Potamocorbula amurensis

System: Marine

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animalia</td>
<td>Mollusca</td>
<td>Bivalvia</td>
<td>Myoida</td>
<td>Corbulidae</td>
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</tbody>
</table>

Common name
Asian clam (English), Nordpazifik-Venusmuschel (German), Amur river corbula (English), Amur river clam (English), brackish-water corbula (English), Chinese clam (English), Numakodaki (English, Japan), Asian bivalve (English), marine clam (English)

Synonym
Corbula amplexa, (for *P. ustuala*) Adams, 1862
Corbula frequens, (for *P. ustulata*) Yokoyama, 1922
Corbula labiata, (for *P. ustulata*) Reeve, 1844
Corbula pustulosa, (for *P. ustulata*) Yokoyama, 1922
Corbula ustulata, (for *P. ustulata*) Reeve, 1844
Corbula vladivostokensis, (for *P. ustulata*) Bartsch, 1929
Potamocorbula amurensis, Reeve (now considered to be, 1861)
Potamocorubala ustulata, separate spp by Carlton, 1999., 1844

Similar species
Potamocorbula laevis, Potamocorbula rubromuscula, Potamocorbula ustulata

Summary
The suspension-feeding clam, Potamocorbula amurensis is native to Japan, China and Korea in tropical to cold temperate waters. Known as the Asian or Chinese clam, it has been designated as a major biological disturbance with significant ecological consequences in the San Francisco Bay area of California where large populations have become established.

Species Description
The Asian clam *Potamocorbula amurensis* grows to around 2-3cm in length. It is usually white, tan or yellow in colour with no markings on the external valves. The valves are thin and smooth, with one shell slightly longer than the other. There is a prominent external keel on the top of the left valve, which extends slightly down the shell. Older specimens appear wrinkled on the shell surface. The inhalent and exhalent siphons are brown in colour and short in length. *P. amurensis* buries into sediments on the sea floor and exposes 1/2 to 2/3 of its shell above this sediment in order to feed (NIMPIS, 2002a).
Notes
The largest specimen of *Potamocorbula amurensis* collected in San Francisco Bay as of August 1988 was 25.1mm in length (NIMPIS, 2002b).

Habitat Description
*Potamocorbula amurensis* is a highly tolerant species. It is found from almost freshwater areas to high salinity areas. It exists from tropical to cold temperate waters, mostly subtidally, but it has been found in the intertidal zone. It occurs in all sediment types: mud, peat, clay, sand and is most abundant on a variety of mixed mud-sand bottoms (NIMPIS, 2002a). With its ability to survive in polluted environments, this salinity-tolerant bivalve has a distinct advantage in invading a variety of geographic areas and habitats.

Reproduction
Studies indicate that some populations of *Potamocorbula amurensis* spawn throughout the year and that newly settled individuals become reproductive within a few months. San Francisco North Bay populations spawn in Spring and Fall, while South Bay populations are reproductive all year round. In Korea spawning occurs twice a year from May - June and Sept – Oct. Males and females are separate. Spawning is induced by physical stress, heat shock, rough handling or placing in filtered water. Newly settled clams become reproductive within a few months. Females can produce from 45,000 to 220,000 viable oocytes, the number produced is, however, independent of female size. The development of larval stages appears to be influenced by water temperature (Nicolini & Penry (2000) in NIMPIS, 2002b).

Nutrition
*Potamocorbula amurensis* is a suspension feeder that can consume large amounts of phytoplankton and zooplankton per day. It consumes many species, the main ones appearing to be diatoms and copepods (NIMPIS, 2002a). The bivalve buries itself in subtidal sediments, exposing half to three-quarters of its shell above the sediment-water interface and anchoring itself by byssal threads which adhere to small rocks or other hard objects in the sediment. A current of water passing in through the bivalve’s inhalant siphon is filtered by gills to extract oxygen and microscopic plants, such as diatoms, which are passed on to its mouth. The water current then flows out of the bivalve’s gill chamber through the posteriorly-located exhalant siphon. Very little was known about the reproduction, growth and feeding of *P. amurensis*. However, significant research is being undertaken in California following its invasion of San Francisco Harbour (Department of Fisheries, 2000-2001).
General Impacts
The suspension-feeding clam *Potamocorbula amurensis* has been designated as a major biological disturbance with significant ecological consequences. NIMPIS (2002a) states that "the introduction of *P. amurensis* to the San Francisco Bay in California has resulted in dramatic changes to the soft sediment communities of the area. It is thought to be responsible for the collapse of some commercial fisheries in addition to the decline in the diversity and abundance of many benthic species in the area. The clam consumes large amounts of phyto- and zooplankton and therefore changes many of the existing community dynamics, resulting in many benthic species being unable to obtain enough food for growth. The clam is also a dominant species in the bay, accounting for 95% of the biomass in some areas. This reduces the amount of available space for other species to grow and reproduce".

Management Info
*Preventative measures:* Strategies to decrease the risks of future introductions involve ballast water management. Ballast water management regulations have been put in place in countries like the USA, Australia and New Zealand. Oxygen deprivation, which has been trialed as a treatment in ballast tanks, is found to be unsuccessful in the case of the Asian clam. It has a high tolerance to low oxygen and is found in polluted or eutrophic areas and hence, low oxygen is unlikely to be successful unless hypoxic conditions can be maintained for a long time (McEnnulty *et al.*, 2001).

In Australia's National List of Invasive Marine Species, the Asian clam has been classified as one of the species whose incursion can trigger an emergency response. Regulations have been put in place for the management of internationally sourced ballast water, a known vector for the Asian clam (DAFF, 2004). In New Zealand, surveillance systems have been put into place for the early detection of any incursions of *P. amurensis*, classified as one of 6 exotic high impact species (MAF, 2008).

*Physical:* The Asian clam is preyed upon by birds, fish and crabs. However, options for its large-scale control are limited (Department of Fisheries, WA). Dredging, beamtrawling and mopping as control options have been found to be unsuccessful in the case of the Asian clam. Dredging is unlikely to succeed as a control option due to very high densities and the small size of this species. *P. amurensis* is a comparatively thin, fragile shell more subject to breakage.

Pathway
The Asian clam's initial introduction to San Francisco Bay was as veliger larvae transported in ballast water by trans-Pacific cargo ships. *P. amurensis* larvae have the ability to tolerate substantial changes in salinity. Studies in the San Francisco


Compiler: IUCN/SSC Invasive Species Specialist Group (ISSG)

Review:
GLOBAL INVASIVE SPECIES DATABASE
FULL ACCOUNT FOR: *Potamocorbula amurensis*

**Pubblication date:** 2005-11-09

**ALIEN RANGE**

[1] UNITED STATES

**BIBLIOGRAPHY**

40 references found for *Potamocorbula amurensis*

**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. Hall (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:**

Cohen, Andrew N. 2005 Guide to the Exotic Species of San Francisco Bay, San Francisco Estuary Institute, Oakland, CA. Species Gallery *Corbula amurensis* (Schrenck, 1861)

**Summary:**

Guide to the exotic species of San Francisco Bay available from: http://www.exoticsguide.org


**Summary:**

This report is the final report of a two year study designed to identify and rank introduced marine species found within Australian waters (potential domestic target species) and those that are not found within Australian waters (potential international target species).


**MAF (Ministry of Agriculture and Forestry)/Biosecurity New Zealand 2008, An Independent Review of New Zealand’s Biosecurity Surveillance Systems.**


**Summary:**

Web publication. Date of release: June 2001, Date of access: 13/06/2002

**General information**


Potamocorbula amurensis, a recently introduced Asian clam, has had dramatic effects on the phytoplankton biomass and production in northern San Francisco Bay. Journal of Shellfish Research. 10(1):258-259.


LINVILLE, Regina G.; LUOMA, Samuel N.; CUTTER, Lynda; CUTTER, Gregory A. 2002. Increased selenium threat as a result of invasion of the exotic bivalve Potamocorbula amurensis into the San Francisco Bay-Delta. Aquatic Toxicology (Amsterdam). 57(1-2). 51-64.


Summary: Web publication, Date of access: 7/26/2004


