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## — NOTE —

**Windrow Formation of Two Snails  
(Families Viviparidae and Pleuroceridae)  
Colonized by the Exotic Zebra Mussel, *Dreissena polymorpha***

## ABSTRACT

Colonization of two species of native gastropods, *Campeloma crassulum* (Viviparidae) and *Pleurocera canaliculatum* (Pleuroceratidae), by the exotic zebra mussel (*Dreissena polymorpha*) was documented for the Mississippi River and Illinois River in Illinois. Wind- and boat-generated waves created windrowed deposits of these snails. Nearly all snails collected retained intact zebra mussels or evidence of mussel attachment.

In the fall of 1993, snails were collected from windrows deposited by wind- and boat-generated waves at Grafton on the Illinois River, Jersey County, Illinois; near the Brussels Ferry on the Illinois River, Jersey County, Illinois; and at Lewis and Clark Park on the Mississippi River, Madison County, Illinois, on November 3, 1993. The snails were the silty hornsnail, *Pleurocera canaliculatum* (Say, 1821) and the ponderous Campeloma, *Campeloma crassulum* Rafinesque, 1819. All snails were alive or recently dead and retained the operculum in life position within the aperture at the time of collection. Dead snails (i.e., those without opercula) were also present. All snails still retained either zebra mussels or their byssal threads and plaques at the time of collection. Approximately 50 snails were collected at each site. Voucher specimens of each species were deposited in the collections of the Illinois Natural History Survey.

Of 53 specimens of *C. crassulum* collected from Grafton windrows, 17 retained intact zebra mussels, 33 retained only byssal threads and plaques, and 3 had no evidence of zebra mussel attachment. Among the 35 specimens of *C. crassulum* collected in windrows at Brussels Ferry, 22 retained intact zebra mussels, and 13 others retained only byssal threads and plaques. No specimens of *C. crassulum* were found in windrows at Lewis and Clark Park. Zebra mussels were found attached to 42 of 48 specimens of *C. crassulum* collected from the Illinois River at Grafton.

A total of 51 specimens of *P. canaliculatum* were collected from Grafton windrows. Of these, 30 retained one or more intact zebra mussels, and 21 retained only byssal threads and plaques. Of 53 specimens of *P. canaliculatum* collected from windrows at Lewis and Clark Park, 48 retained only byssal threads and plaques, and 5 retained attached zebra mussels.

I also collected snails of each species at Grafton that were not in windrows but were located in/on silty sand substrate. Of 108 specimens, 42 were colonized by zebra mussels.

The number of zebra mussels colonizing available substrates in the lower Illinois River has increased markedly since the survey of unionids reported by Tucker et al. (1993). Observations at that time revealed few gastropods colonized by zebra mussels. Although flood conditions precluded quantitative sampling of snail populations for colonization rates by zebra mussels in 1993, the number of gastropods stranded following retreat of the flood waters was very large, numbering in the thousands at the Grafton boat ramp alone, which suggests that colonization by zebra mussels is extremely detrimental to native species of gastropods.

Even though many stranded specimens of snails were alive at the time of collection, they apparently were unable to move back to water even after the zebra mussels had detached. Every specimen collected in windrows had some evidence of zebra mussel attachment either in the form of attached whole mussels or byssal threads and plaques from mussels that had presumably fallen off. Dangling byssal threads become entangled in the general mass of debris of the windrow, further anchoring the snail in place. Apparently, snails were unable to escape the windrows because of this and the added weight of attached zebra mussel valves in other cases. The attached zebra mussels not only appear to imprison stranded snails within the windrows but also may make it more likely that a snail will be washed ashore. Zebra mussels may act as sails and make snails more likely to be washed ashore than snails not colonized. At present, information has been published on the effect of zebra mussel colonization on snail hydrodynamics or mobility. Consequently, my observations must be considered tentative. However, the large number of stranded specimens

observed leaves little doubt that the impact of zebra mussels on the biology of native species of gastropods in the Mississippi River drainage will be significant.

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#### LITERATURE CITED

- Tucker, J. K., Theiling, C. H., Blodgett, K. D., and Thiel, P. A. 1993. Initial occurrences of zebra mussels (*Dreissena polymorpha*) on freshwater mussels (Family Unionidae) in the Upper Mississippi River System. *J. Freshwater Ecol.* 8(3):245-251.

John K. Tucker

*Illinois Natural History Survey, Long Term Resource Monitoring Program Pool 26  
1005 Edwardsville Road, Wood River, Illinois 62095, USA*