



Physa carolinae
Wethington, Wise & Dillon 2009
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Taxonomy & Systematics. The basommatophoran pulmonate family Physidae is worldwide in distribution but reaches its maximum diversity in North America. The gill has been lost, leaving respiration to occur across the entire mantle cavity, as is true for pulmonates in general. Their ability to enfold an air bubble within this cavity can be seen as an adaptation to the colonization of warm or stagnant freshwaters, where the concentration of dissolved oxygen may be reduced. Physids are hermaphroditic, as is also true for pulmonates in general; typically capable of self-fertilization and laying eggs in irregular, loosely-packed, gelatinous masses.

Until recently it was believed that the North American Physidae numbered more than 40 species, and a variety of elaborate classification schemes have been proposed. All of the physids common in the southeastern U.S. have at times been referred to the genus "*Physella*," which VDGIF recognizes following Turgeon et al. It is now clear that most of this nominal diversity is attributable to phenotypic plasticity, however, and that the true number of American species is closer to ten. The simple two-genus system favored by earlier workers would seem sufficient, all species of the American southeast referable to the genus *Physa*.

Populations of *P. carolinae* can typically be recognized by their dark bodies and slender shells. This species has probably been confused both with *P. acuta* and with *P. pomilia* (or *hendersoni*) throughout their broadly-overlapping ranges. DNA sequence data first called the distinction to our attention, which we subsequently confirmed with breeding experiments. Populations of *P. carolinae* freely hybridize with *P. acuta*, but F1 hybrids are sterile. *Physa carolinae* and *P. pomilia* demonstrate significant sexual isolation when paired in mate-choice tests, by contrast, and *carolinae/pomilia* hybrids are apparently inviable.

Habitat & Distribution. *Physa carolinae* is seasonally common in shallow, temporary, or vernal ponds and ditches in the lower Piedmont and Coastal Plain of Virginia. It apparently grazes on organic debris and detritus when the ponds fill with rainwater, and burrows as the ponds dry. In habitat, life history, and shell form it is reminiscent of the northern physid genus *Aplexa*.

Ecology & Life History. Our laboratory cultures reach maturity around 7 – 9 weeks post hatch, about a week later than typical *P. acuta* and much behind *P. pomilia*. Although *Physa carolinae* reaches a greater maximum size than either of these, its fecundity in laboratory culture is lower.



Conservation Status. NatureServe G5Q/SNR - Secure/Unranked.