GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Ficopomatus enigmaticus***

Ficopomatus enigmaticus **System:** Marine

Kingdom	Phylum	Class	Order	Family
Animalia	Annelida	Polychaeta	Canalipalpata	Serpulidae

Common name

Synonym *Mercierella enigmatica* , (Fauvel, 1923)

Similar species

Summary Ficopomatus enigmaticus is a reef building tubeworm, believed to be native to Australia and regions of the Indian Ocean. It has established populations worldwide and is an aggressive species that dominates habitats, significantly altering water conditions and physical environments resulting in changes to native communities. F. enigmaticus is also an abundant fouling species. It has caused problems in cooling intakes of power plants and is extremely common in harbours and on ships hulls.

view this species on IUCN Red List

Species Description
Ficopomatus enigmaticus is a serpulid polychaete worm that builds and inhabits white calcareous tubes about 2cm in diameter and up to 10cm long. They form gregarious congregations of large intertwining reef-like aggregates that may exceed 7m in diameter. The tubes are flared at the openings and have collar like rings along their length. They begin white but are stained brown as they age. The worms themselves are usually 20-25 mm in length but may reach 40 mm. They have a crown of 12-20 gray, green or brown extensively branching, ciliated gill plumes which they extrude from the tube opening to filter feed (Cohen, 2005; Bianchi, 2001; Schwindt, 2001).
Please see PaDIL (Pests and Diseases Image Library) Species Content Page Marine: Encrusting tube worm \r\n*Ficopomatus enigmaticus* (Fauvel, 1923) Annelida: Polychaeta: Serpulidae for high quality diagnostic and overview images.

Notes
Formerly known as *Mercierella enigmatica* (Fauvel, 1923)

Lifecycle Stages
Ficopomatus enigmaticus may have two periods of spawning and recruitment. Its first takes place in the summer yeilding early cohorts with a 24 month life span and two spawning periods, while late cohorts have a 20 month life span with only one spawning period. Larvae are tochophore and planktotrophic, developing in the plankton and settling to a nucleus substrate or an established colony, after 20-25 days where they form a calcareous tube secreted by the collar gland. Maturation of oocytes takes about 4 months (Obenat, 1994; Cohen, 2005; Muniz, 2005; Bianchi, 2001).

Uses
In enclosed waters *Ficopomatus enigmaticus* can be beneficial by reducing particulate loads and improving oxygen and nutrient levels making waters less eutrophic. They provide substratum and food to many epibionts and endobionts and shelter to mulluscs, amphipods, crabs, and other polychaetes. Aquatic birds use the reefs as resting sites (JNCC, 1997; Obenat, 1994; Orensanz, 2002).

Habitat Description
Ficopomatus enigmaticus encrusts on various substrates preferring shells of gastropods and bivalves, as well as structures like boats, pontoons, pipes, piers, and docks. It exists in depths up to 3 m, temperate to subtropical climates, oligohaline to iperhaline salinities, and a fairly wide pH ranges. It is highly resistant to pollution but is sensitive to wave intensity. It is most prominent and grows best in estuaries and lagoons with brackish waters and high nutrient content (Bianchi, 2001; JNCC, 1997; Schwindt, 2000).

Reproduction
Sexual: Iteroparous, with 1 to 2 spawnings and recruitments of small eggs per female. Eggs and sperm are released into water where fertilization occurs. Larvae develop in plankton and settle to a substrate after 20-25 days (Obenat, 1994; Cohen, 2005).

Nutrition
Ficopomatus enigmaticus feeds on suspended detritus and phytoplankton with its crown of ciliated gill plumes, which it extrudes from its tube opening. Cilia move water currents thereby oxygenating blood within, while others capture food particles and pass them down to the mouth (Obena, 1994).

General Impacts
Ficopomatus enigmaticus grows very fast and abundantly and inflicts significant change in ecological and sedimentary dynamics. Referred to as an ecosystem engineer it modifies resources and physical environment. These reefs affect water movement, generate topographic heterogeneity, and ameliorate physical conditions by accumulating sediments. These changes modify distribution abundance of infaunal organisms and food supply dramatically affecting native benthic communities. *F. enigmaticus* increases oxygen and nutrient levels which may be viewed as beneficial, but these changes can have adverse effects on native communities. Changes in geomorphology pose a threat to recreational and aesthetic values of water bodies. Since it faces little competition in relatively confined waters with variable salinity, it is able to flourish in these characteristically highly productive habitats. In the presence of native competitors, abundant populations *F. enigmaticus* is known to deplete resources from and even replace them. (Fornos, 1997; Schwindt, 2004; Orensanz, 2002; JNCC, 1997; Hove,1978).

Management Info
Preventative measures: As with most marine invasive species prevention of establishment is the best and sometimes only means of management of *Ficopomatus enigmaticus*. De-oxygenation of ballast water tanks using nitrogen gas may prove effective in reducing introductions of *F. enigmaticus* as one study found this treatment to kill 80% of its larvae (Tamburri, 2001). Physical removal of *F. enigmaticus* by scrapping it from ships hulls may reduce new introductions (JNCC, 1997).
Physical: The use of freshwater has been employed in the cooling system of Otahuhu Power Station on the Tamaki Estuary, Auckland to combat fouling by *F. enigmaticus* (Read, 1991). Others propose heat treatment as a means of eliminating fouling of cooling systems (Jenner, 2004). Scraping of *F. enigmaticus* from harbour surfaces is a short term solution to fouling (JNCC, 1997).
Chemical: *F. enigmaticus* is resistant to anti-marine borer timber preservative CCA. Its susceptibility to other antifouling and biocide treatments has not been documented (Brown, 2001).

Principal source: Cohen, Andrew N. 2005 Guide to the Exotic Species of San Francisco Bay. San Francisco Estuary Institute, Oakland, CA
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Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Expert review underway: Dr. Evangelina Schwindt Grupo de Ecología en Ambientes Costeros Centro Nacional Patagonico (CENPAT-CONICET) Argentina

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ALIEN RANGE

[1] ARGENTINA
[1] CASPIAN SEA
[1] FRANCE
[1] INDIAN - OCEAN EASTERN
[1] ITALY
[2] MEDITERRANEAN & BLACK SEA
[1] NEW ZEALAND
[1] SPAIN
[12] UNITED STATES
[1] ATLANTIC - NORTHEAST
[1] DENMARK
[1] GERMANY
[1] IRELAND
[1] JAPAN
[1] NETHERLANDS
[1] SOUTH AFRICA
[2] UNITED KINGDOM
[1] URUGUAY

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Summary: English:
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Invasive species - Aquatic invertebrates is available from:
http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Otros_invertebrados [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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Summary: The North European and Baltic Network on Invasive Alien Species (NOBANIS) is a gateway to information on alien and invasive species in North and Central Europe. The participating countries are Denmark, Estonia, Finland, Faroe Islands, Germany, Greenland, Iceland, Latvia, Lithuania, Norway, Poland, European part of Russia, Sweden.
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