Mytilopsis leucophaeata 正體中文

System: Brackish

Kingdom	Phylum	Class	Order	Family
Animalia	Mollusca	Bivalvia	Veneroida	Dreissenidae

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

Synonym *Mytilopsis cochleatus* ,
Mytilopsis leucophaeta ,
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.

view this species on IUCN Red List

Species Description
Mytilopsis 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, rugrose periostractum 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 is 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 *Driessena 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).

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?

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ALIEN RANGE

[2] ATLANTIC - NORTHEAST
[1] BRAZIL
[2] FRANCE
[2] MEDITERRANEAN & BLACK SEA
[1] RUSSIAN FEDERATION
[2] UKRAINE
[9] UNITED STATES
[4] BELGIUM
[1] FINLAND
[1] GERMANY
[3] NETHERLANDS
[1] SPAIN
[4] UNITED KINGDOM

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