Hemigrapsus sanguineus **System:** Marine_terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Malacostraca	Decapoda	Varunidae

Common name Asian shore crab (English), Japanese shore crab (English)

Synonym

Similar species

Summary Hemigrapsus sanguineus is commonly called the Asian shore crab and is native to the Asia-Pacific region. It has a very broad diet and, in its introduced range, has the potential to affect populations of native species, such as crabs, fish and shellfish by disrupting the food web. It also occupies habitats very similar to native mud crabs. Hemigrapsus sanguineus may compete with larger species, like the blue crab, rock crab and the non-native green crab.

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Species Description
Hemigrapsus sanguineus has several distinguishing characteristics. It has a somewhat square carapace which is usually patterned and dark in colour, ranging from brownish orange to greenish black. Each side of the carapace has three distinct anterolateral teeth. *H. sanguineus* has a readily observable banding pattern on the walking legs. Male crabs possess a fleshy knob at the base of the dactyl of the cheliped, as well as relatively larger and more robust claws than females (Ledesma and O'Connor, 2001). The abdomen of mature females is wider than that of male crabs (Mcdermott 1998a). Benson (2005) states that, \"This species is small with adults ranging from 35mm (1.5 in) to 42mm (1.65 in) in carapace width.\"

Notes
In their studies, Jensen *et al*. (2002) found that, \"When competing for food against *H. sanguineus*, the non-native green crab (*Carcinus maenas*) was usually the first to find the bait yet was almost invariably dislodged shortly thereafter by *H. sanguineus*. This typically did not involve overt aggression or chelae displays on the part of the *H. sanguineus*, but rather the use of the body and legs as a wedge to displace the *C. maenas* from the food. *H. sanguineus* rarely used their chelae for grasping their opponent or defending the bait; rather, approaching *C. maenas* were fended off with kicks from the walking legs while the chelae continued to be used for feeding.\"

Lifecycle Stages
Benson (2005) reports that in its introduced range, \"*Hemigrapsus sanguineus* is highly reproductive with a breeding season from May to September, twice the length of native crabs. The females are capable of producing 50,000 eggs per clutch with 3-4 clutches per breeding season. The larvae are suspended in the water for approximately one month before developing into juvenile crabs.\" Ledesma and O'Connor (2001) report that, \"Life history studies suggest that *H. sanguineus* has a high reproductive potential, facilitating a rapid rate of dispersal and colonization of new areas (Fukui 1988; Mcdermott 1991, 1998a).\"

Habitat Description
Hemigrapsus sanguineus inhabits any shallow hard-bottom intertidal or sometimes subtidal habitat, with the highest densities occurring at the middle and lower intertidal elevations. It can live on artificial structures and on mussel beds and oyster reefs, and is usually found under the shelter of rocks, shells and other debris on tidal flats. It will search along the fringe of tidal flats as the tide recedes for unusused burrows to occupy. Lohrer *et al*. (2000) found that the availability of shelter sites influenced the density and distribution of *H. sanguineus*. *H. sanguineus* can tolerate a wide range of salinities and temperature, as well as damp conditions in the upper intertidal regions (Benson, 2005). It coexists with mud crabs in the family Xanthidae, juvenile green crabs (*Carcinus maenas*), and occasionally the rock crab, *Cancer irroratus* (Benson, 2005; Brousseau *et al*. 2003; Ledesma and O'Connor, 2001).
The primary habitat of *H. sanguineus* in Japan is crevices among boulders on rocky intertidal shores (Fukui, 1988; in Gerard *et al*. 1999). In the Western Pacific the distribution of *H. sanguineus* ranges from ~20 to 50 N latitude including Hong Kong and Taiwan, the Chinese and Korean coasts, and all of Japan (Mcdermott, 1998).

Reproduction
Gerard *et al.* (1999) states that \"The reproductive output of this species is impressive: mature females may have two or more broods annually, with a mean clutch size of 15,000 and a maximum of at least 50,000 eggs per crab (Fukui 1988; McDermott 1998b). Planktonic larval stages, which last for about a month under optimal temperature and salinity conditions (Epifanio *et al.* 1998), provide a mechanism for dispersal. Growth and maturation are rapid: newly settled juveniles have a mean carapace width (CW) around 2mm and reach 20mm in about two years (Fukui, 1988). The crabs become reproductively mature at this age and, although growth is slower in mature crabs, they can reach a maximum CWof 40mm, corresponding to a maximum lifespan of around eight years.\"
Ledesma and O'Connor (2001) states that, \"Mcdermott (1998a) suggested that the length of the reproductive period of *H. sanguineus* is related to latitude and therefore water temperature. In southern parts of Japan, the breeding season is 8 months long (Fukui 1988), whereas in northern Japan, it lasts 3 months (Takahashi *et al.* 1985). Whereas breeding occurred through September at Gooseberry in Buzzards Bay, ovigerous females were found only until early August in Sandwich in Cape Cod Bay.\"

Nutrition
Gerard *et al.* (1999) states that \"Like many grapsid crabs, *Hemigrapsus sanguineus* is an opportunistic omnivore, consuming a wide variety of plant and animal foods in the field and in captivity (Fukui 1988; McDermott 1991, 1998b; Takahashi and Matsuura 1994; Lohrer and Whitlatch 1997).\"

General Impacts
Hemigrapsus sanguineus has the potential to cause significant changes in the inshore marine and estuarine communities of southern New England and mid-Atlantic coast, and predation by *H. sanguineus* on several species important to the structure of Atlantic rocky intertidal communities provides the strongest evidence to date that *H. sanguineus* has the potential for significant ecological impact in its introduced range (Gerard *et al*. 1999).
The intertidal distribution of *H. sanguineus* overlaps that of juvenile (non-native) green crabs (*Carcinus maenas*), particularly in the northern part of their range. Furthermore, *H. sanguineus* is dependent on rock cover and anecdotal reports suggest *C. maenas* has become uncommon under rocks in some areas since the arrival of *H. sanguineus* (Jensen *et al*. 2002). It is debatable whether there is evidence that *H. sanguineus* is negatively impacting on native crabs (G. Jensen, pers. comm.). Brousseau *et al*. (2003) found that mud crabs were actually competitively dominant over *H. sanguineus*.
Laboratory studies have shown that *H. sanguineus* readily consumes three species of commercial bivalves: blue mussels *Mytilus edulis*, soft-shell clams *Mya arenaria*, and oysters *Crassostrea virginica* (Brousseau *et al*. 2001; Benson, 2005). The high densities of *H. sanguineus* which occur in the wild, their effectiveness as predators of juvenile bivalves and their large appetites suggest an important role for these predators in restructuring the prey communities in habitats into which they have been introduced (Brousseau *et al*. 2001).

Management Info
Preventative measures: Ballast water management is being researched to reduce or eradicate new introductions from occurring. Scientists are monitoring changes in native species, tracking the shore crab's spread along the US Atlantic coastline, and conducting experiments to increase their knowledge of basic biology and ecology of this species (Benson, 2005).
Biological: It is possible that species such as tautogs, drums, sheepshead and seagulls prey upon *H. sanguineus* (Benson, 2005; G. Jensen, pers. comm.). Parasites, which help control populations of *H. sanguineus* in its native range, are not present along the US Atlantic coast (Benson, 2005).

Principal source: Brousseau *et al.* 2001. *Laboratory investigations of the effects of predator sex and size on prey selection by the Asian crab, Hemigrapsus sanguineus.*
Benson, 2005. Nonindigenous Species Information Bulletin Asian shore crab, Japanese shore crab, Pacific crab, *Hemigrapsus sanguineus* (De Haan) (Arthropoda: Grapsidae).

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Dr Greg Jensen

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ALIEN RANGE

[1] CROATIA
[1] MEDITERRANEAN & BLACK SEA
[27] UNITED STATES
[2] FRANCE
[1] NETHERLANDS

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Centre for Environment, Fisheries & Aquaculture Science (CEFAS)., 2008. Decision support tools-Identifying potentially invasive non-native marine and freshwater species: fish, invertebrates, amphibians.
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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