AQUATIC INVASIVE SPECIES

Limiting Factors and Ecological Effects of Zebra Mussels in a Southern Lake Michigan Drainage

Final Report

Objectives

Our major research goal was to determine how zebra mussels disperse and colonize through drainage basins that contain connected lake-stream systems. Our specific objectives were to (1) describe the longitudinal distribution of adult and larval zm in streams flowing from colonized lakes, (2) test mechanisms contributing to the apparent "settlement bottleneck" for zm in streams, (3) test whether predators may influence the invasibility of streams by zm, and (4) measure responses of other aquatic biota to the presence of zm in lake-outflow environments.

Summary

The invasion of the Great Lakes by zebra Mussels (*Dreissena polymorpha*) is costing many millions of dollars for control and mitigation, but strikingly little is known about the potential for zm to colonize flowing waters, their population dynamics in rivers, or their impact on riverine biota. Lakes usually are the points of invasion, but outflowing streams may be the conduits for zm dispersal and subsequent ecological and economic impacts. In this 1-year project, we examined the dispersal, recruitment, and physiological condition of zm in cupled lake-stream systems in the St. Joseph River basin (Indiana-Michigan), a major drainage of southern Lake Michigan. Abundanc4s of both settled zm and drifting veligers in 2 streams declined exponentially with increasing distance from the zm-colonized lake source of each stream. We sought mechanisms responsible for these patterns. Using a unique staining method that differentiated live from dead veligers, we found that veliger mortality increased with distance downstream, possibly due to turbulent forces acting on the veligers during transport. In general, zm recruitment was poor in the streams compared with their lake sources although growth of settled zm was higher in the stream than in at least one lake. Veligers may experience a "settlement bottleneck" in streams, related to hydrodynamics, substrate composition, predation, and competition with other invertebrates for space or food.

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Research Information

- **Principal Investigator**: David Lodge
- **Initiation Date**: March 15, 1995
- **Completion Date**: July 31, 1996
- **Affiliation**: University of Notre Dame

- **Principal Investigator**: Gary Lamberti
- **Affiliation**: University of Notre Dame

Contacts

Tomas Höök (../../staff/hook.html)

Associate Director of Research
765-496-6799
thook@purdue.edu (mailto:thook@purdue.edu)

Carolyn Foley (../../staff/foley.html)
Assistant Research Coordinator
765-494-3601
cfoley@purdue.edu (mailto:cfoley@purdue.edu)

Pat Charlebois (../projects/staff/charlebois.html)
Aquatic Invasive Species Coordinator

847-242-6441
charlebo@illinois.edu (mailto:charlebo@illinois.edu)

Sarah Zack (staff/zack.html)
Aquatic Invasive Species Specialist
847-242-6440
szack@illinois.edu (mailto:szack@illinois.edu)

Danielle Hilbrich (staff/hilbrich.html)
Aquatic Invasive Species Assistant
847-242-6442
hilbrich@illinois.edu (mailto:hilbrich@illinois.edu)

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Illinois-Indiana Sea Grant
Purdue University
195 Marsteller Street
West Lafayette, IN 47907-2033
765-496-6009
iisg@purdue.edu (mailto:iisg@purdue.edu?subject=IISG Inquiry)

ILLINOIS (http://web.extension.uiuc.edu/state/)

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