**Sphaeroma quoianum (=S. quoyanum)**

**System:** Terrestrial

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
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<tbody>
<tr>
<td>Animalia</td>
<td>Arthropoda</td>
<td>Malacostraca</td>
<td>Isopoda</td>
<td>Sphaeromatidae</td>
</tr>
</tbody>
</table>

**Common name**

**Synonym**

- *Sphaeroma pentodon*
- *Sphaeroma verrucauda*
- *Sphaeroma quoiana*
- *Sphaeroma quoyana*
- *Sphaeroma quoianum*, Milne Edwards, 1840
- *Sphaeroma quoyanum*

**Similar species**

- *Sphaeroma*

**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.

**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).

*S. 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). Through 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. Burrow 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).

Recent 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.


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**Review:** Timothy M. Davidson, Aquatic Bioinvasion Research and Policy Institute, Portland State University.

**Publication date:** 2008-06-05

**ALIEN RANGE**

[1] China

[17] United States

**BIBLIOGRAPHY**

26 references found for *Sphaeroma quoianum (=S. quoyanum)*

**Management information**

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).

The decision support tools are available from:

The guidance document is available from http://www.cefas.co.uk/media/118009/fisk_guide_v2.pdf [Accessed 13 January 2009].


Summary: Report that provides information about introduced estuarine and marine animals whether intentional or inadvertent.


Summary: Paper discussing the alteration of habitat by Sphaeroma quoyanum and possible management strategies.

General information

Carlton, J.T., 1977. Introduced Invertebrates of San Francisco Bay. Pacific Division of the American Association for the Advancement of Science c/o California Academy of Sciences Golden Gate Park San Francisco, California 94118

Summary: Paper on various information on the introduced invertebrate species into San Francisco Bay including, methods of introduction and impacts.


Summary: Report which includes information about invasive species in the San Francisco Bay and surrounding Delta area.

The species list sheet for the Mexican information system on invasive species currently provides information related to
Scientific names, family, 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:

English:
The list of species for the Sistema de Información sobre especies invasoras en México. Especies invasoras - Crustaceos
Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.
Summary: Paper that discusses the biology of wood boring crustaceans and the methods of controlling them.
Summary: Paper that provides information about consequences of biological invaders, including ecosystem engineers.
Davidson, T. M., 2006. The Invasion of the Australasian Burrowing Isopod (Sphaeroma quoyanum) in Coos Bay, Oregon.
Summary: Thesis on the impacts and status of invasion of Sphaeroma quoyanum in Coos Bay, Oregon.
Davidson, T. M. 2008. Prevalence and distribution of the introduced burrowing isopod, Sphaeroma quoyanum, in the
Summary: Paper which contains information about isopods from the Swan River in Australia including diversity and
distribution of Sphaeroma quoyanum.
Summary: Paper which contains information about isopods from the Swan River in Australia including diversity and
distribution of Sphaeroma quoyanum.
Summary: An online database that provides taxonomic information, common names, synonyms and geographical
jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the

Spanish:
La lista de especies del Sistema de Información sobre especies invasoras en México. Especies invasoras - Crustaceos
Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.
Summary: Paper that discusses the biology of wood boring crustaceans and the methods of controlling them.
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197-205.
Summary: Paper that provides information about consequences of biological invaders, including ecosystem engineers.
Davidson, T. M., 2006. The Invasion of the Australasian Burrowing Isopod (Sphaeroma quoyanum) in Coos Bay, Oregon.
Summary: Thesis on the impacts and status of invasion of Sphaeroma quoyanum in Coos Bay, Oregon.
Davidson, T. M. 2008. Prevalence and distribution of the introduced burrowing isopod, Sphaeroma quoyanum, in the
Summary: Paper which contains information about isopods from the Swan River in Australia including diversity and
distribution of Sphaeroma quoyanum.


**Summary:** Online database with information pertaining to invasive species in the state of Oregon. Available from: [http://www.oregon.gov/OISC/most_dangerous.shtml](http://www.oregon.gov/OISC/most_dangerous.shtml) [Accessed 26 March 2008]


South Slough National Estuarine Research Reserve Coastal Training Program. 2006. New Zealand burrowing isopod (*Sphaeroma quoyanum*).

**Summary:** A fact sheet developed for decision makers and landowners to inform people of the characteristics and impacts of New Zealand burrowing isopods (*Sphaeroma quoyanum*).


