Sphaeroma quoianum (=S. quoyanum) **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Malacostraca	Isopoda	Sphaeromatidae

Common name

Synonym
Sphaeroma pentodon
Sphaeroma verrucauda
Sphaeroma quoiana
Sphaeroma quoyana
Sphaeroma quoianum , Milne Edwards, 1840
Sphaeroma quoyanum

Similar species
Sphaeroma spp.

Summary
The burrowing isopod, Sphaeroma quoianum, invades estuarine environments and causes increased erosion rates as well as significant damage to maritime structures. The reproductive patterns, high densities, and rapid colonisation rates make Sphaeroma quoianum a significant invasive species to local estuarine systems. When densities of Sphaeroma quoianum are high this isopod has the ability to increase erosion amounts up to 240%, as is the case in California.

view this species on IUCN Red List

Species Description
Sphaeroma quoianum has a stout, thick body with paddle-like appendages that are sharply serrated in the hind region. *S. quoianum* tends to be darkly coloured gray or sandy brown with black patterns throughout. *S. quoianum* can grow up to 15mm in length. Powerful mandibles aid in forming the burrows which *S. quoianum* is so well known for (Rotramel 1975a).
\r\n\r\n*Sphaeroma quoianum* do not consume the material excavated from burrows (Rotramel, 1975a), but likely create burrows to be less vulnerable to epibenthic predators and to reduce environmental stress (Davidson, 2008).

Notes
Introduced to the United States along with *Sphaeroma quoianum* is a commensal isopod *Iais californica* from New Zealand which lives directly on *S. quoianum*. The U.S. native isopod *Gnorimosphaeroma oregonensis* also plays host to *I. californica* but unlike *S. quoianum* actively removes it (Rotramel, 1975b).

Lifecycle Stages
Sphaeroma quoianum undergoes direct development. Females carry fertilized eggs within a marsupium and the young disperse as fully formed juveniles. Often juveniles remain at the terminal end of the burrow for an unknown amount of time, until they are likely expelled by the adult. Growth rates for *S. quoianum* are highest in spring at approximately 1.5mm per month. Normal growth rates average 0.64mm per month and juveniles become reproductive after 6 months. The life-span of *S. quoianum* is between 1.5 to 2 years (Schneider, 1976).

Habitat Description
Sphaeroma quoianum inhabits wetland marshes within estuarine environments and is found predominately between salinity levels of 5 and 30 (Davidson, 2008). Within these habitats themselves *S. quoianum* resides within burrows created in the marsh banks (composed of mud, clay, or peat). The system of interconnected burrows within the bank weakens the substratum, which in turn accelerates erosion. *S. quoianum* is also found in wooden structures, sandstone or other friable rock, and various other materials such as Styrofoam floats (used in floating docks) along shorelines (Davidson, 2008). *S. quoianum* is often found in empty barnacle tests in its native range (Hass & Kott, 1998).

Reproduction
Sphaeroma quoianum adults are thought to reproduce continuously though peak reproduction occurs in late spring and early summer. The brood size increases from 19.5 in fall to 64 in spring (Schneider, 1976).

Nutrition
Sphaeroma quoianum is capable of feeding using plumose setae on the pereopods to filter currents generated by its pleopods (Rotramel, 1975a). *S. quoianum*, as well as other members of the *Sphaeroma* genus, does not consume wood products but rather feeds on microalgae and detritus (Rotramel, 1975a).

General Impacts
The burrowing tendencies of *Sphaeroma quoianum* have lead to an increase in erosion rates by as much as 240% of many estuarine environments as well as damage to docks, wooden structures, levees and dikes (Carlton, 2001; Talley *et al*., 2001, Davidson, 2008). Burrowing by *S. quoianum* into polystyrene floats, such as Styrofoam, also disperses microscopic polystyrene particles into local waterways (Carlton, unpublished). An increased loss of marsh plants also occurs due to the invasion of *S. quoianum* (Talley *et al*., 2001).
\r\n\r\n\r\nThrough their burrowing activities, *S. quoianum* creates extensive networks of burrows which are utilised by a variety of estuarine and semi-terrestrial species. Davidson *et al*. (2009) found that *S. quoianum* were associated with higher densities, richness and diversity of fauna in some substrates. Additionally, some species were able to survive at higher tidal levels than normal by using burrows as refuges.
\r\n\r\nBurrow microhabitats appeared to support greater proportions of non-native fauna than native fauna in Coos Bay, Oregon (Davidson *et al*., 2009). Thus burrows created by *S. quoianum* could be an important factor in the establishment and spread of other non-native species (Davidson *et al*., 2009).

Management Info
Higher densities of *S. quoianum* have been observed in vertical banks compared with sloped banks. Thus restoration efforts should use sloped banks where possible, in order to reduce colonisation rates and erosion impacts (Talley *et al*., 2001).
\r\n\r\nRecent work by Davidson *et al*. (2008) on substrate preference of *S. quoianum* demonstrated that they colonise a wide range of substrata, but have a clear preference for decayed wood. A potential control method could involve outplanting a preferred substrate such as wood and removing it once it had been colonised. By continuing to do this over several seasons it may be possible to reduce *S. quoianum* populations, thereby reducing their impacts. Further research by Davidson *et al*. will investigate the success of different management strategies.

Principal source: Davidson, T.M., Shanks, A.L. & Rumrill, S.S. 2009. The composition and density of fauna utilizing burrow microhabitats created by a non-native burrowing crustacean (*Sphaeroma quoianum*). *Biological Invasions*. in press.
\r\n\r\n\r\nDavidson, T.M. 2008. Prevalence and distribution of the introduced burrowing isopod, *Sphaeroma quoianum*, in the intertidal zone of a temperate northeast pacific estuary\r\n(Isopoda, Flabellifera). *Crustaceana 81*(2): 155-167.
\r\n\r\nDavidson, T.M., Rumrill, S.S. & Shanks, A.L. 2008. Colonization and substratum preference of an introduced burrowing crustacean in a temperate estuary. *Journal of Experimental Marine Biology and Ecology 354*: 144–149.
\r\n\r\n\r\nTalley, T. S., Crooks, J. A., and Levin, L. A. 2001. Habitat utilization and alteration by the invasive, burrowing isopod, *Sphaeroma quoyanum*, in California salt marshes, *Marine Biology 138*, 561-573.

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ALIEN RANGE

[1] CHINA

[17] UNITED STATES

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Managment information
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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CONABIO. 2008. Sistema de informaci&#65533;n sobre especies invasoras en M&#65533;xico. Especies invasoras - Crust&#65533;ceos. Comisi&#65533;n Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.
Summary: English:
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&#65533;n sobre especies invasoras de m&#65533;xico cuenta actualmente con informaci&#65533;n aceca de nombre cient&#65533;fico, familia, grupo y nombre com&#65533;n, as&#65533; como h&#65533;bitat, estado de la invasi&#65533;n en M&#65533;xico, rutas de introducci&#65533;n y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la p&#65533;gina de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualizaci&#65533;n, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la secci&#65533;n novedades, para conocer los cambios.
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