IDENTIFICATION OF JUVENILE *DREISSENA POLYMORPHA* AND *MYTILOPSIS LEUCOPHAEATA*

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The introduction of the zebra mussel, *Dreissena polymorpha*, into North America is expected to have serious economic and ecological ramifications. As populations of this biofouling bivalve expand, it is predicted that its range expansion will include several temperate estuarine systems along the eastern seaboard, entering the range of a native member of the *Dreissena* family, the dark false mussel, *Mytilopsis leucophaeata*. This euryhaline species has limited biofouling tendencies. Because *Dreissena* and *Mytilopsis* are adaptable to a spectrum of environmental regimes including variable salinity, partially sympatric or overlapping populations of both species are likely. Because of their related evolutionary history, these two species show striking morphological similarities, particularly as juveniles, which may result in field misidentification as sympatric populations are established. This publication is an abbreviated guideline for the definitive identification of these two similar species.

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Based on several studies, *Mytilopsis leucophaeata* generally inhabits and can survive at higher salinities than *Dreissena*. European studies of sympatric populations of these species indicate a partial salinity tolerance overlap between 0.2 ppt and about 3.0 ppt (parts per thousand) total salinity (Table 1). North American sympatric populations may generally be found in estuarine areas having total salinities in this range.

Table 1. Salinity tolerance of *D. polymorpha* and *M. leucophaeata* (values in ppt total salinity).

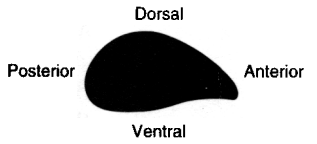
	Dreissena	*Mytilopsis*
maximum tolerated	1.84–13.40	26.40
optimal salinity	0.93	1.38–12.66
normal ranges	0.21–1.47	0.21–18.08

Species Identification

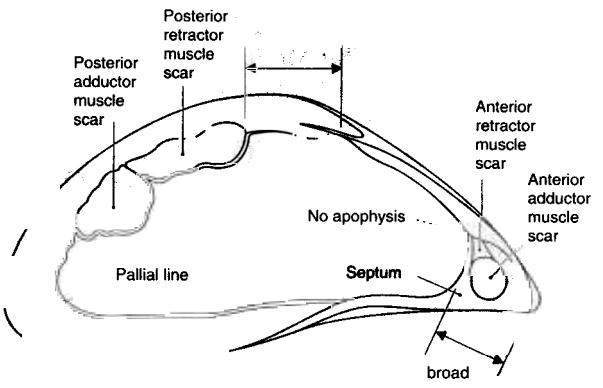
Externally, juveniles of both species are mytiliform — mussel shaped — and often display herringbone striping patterns on the shell. Closer observation will reveal subtle differences in the degree of shell flattening, coloration and integrity of the periostracum, or outer shell layer. *Mytilopsis* is darker and more rounded ventrally, and the periostracum is easily scraped off in dried specimens. *Dreissena* is flattened ventrally, and has a more durable periostracum. During ontogeny, the external morphology changes considerably, with *Mytilopsis* developing a much more elongated shape.

A microscopic examination of the shell structure in the anterior portion of the shell (the "beak" end) is the most definitive means to correctly identify both species. Mussel specimens must be dissected removing the soft tissues from each of the shell halves or valves. A microscopic magnification of at least 10x is recommended for proper shell examination.

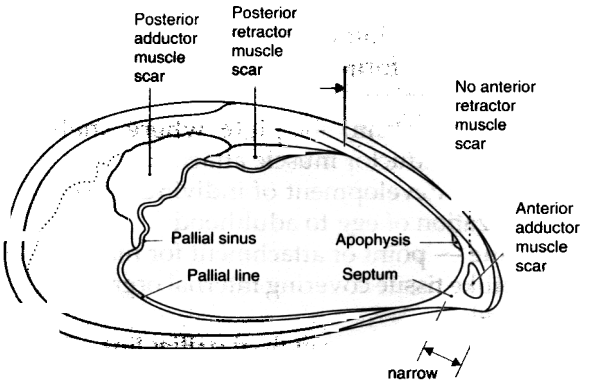
COMPARATIVE SHELL FEATURES



Dreissena polymorpha



Mytilopsis leucophaeata



Internal Microscopic Features of Shell

Posterior Retractor Muscle:

- does not extend to anterior shell margin.
- extends to anterior shell margin.

Pallial Line:

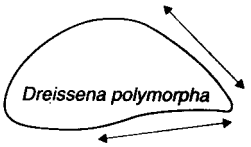
- rounded at posterior portion, no sinus.
- may be invaginated forming a sinus.

Myophore Plate (Septum):

- broad, scars of both anterior muscles present on septum; no apophysts present.
- narrowed, only anterior adductor scar present on septum; anterior retractor attached to inward-facing apophysis.

External Shell Characteristics

more flattened at anterior margin and ventrally.



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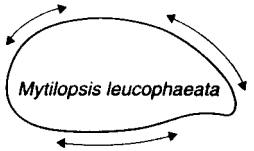
typically have herringbone patterns, may be radially striped or show diffuse striping.

- more rounded and broad laterally.



- often have herringbone pattern; generally darker coloration.

Illustrations by Norm Frisch
Adapted from Morton (1969)
and Marelli and Gray (1983)

Glossary

adductor muscle — muscle that closes shell during contraction
apophysis — inward-facing "toothlike" structure that functions as point of attachment for anterior adductor muscle in *Mytilopsis*
euryhaline — having wide salinity tolerances
morphology — form and structure of individual organism
myophore (septum) — plate where shell anterior adductor muscle attaches
ontogeny — development of individual from fertilization of egg to adulthood
pallial line — point of attachment for mantle, sheetlike tissue covering internal organs of mussels
pallial sinus — an ingrowth of pallial line
periostracum — outermost covering of shell
retractor muscle — when contracting, withdraws foot structures of mussel into shell

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