4th Biennial Symposium
Freshwater Mollusk Conservation Society
May 15-18, 2005 • Radisson Riverfront Hotel • St. Paul, Minnesota, USA

Are your Natives Restless
Holistic Strategies for Conserving Freshwater Mollusks During Exotic Species Invasions

Meeting Program and Abstracts

Symposium Host Sponsors
Ecological Specialists, Inc.
Illinois Natural History Survey
Macalester College
Minnesota Department of Natural Resources
NC State University
University of Minnesota
U. S. Fish and Wildlife Service
U. S. Geological Survey
Wisconsin Department of Natural Resources

Symposium Financial Sponsors
Mississippi Interstate Cooperative Resources Association
Mussel Mitigation Trust Fund
Upper Mississippi River Conservation Committee
Virginia Department of Game and Inland Fisheries
The Freshwater Mollusk Conservation Society (FMCS) is an organization devoted to the advocacy for, public education about, and conservation science of freshwater mollusks, North America's most imperilled fauna. Membership in the society is open to anyone interested in freshwater mollusks who supports the stated purposes of the Society:

- advocate conservation of freshwater molluscan resources,
- serve as a conduit for information about freshwater mollusks,
- promote science-based management of freshwater mollusks,
- promote and facilitate education and awareness about freshwater mollusks and their function in freshwater ecosystems,
- assist with the facilitation of the National Strategy for the Conservation of Native Freshwater Mussels (Journal of Shellfish Research, 1999, Volume 17, Number 5), and a similar strategy under development for freshwater gastropods.

**4th BIENNIAL SYMPOSIUM**
Freshwater Mollusk Conservation Society
May 15-18, 2005 • Radisson Riverfront Hotel • St. Paul, Minnesota, USA

**Are Your Natives Restless?**
Holistic Strategies for Conserving Freshwater Mollusks During Exotic Species Invasions

---

**MEETING PROGRAM AND ABSTRACTS**

**Symposium Host Sponsors**
- Ecological Specialists, Inc.
- Illinois Natural History Survey
- Macalester College
- Minnesota Department of Natural Resources
- North Carolina State University
- University of Minnesota
- U. S. Fish and Wildlife Service
- U.S. Geological Survey
- Wisconsin Department of Natural Resources

**Symposium Financial Sponsors**
- Mississippi Interstate Cooperative Resources Association
- Mussel Mitigation Trust Fund
- Upper Mississippi River Conservation Committee
- Virginia Department of Game and Inland Fisheries
PL 66 CONVERGENCE AND THE UNIONIFORMES.

Arthur E. Bogan 1 and Joseph Hartman 2
1North Carolina State Museum, Raleigh, NC 27606; 2Dept. of Geology and Geological Engineering, University of North Dakota, Grand Forks, ND 58202

A.J. Cain discussed the role of convergence of shell form in land snails. He cautioned about the under appreciated role of convergence. A.E. Ortmann, in discussing the definition of the subfamilies of Unionidae, noted that he was not using shell characters due to problems of convergence. B. Prashad more recently discussed the similarity of shell shapes from Southeast Asia and South America. G.T. Watters has provided information on the role of shell shape and sculpture and their role in providing stability in the aquatic environment. Shell shape, disc sculpture, hinge plate presence or absence, and relation to substrate are all features that have convergent elements between the six recognized unioniform families. Recent, preliminary phylogenies provide support for the recognition of convergence of the shell form and sculpture. Historically the freshwater mussel fauna of the Late Cretaceous of the Western Interior of North America is given as the ancestor for the great modern radiation of Unionidae in the southeastern United States. Similarity of shell shape and sculpture has been used to link the Cretaceous unioniform fauna of Africa with that of modern Asia, as well as linking fossils from the Cretaceous of Montana with the modern fauna of West Africa. More interesting, the Triassic species with radial umbo sculpture from Connecticut have been linked with those species with similar sculpture of the Late Cretaceous of the western United States as the precursors of the whole hyrid fauna of South America. We use the concept of convergence in the World's modern unioniform fauna to examine the fossil record of this group and question the interpretations of these faunas based on shell shape and sculpture similarities.