**Mytilopsis leucophaeata**

**System:** Brackish

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
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<td>Animalia</td>
<td>Mollusca</td>
<td>Bivalvia</td>
<td>Veneroida</td>
<td>Dreissenidae</td>
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</table>

**Common name**
Conrad's false mussel (English), brackish water mussel (English), dark false mussel (English)

**Synonym**
*Mytilopsis cochleatus*, *Mytilopsis leucophaeata*, *Mytilopsis leucophaetus*, *Congeria cochleatus*, *Congeria cochleata*

**Similar species**
*Dreissena polymorpha*, *Dreissena rostriformis* (bugensis)

**Summary**
*Mytilopsis leucophaeata* is a bivalve mollusk native to the Gulf of Mexico and portions of the North American Atlantic coast that has invaded Europe and non-native locations of North America. It establishes dense populations that attach to natural and artificial surfaces and has become a problematic biofouler, especially to electrical and industrial plant cooling systems. Its ecological effects have yet to be determined.

**Species Description**
*M. leucophaeata* is a dreissenid, bivalve mussel that typically reaches 22 to 25 mm in length (Kennedy, 2010; Laine et al, 2006). It has a thick, rugose periostracum covering its shell that is dark brown in adults and cream-colored in young specimens with fine to medium rough concentric lines. It commonly has “zebra stripes” and zig-zag patterns in juveniles (Verween et al, 2010; NOBANIS, 2011; Laine et al, 2006). Its shell shape is mytiliform and incurved with the anterior side depressed, hinge margin excavated, and teeth obsolete (Verween et al, 2010). The interior of the shell of *M. leucophaeata* is gray and has a shelf, or myophore, plate at the anterior with an apophysis, a small triangular tooth that serves as an attachment point for anterior retractor muscles, which is absent many similar-looking mussels including the Zebra mussel *Dreissena polymorpha* (Verween et al, 2010; Zebra Mussel Information System, 2002). It is an epifaunal species that attaches to hard substrates with byssal threads (NOBANIS, 2011; Verween et al, 2010).

**Lifecycle Stages**
The larvae of *Mytilopsis leucophaeata* are planktonic and have been found to metamorphose in about 6 days to 2 weeks depending on temperature (Sidall, 1980). It has been found to have an average growth rate of about 3-6 mm/year (Verween, 2006). Young Dark false mussels in Amsterdam Harbor were measured to an average of 4 mm by the end of May after a period of no growth over winter. Their subsequent average sizes included 8 mm (end of June), 11 mm (end of July), 15 mm (end of August), 17 mm (mid-September), and 19 mm (end of October). The maximum size was about 23–24 mm and no individual seemed to be older than a year and a few months (Vorstman, 1933). However, these sizes may not be typical as first year and even maximum sizes of 10-15 mm have also been reported (Kennedy, 2010).
Habitat Description
*Mytilopsis leucophaeata* generally inhabits oligohaline to mesohaline estuarine environments (Kennedy, 2010). It is strongly euryhaline and has been recorded from salinities of 0-25 PSU with an optimal range of 0.75-20.9 PSU (Verween et al., 2010). It is also fairly temperature tolerant and may tolerate temperatures from 6.8°C to 37°C, but its optimum range, in which reproduction occurs, is between 15°C to 27°C (Verween et al., 2010; Rajagopal et al., 2005b; NOBANIS, 2011). It attaches to artificial and natural substrates including stones, woody debris, oysters, conduits, bottles, stone walls, wooden posts and other structures (Verween et al., 2010; Kennedy, 2010).

Reproduction
*Mytilopsis leucophaeata* is a dioecious species that reproduces sexually by external fertilization (Zebra Mussel Information System, 2002). Reproduction may occur continuously in some locations or from the late spring to early fall in others (Verween et al., 2009b; Kennedy, 2010; NOBANIS, 2011). The minimum reported temperature required for spawning is about 13-15°C (NOBANIS, 2011; Verween et al., 2010).

Nutrition
*Mytilopsis leucophaeata* is a filter feeder that consumes phytoplankton, plant detritus, diatoms, and other organic matter (Verween et al., 2010; Kennedy, 2010).

General Impacts
*Mytilopsis leucophaeata* is a biofouling species which commonly disturbs coolant water systems of industrial and power plants. Its rapid reproduction in such an ideal environment may result in extremely dense populations that clog water intakes and may damage or cause failure to systems (Rajagopal et al., 2002c; Kennedy, 2010; Verween et al., 2006). Specific examples of its biofouling have been reported from Belgium, Finland, and the Netherlands with densities ranging from tens of thousands to even millions of individuals/m2 (Verween et al., 2007a; Laine et al., 2006; Rajagopal et al., 2002b). *M. leucophaeata* also fouls boats, ropes, cages, and other marine equipment (Bergstrom, 2004). Aside from biofouling, dense populations *M. leucophaeata* alter ecosystems and likely have significant ecological effects similar to that of the more widely researched dreissenid Zebra mussel, (*Dreissena polymorpha*), which demand further investigation.

Management Info
**Preventative measures:** Early detection and prevention of establishment of *Mytilopsis leucophaeata* is essential, especially in industrial plant cooling systems (Verween et al., 2002). Adherence to GloBallast (GEF/UNDP/IMO Global Ballast Water Programme) ballast water standards may prevent establishment in new locations. **Physical:** The use of a submersible cleaning and maintenance platform (SCAMP) was found ineffective at removing *Mytilopsis leucophaeata* (Davidson et al, 2008). **Chemical:** Chlorination is effective in controlling *Mytilopsis polymorpha* in water cooling system intakes, which has been applied successfully to the similar biofouler *Dreissena polymorpha* (Rajagopal et al, 2002a; Verween et al., 2009a). *M. leucophaeata* is more resistant to chlorination than *D. polymorpha* and has been found to close its valves when exposed to chlorine. Therefore, continuous levels of chlorination are necessary to achieve results (Rajagopal et al, 2003). Levels of 0.25 mg/L residual chlorine achieved 100% mortality in a little over 100 days (Rajagopal et al., 2002b). Higher levels of 1mg/L achieved 100% mortality after 588 hours (Rajagopal et al., 2003). Such durations of continuous chlorination may not be practical though (Rajagopal et al, 2002a). Chlorine levels of 0.6mg/L were effective against *M. leucophaeata* embryos even at short intervals (Verween et al, 2009a). Experimentation with pulse chlorination has been recommended but not evaluated (Rajagopal et al., 2002a). Peracetic acid, used as commercial product Degaclean, was also found to be effective against embryos achieving over 98% mortality at 3 mg/L in a 15 minute exposure. Although it may be a more ecologically friendly alternative to chlorine, its higher cost may be prohibitive (Verween et al, 2009a).
FULL ACCOUNT FOR: Mytilopsis leucophaeata

Principal source: Therriault et al. 2004. Molecular resolution of the family Dreissenidae (Mollusca: Bivalvia) with emphasis on Ponto-Caspian species, including first report of Mytilopsis leucophaeata in the Black Sea basin. Rajagopal et al. 2002b. How effective is intermittent chlorination to control adult mussel fouling in cooling water systems?

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

Review: Therriault, T.W. Department of Fisheries and Oceans. Pacific Biological Station Canada

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ALIEN RANGE

[2] ATLANTIC - NORTHEAST
[1] BRAZIL
[2] FRANCE
[2] MEDITERRANEAN & BLACK SEA
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[9] UNITED STATES

[4] BELGIUM
[1] FINLAND
[1] GERMANY
[3] NETHERLANDS
[1] SPAIN
[4] UNITED KINGDOM

BIBLIOGRAPHY

48 references found for Mytilopsis leucophaeata

Management information

Bergstrom, P. 2004. An Introduction to Dark False mussels. NOAA Chesapeake Bay Office.

Summary: Available from: http://www.chesapeakebay.net/pubs/calendar/LRSC_09-30-04_Presentation_1_5352.pdf [Accessed 20 December 2004]


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


General information


ITIS (Integrated Taxonomic Information System). 2004. Online Database Mytilopsis leucophaeata

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=81335 [Accessed 5 January 2011]


NORBIS. 2010. Mytilopsis leucophaeata (Conrad, 1831) ❖ dark false mussel or Conrad’s false mussel


