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## *Mytilopsis leucophaeata*, an alien dreissenid bivalve discovered in the Gulf of Gdańsk (southern Baltic Sea)

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**Abstract**

*Mytilopsis leucophaeata* (Conrad's false mussel), an invasive American bivalve, has been found for the first time in the Gulf of Gdańsk on hard substrata (PVC panels) deployed at depths from 3.5 to 6.0 m.

Like the zebra mussel (*Dreissena polymorpha*) and the quagga mussel (*D. bugensis*), Conrad's false mussel, *Mytilopsis leucophaeata* (Conrad 1831) is a member of the family Dreissenidae. It originates from the Atlantic coast of North America and was first recorded in European waters in Antwerp harbour, Belgium, in 1835 (Verween et al. 2006a). A brackish-water species highly resistant to ambient environmental conditions (Verween et al. 2009), it was also detected in the south-western Baltic Sea (Kiel Canal) but the population probably died out (Boettger 1933, Schlesch 1937, cited in Laine et al. 2006). In 2004 Conrad's false mussel appeared in the Gulf of Finland, northern Baltic (Laine et al. 2006).

Young individuals of *M. leucophaeata* were recently found in the Gulf of Gdańsk (54°32′53.97″N, 18°33′57.96″E) during investigations of the sessile organisms that had established themselves on artificial substrata (PVC panels 15 × 15 cm, 0.2 cm thick) at nine depths (2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5 and 6.0 m). The set-up consisted of 10 PVC settlement panels deployed at each depth. Panels colonized by *M. leucophaeata* were collected once a week in August–September 2010, one panel being taken from each depth.

*M. leucophaeata* first appeared on the panels on 23 August 2010, one individual at 5 m and one at 6 m. During subsequent samplings (30 August, 7 September, 21 September 2010), it was found at depths of 3.5–6.0 m, at least one individual per panel. The maximum abundance was 5 specimens per panel (222 indiv. $m^{-2}$) at 5.5 m on 21 September 2010. The mussels varied from 1.4 to 4.9 mm in length.

At first, the mussel was thought to be *Dreissena polymorpha* (Pallas 1771). But further, more detailed examination, based on the characteristics given in Marelli & Gray (1983) and in MacNeill (1991), revealed a tooth-like projection at the anterior end of the shell (Figure 1). This apophysis is absent in *D. polymorpha* (Laine et al. 2006). The degree of shell flattening, coloration and integrity of the periostracum in juvenile specimens, as

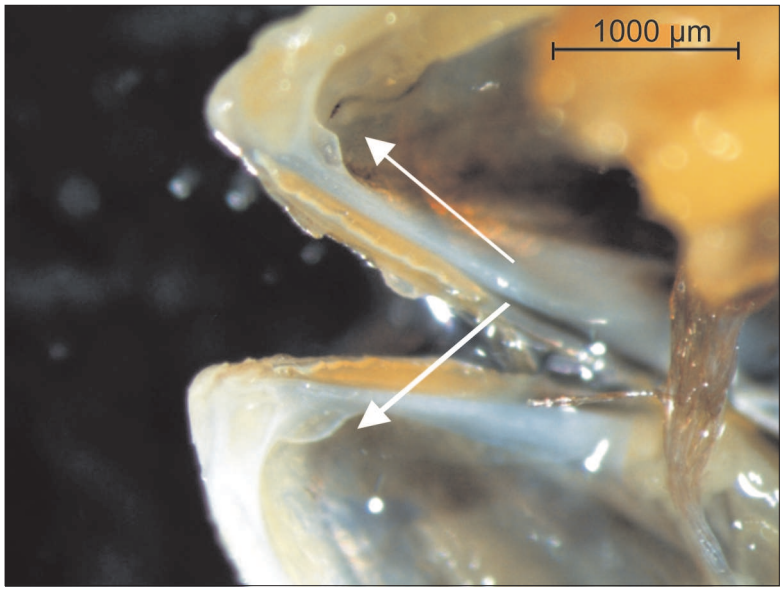


**Figure 1.** The internal part of the *Mytilopsis leucophaeata* shell with the characteristic tooth-like projection (apophysis)

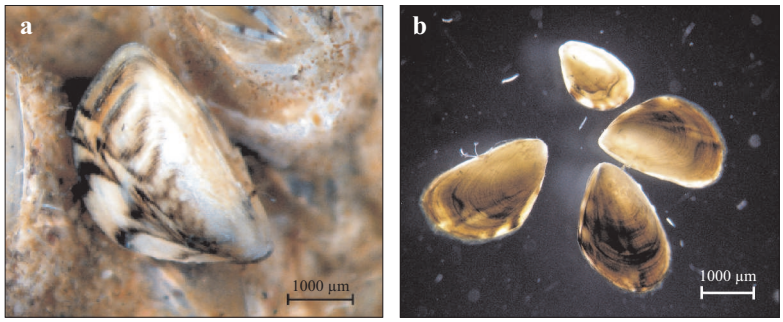


**Figure 2.** (a, b) Young individuals of *Mytilopsis leucophaeata* (shell length of about 2.0–3.5 mm); the shape and pattern of stripes are very similar to those of *Dreissena polymorpha*

described in MacNeill (1991), also indicate that the mussels found in the Gulf of Gdańsk were in fact *M. leucophaeata* (Figure 2a,b).

As *M. leucophaeata* is tolerant of a broad range of salinity, the conditions for its survival in the Gulf of Gdańsk (southern Baltic) are favourable. The optimal salinity range for adults is 1.38–12.66 PSU (MacNeill 1991), while the maximum tolerated salinity is 26.4 PSU. The average salinity at the site where *M. leucophaeata* was found is about 7 PSU, which is much the same value as in other parts of the Gulf of Gdańsk (Nowacki 1993). The water temperature at the time of the mussels' appearance ranged from 13.0 to 24.2°C.

*M. leucophaeata* reproduces once a year, spawning between the end of May and September–October in European waters. According to Siddall (1980), abundant settlement of spat in natural populations takes place two weeks after gamete release, when the temperature reaches 26°C during spatfall. Experiments by Verween et al. (2007) showed that the optimal temperature/salinity conditions for larvae are 22°C and 15 PSU. These authors suggested that *M. leucophaeata* could tolerate suboptimal temperatures at the upper end of the salinity range and vice versa.

The probable time of spat settlement is not known in the case of my findings, as I did not come across any individuals with a shell length $< 1$ mm. If they were present, they must have been mistakenly identified as *Mytilus edulis trossulus* juveniles. The highest water temperature noted in the study area was 24.2°C in June. On the basis of size, the mussels I found were first-year specimens. The annual average growth rate of *M. leucophaeata*, measured in the port of Antwerp (North Sea) varied from about 3 to 6 mm per year, whereas specimens with shell lengths $\leq 5$ mm grew 23 $\mu$m per day during peak growth (May to July) (Verween et al. 2006b). All the specimens

found in the Gulf of Gdańsk had a shell length below 5 mm. According to Siddall (1980), individuals with these dimensions are juveniles.

According to Laine et al. (2006), who found *M. leucophaeata* in the Gulf of Finland (northern Baltic Sea), the mussel larvae had been transported there in ship ballast waters from the North Sea. The occurrence of this species in the Gulf of Finland could have depended on cooling water discharged from power plants. But there are no such 'hot spots' near the part of the Gulf of Gdańsk where I found these mussels.

One question that still awaits an answer is whether young *M. leucophaeata* will be able to develop successfully and reproduce in the Gulf of Gdańsk, as adult specimens have not yet been found in this area.

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## References

Boettger C. R., 1933, *Über die Ausbreitung der Muschel Congeria cochleata Nyst in europäischen Gewässern und ihr Auftreten im Nordostseekanal*, Zool. Anz., 101, 43–48.

Laine A. O., Mattila J., Lehikoinen A., 2006, *First record of the brackish water dreissenid bivalve Mytilopsis leucophaeata in the northern Baltic Sea*, Aquat. Invasions, 38–41.

MacNeill D. B., 1991, *Identification of juvenile Dreissena polymorpha and Mytilopsis leucophaeata*, *Dreissena polymorpha* Inf. Rev., 2 (5), 1–3.

Marelli D. C., Gray S., 1983, *Conchological redescriptions of Mytilopsis sallei and Mytilopsis leucophaeata of the brackish Western Atlantic (Bivalvia: Dreissenidae)*, Veliger, 25, 185–193.

Nowacki J., 1993, *Water temperature, salinity and density*, [in:] *Puck Bay*, K. Korzeniewski (ed.), Fun. Roz. UG, Gdańsk, 79–112, (in Polish).

Schlesch H., 1937, *Bemerkungen über die Verbreitung der Süsswasser- und Meeresmollusken im östlichen Ostseegebiete*, Tartu Loodusuurijate Seltsi Aruanded, 43, 37–64.

Siddall S. E., 1980, *Early development of Mytilopsis leucophaeata (Bivalvia, Dreissenacea)*, Veliger, 22, 378–379.

Verween A., Vincx M., Degraer S., 2006a, *Mytilopsis leucophaeata: the brackish water equivalent of Dreissena polymorpha? A review*, [in:] *The zebra mussel in Europe*, G. van der Velde, S. Rajagopal & A. bij de Vaate (eds.), Backhuys Publ., Leiden, 29–44.

Verween A., Vincx M., Degraer S., 2006b, *Growth pattern of Mytilopsis leucophaeata, an invasive biofouling bivalve in Europe*, Biofouling, 22 (4), 221–231.

Verween A., Vincx M., Degraer S., 2007, *The effect of temperature and salinity on the survival of Mytilopsis leucophaeata larvae (Mollusca, Bivalvia): The search for environmental limits*, J. Exp. Mar. Biol. Ecol., 348, 111–120.

Verween A., Vincx M., Degraer S., 2009, *Seasonal variation in gametogenesis and spawning of Mytilopsis leucophaeata, an invasive bivalve in Europe*, J. Mollus. Stud., 75 (3), 307–310.