almost 100 years and this is why some believe it is a native species (Gollasch, 2006). Awareness raising initiatives have been so far limited to publications in journals (Gollasch, 2006). The general perception is that not much can be done to manage the mitten crab (Gollasch, 2006). \r\n
Knowledge and research: The first mass development of mitten crabs in Germany in the 1930s prompted many studies in the North Sea region, however, comprehensive studies in the Baltic are lacking (Gollasch, 2006). As the crab is only collected occasionally in Baltic waters no substantial research on the invader developed (Gollasch, 2006). However, invasion biology in general is a research topic in almost all Baltic countries (Gollasch, 2006). A network of researchers who deal with mitten crabs published a joint article on mitten crabs findings in the Baltic (Ojaveer *et al*., 2007).\r\n
Integrated Management: Zoologists at the Natural History Museum (London, UK) have suggested that commercial fishermen should target this species and export it to China where it is considered a delicacy (Owen, 2003). Clark *et al* (2009) also suggest commerical harvesting of the crab in the River Thames Estuary.

Pathway
Live Chinese mitten crabs are imported for aquarium purposes (Marquard 1926, Peters 1933, in Gollasch 2006).The Chinese mitten crab is introduced via shipping (ballast tanks and hull fouling of vessels) (Marquard 1926, Peters 1933, in Gollasch 2006).Fouling communities on ships are typically composed of sessile species, however sometimes mobile species can hitch a ride too. For example, specimens of *E. sinensis* have been reported in empty cirriped shells on ship hulls.The mitten crab is a delicacy and crabs have been imported live illegally to markets.

Principal source: Rudnick Halat & Resh 2000; Gollasch 2006; Veilleux & de Lafontaine 2007

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ALIEN RANGE

[2] ATLANTIC - NORTHEAST
[1] AUSTRIA
[1] BELGIUM
[2] CANADA
[1] CZECH REPUBLIC
[1] DENMARK
[1] ESTONIA
[1] EUROPE

[1] FAROE ISLANDS
[1] FINLAND
[1] FRANCE
[1] GERMANY
[1] GREENLAND
[1] ICELAND
[1] IRAN, ISLAMIC REPUBLIC OF
[1] IRELAND
[1] ITALY
[1] LAKE ERIE
[1] LAKE SUPERIOR
[1] LATVIA
[1] LITHUANIA
[1] MEDITERRANEAN & BLACK SEA
[1] NETHERLANDS
[1] NORWAY
[1] POLAND
[1] PORTUGAL
[1] ROMANIA
[2] RUSSIAN FEDERATION
[1] SERBIA
[1] SPAIN
[1] ST. LAWRENCE RIVER
[1] SWEDEN
[1] UKRAINE
[2] UNITED KINGDOM
[9] UNITED STATES

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Summary: The electronic tool kits made available on the Cefas page for free download are Crown Copyright (2007-2008). As such, these are freeware and may be freely distributed provided this notice is retained. No warranty, expressed or implied, is made and users should satisfy themselves as to the applicability of the results in any given circumstance. Toolkits available include 1) FISK- Freshwater Fish Invasiveness Scoring Kit (English and Spanish language version); 2) MFISK- Marine Fish Invasiveness Scoring Kit; 3) MI-ISK- Marine invertebrate Invasiveness Scoring Kit; 4) FI-ISK- Freshwater Invertebrate Invasiveness Scoring Kit and AmphISK- Amphibian Invasiveness Scoring Kit. These tool kits were developed by Cefas, with new VisualBasic and computational programming by Lorenzo Vilizzi, David Cooper, Andy South and Gordon H. Copp, based on VisualBasic code in the original Weed Risk Assessment (WRA) tool kit of P.C. Pheloung, P.A. Williams & S.R. Halloy (1999).
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The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, group and common names, as well as habitat, status of invasion in Mexico, pathways of introduction and links to other specialised websites. Some of the higher risk species already have a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (http://www.conabio.gob.mx/invasoras/index.php/Portada), under the section Novedades for information on updates.
Invasive species - crustaceans is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Crust%C3%A1ceos [Accessed 30 July 2008]
Spanish:
La lista de especies del Sistema de informaci�n sobre especies invasoras de m�xico cuenta actualmente con informaci�n aceca de nombre cient�fico, familia, grupo y nombre com�n, as� como h�bitat, estado de la invasi�n en M�xico, rutas de introducci�n y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la p�gina de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualizaci�n, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la secci�n novedades, para conocer los cambios.
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