

***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).

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 led 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.



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Sphaeroma quoianum* (= *S. quoyanum*)

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.

Davidson, T.M. 2008. Prevalence and distribution of the introduced burrowing isopod, *Sphaeroma quoianum*, in the intertidal zone of a temperate northeast pacific estuary (Isopoda, Flabellifera). *Crustaceana* 81(2): 155-167.

Davidson, 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.

Talley, 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.

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

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

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

Management 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).

The decision support tools are available from:

<http://cefas.defra.gov.uk/our-science/ecosystems-and-biodiversity/non-native-species/decision-support-tools.aspx> [Accessed 13 October 2011]

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

Ray, G.L., 2005. Invasive Marine and Estuarine Animals of California. ANSRP Technical Notes Collection (ERDC/TN ANSRP-05-2), U.S. Army Engineer Research and Development Center, Vicksburg, MS.

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

Talley, 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.

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

General information

Boyd, M.J., 2002. Non-Indigenous Marine Species of Humboldt Bay, California: A Report to the California Department of Fish & Game.

Summary: Survey of non-indigenous species inhabiting the areas in and around Humboldt Bay, California.

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

Carlton, J.T., 2001. Introduced Species in U.S. Coastal Waters. Environmental Impacts and Management Priorities. PEW Oceans Commission.

Summary: Report to the Pew Oceans Commission describing the impacts and future management actions for US coastal waters pertaining to introduced species management.



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Sphaeroma quoianum* (= *S. quoyanum*)

[Cohen, A.N., & J.T. Carlton., 1995. Nonindigenous Aquatic Species in a United States Estuary: A Case Study of the Biological Invasions of the San Francisco Bay and Delta. University of California at Berkeley.](#)

Summary: Report which includes information about invasive species in the San Francisco Bay and surrounding Delta area. Available from: <http://sgnis.org/publicat/cc1.htm> [Accessed 30 March 2008]

[CONABIO. 2008. Sistema de información sobre especies invasoras en México. Especies invasoras - Crustáceos. Comisión 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 información sobre especies invasoras de México cuenta actualmente con información acerca de nombre científico, familia, grupo y nombre común, así como hábitat, estado de la invasión en México, rutas de introducción y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la página de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualización, por favor consulte la portada (<http://www.conabio.gob.mx/invasoras/index.php/Portada>), en la sección novedades, para conocer los cambios.

Especies invasoras - Crustáceos is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Crust%C3%A1ceos [Accessed 30 July 2008]

Cragg, S.M., Pitman, A.J., Henderson, S.M., 1999. Developments in the understanding of the biology of marine wood boring crustaceans and in methods of controlling them. *International Biodeterioration & Biodegradation* 43 (1999) 197-205.

Summary: Paper that discusses the biology of wood boring crustaceans and the methods of controlling them.

Crooks, J. A. 2002. Characterizing ecosystem-level consequences of biological invasions: the role of ecosystem engineers. *Oikos* 97: 153-166.

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 quoianum*, in the intertidal zone of a temperate northeast Pacific estuary (Isopoda, Flabellifera). *Crustaceana* 81(2): 155-167.

Davidson, 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.

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Hass, C.G., & Kott, B., 1998. Sphaeromatid Isopods from the Swan River, Western-Australia: Diversity, Distribution, and Geographic Sources.

Summary: Paper which contains information about isopods from the Swan River in Australia including diversity and distribution of *Sphaeroma quoyanum*.

[ITIS \(Integrated Taxonomic Information System\), 2008. Online Database. *Sphaeroma quoyanum* H. Milne-Edwards, 1840](#)

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 Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.

Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=92340 [Accessed 15 February 2008]

[Kussakin O. F., Malyutina M. V., 1993. Sphaeromatidae \(Crustacea: Isopoda : Flabellifera\) from the South China Sea. *Invertebr Taxon* 7: 1167-1203](#)

Summary: Paper which contains information about the introductions of species from the family Sphaeromatidae and their impact on the South China Sea surrounding areas.

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[Oregon Invasive Species Council. 2008. 100 Worst list. *Aquatic Invertebrates. Sphaeroma quoyanum.*](#)

Summary: Online database with information pertaining to invasive species in the state of Oregon.

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GLOBAL INVASIVE SPECIES DATABASE

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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*).

[United States Geological Survey \(USGS\). 2008. *Sphaeroma quoianum*. USGS. Nonindigenous Aquatic Species Database, Gainesville, FL.](#)

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Summary: Online resource that provides information on various types of invasive species and their status in the state of Washington.

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