GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Carcinus maenas***

Carcinus maenas 简体中文 正體中文

System: Marine_terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Malacostraca	Decapoda	Portunidae

Common name

le crabe vert (French), European shore crab (English), green crab (English), shore crab (English), Strandkrabbe (German), European green crab (English, Germany), le crabe vert Europeén (French), le crabe enragé (French)

Synonym

Carcinides maenas , (Linnaeus, 1758)
Cancer marinus sulcatus , Rumph, 1705
Portunus maenas , Leach, 1814
Carcinus maenas , Leach, 1814
Cancer maenas , Linnaeus, 1758

Similar species

Summary

Carcinus maenas is native to Europe and northern Africa and has been introduced to the North America, Australia, parts of South America and South Africa. It is a voracious food generalist and in some locations of its introduced range it has caused the decline of other crab and bivalve species. Its success with invasion has also caused numerous other problems that require management.

view this species on IUCN Red List

Species Description

The European green crab is one of the world's most successful aquatic invaders (Darling *et al* 2008). It is a voracious omnivore with a wide tolerance for salinity variation, water temperature and habitat types (Klassen & Locke, 2007). It has primarily been characterized as a molluscan predator (DeGraaf & Tyrrell, 2004). This species has a larval stage that typically includes four zoeal stages and a megalopa stage. It is a medium sized crab, being more broad than it is long. In its adult size it can get up to about 6 cm in length and 9 cm wide. It has a thorax granulate with five lateral spines about equal in size on either side of the rostrum. The sides of the thorax contain silky hair. The orbit subovate is an obtuse tooth beneath the anterior canthus. The rostrum protrudes with three very obtuse subequal teeth, with the middle tooth being the smallest. The body and feet are spotted with brown and covered with minute, crowded granules; those on the thorax are more conspicuous. The spots of the feet and abdomen are impressed and placed in more or less obvious lines. The chelae are large and slightly unequal with the second and third joint ciliate before. The carups is acutely spined within having no spine on the opposite edge. The hand is convex on the back, with an elevated line above on the inner side. The fingers are striate with impressed lines, about four on the thumb, not falcate at tip. The second to fourth walking legs are about equal, and the fifth leg is more compressed with a dactyl that is wider but not spatulate as in other Portunidae. The abdomen of the male is triangular, and the somites 3-5 are fused (Klassen & Locke, 2007). This species is a poikilotherm, thus physiology and behavior are affected by daily and seasonal temperature variations. The green crab is capable of producing eggs at temperatures up to 26 degrees Celsius but larval development is limited to a narrower range. In addition, green crabs are considered reasonably tolerant of oxygen stresses (Klassen & Locke, 2007).

Notes

Salinity tolerance enables distribution in estuaries

Lifecycle Stages
Larval stages include Protozoea, Zoea (4 stages) and Megalopa. The lifespan of females is about 3 years, while it is about 5 years for males. Larvae are not as tolerant to temperature, salinity, or starvation as adults which may be the limiting factor in the ability to become established in new habitats. Suboptimal salinity can result in delays in larval development (Bravo, 2007). This species has been proven to grow faster and achieve larger maximum size on the Pacific coast of North America than they do on the Atlantic coast of North America and in their native range (Gillespie *et al* 2007). Molting, and consequently growth is affected by food availability and seasonal temperature fluctuation with 10 degrees Celsius indicated as an important thermal barrier (Klassen & Locke, 2007).

Uses
In native ranges of Europe, *Carcinus maenas* has been fished commercially for years (Klassen, 2007). In addition, this species has been recommended as an indicator species for the monitoring of heavy metal contamination because heavy metal pollution has been associated with respiratory failure in crabs (Klassen & Locke, 2007). While in its native range, this species is considered an important scavenger, especially of commercial fishery discards (Klassen & Locke, 2007).

Habitat Description
Adult *Carcinus maenas* can tolerate temperatures ranging from 0 to 33°C, salinities from 4 to 54, starvation for up to 3 months, and air exposure in damp burrows for up to 10 days (Bravo, Cameron & Metaxas, 2007). Larvae have narrower temperature tolerances and there is evidence that some have not been able to survive when cultured at 6 and 25 degrees Celsius (deRivera *et al* 2007). As this species increases in age, it begins to occupy more of a variety of substrates such as mud, sand, rock, and eelgrass. It can also occupy depths ranging from high tide to 6 meters, and there have even been records of up to 60 meters (Breen & Metaxas, 2008). The expansion and contraction of this species along the northern limit along the western Atlantic has coincided with short-term temperature changes, suggesting that cold water temperature determines the northernmost limit of the species (deRivera *et al* 2005).

Reproduction
In Europe, the green crab's entire reproductive cycle usually lasts about a year. However, gonadogenesis may occur twice a year in the case of large females. Individuals usually mate once a year during the midsummer to early-fall period. Reproductive strategies may differ among newly invaded coastlines (Audet *et al* 2008).

Nutrition
This species preys on large and small snails with a preference for the smaller snails (Eastwood *et al* 2007). In addition, soft-shell clams are a significant prey item for the European green crab (Floyd & Williams, 2004). The European green crab is also a major predator on clams, mussels, juvenile fishes and other species in natural settings and in aquaculture (Gillespie *et al* 2007).

General Impacts
Carcinus maenas is a voracious predator. It is able to crush mussels and shows a clear potential to negatively threaten mussel farms. In its native range, as well as in invaded regions, this species has been considered responsible for significant impacts on epibenthic and infaunal species, such as bivalves, other mollusks, and crustaceans, through predation, competition, and burrowing activities (Bravo, 2007). This species competes with other decapods for food or structure as well as resource competition, which may affect their geographic distribution (deRivera *et al*, 2005). The collapse of the soft-shell clam industries, in both New England and Nova Scotia, have been attributed to this species, which is causing concern for other local fisheries and economies (Breen & Metaxas, 2008). In the United States alone, *C. maenas* causes approximately $22 million dollars worth of damage each year (Williams, 2008). In areas in which the green crab has been introduced, it has the potential for significant impacts on fisheries, aquaculture, and the ecosystem. In fact, numerous studies have shown the potential for green crab to adversely affect many ecosystem components, directly and indirectly, by predation, competition and habitat modification (Klassen & Locke, 2007). This species has been documented as being a potential facilitator of *Styela*, which is an invasive club tunicate is some areas. They could facilitate the invasions by preying on tunicate predators. Green crabs are known to comsume prey from at least 158 genera and have been widely documented to decrease the diversity and biomass of estuarine communities (Locke *et al* 2007).

Management Info
Prevention: Block anthropogenic pathways. Vectors such as ballast water accelerate the transport of populations into areas, and slowed expansion times can provide significant economic benefits (Klassen & Locke, 2007).
Physical: constructing local physical barriers such as fences, rafts and nets may help to keep crabs in a controlled area. Also altering fishing practices may be helpful. For example, overwintering seed so that it is larger when planted and in closed areas. In addition, manual removal, commercial harvesting, trapping, and parasitic castrators are all possible options for control (Klassen & Locke, 2007).
Biological: A crab native to North America, *Callinectes sapidus* has been proven to have a significant effect on the abundance of this species, having increasing effects at the southern end of the range (deRivera, Ruiz, Hines & Jivoff, 2005). The Asian shore crab, *Hemigrapsus sanguineus*, has a negative influence on the mussel consumption of the European green crab and thus, its resulting growth rates. The Asian shore crab also affects this species by consuming settling post-larvae and displacing juveniles from their refuge habitat under rocks (Griffen, Guy & Buck, 2008). Another possibility is to utilize biological control by \"guarding\" bivalve seed using the toadfish, *Opanus tau*. (Klassen & Locke, 2007).
The parasitic barnacle, *Sacculina carcini* is a potential biocontrol agent for introduced *C. maenas* populations. However laboratory host specificity testing of native California crabs showed that *S. carcini* larvae settled on, infected and killed all four of the native crab species tested. However the infection process was different in native crabs and *S. carcini* was not able to fully mature and produce reproductive sacs in native crabs, in contrast to *C. maenas*. Goddard *et al* emphasise the importance of weighing up the potential benefits of using *S. carcini* as a biological control agent, with the potential non-target impacts (Goddard *et al*. 2005).
\r\nOther biocontrol agents may have the potential to control green crabs, which include the parasitic isopod *Portunion maenadis*, the flatworm *Fecampia erythrocephala* and the egg predator *Carcinonemertes carcinophila*. However more information is needed on the host specificity and life history characteristics of these natural enemies (Goddard *et al*. 2005).

Pathway
The transport vectors implicated in the events of introduction of this species include natural dispersal, solid ballast, hull and equipment fouling, ballast water, and contaminated packing material shipped with commercial shellfish (Darling *et al* 2008).

Principal source:

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ALIEN RANGE

[1] AUSTRALIA
[1] JAPAN
[1] SOUTH AFRICA
[4] CANADA
[1] PATAGONIA
[7] UNITED STATES

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