Gulf and Caribbean Research

Volume 6 | Issue 3

January 1979

Notes on the Genus *Probythinella* Thiele, 1928 (Gastropoda: Hydrobiidae) in the Coastal Waters of the Northern Gulf of Mexico and the Taxonomic Status of *Vioscalba louisianae* Morrison, 1965

Richard W. Heard
Gulf Coast Research Laboratory

Gulf Research Reports, Vol. 6, No. 3, 309–312, 1979.

NOTES ON THE GENUS *PROBYTHINELLA* THIELE, 1928 (GASTROPODA: HYDROBIIDAE) IN THE COASTAL WATERS OF THE NORTHERN GULF OF MEXICO AND THE TAXONOMIC STATUS OF *VIOSCALBA LOUISIANAE* MORRISON, 1965

RICHARD W. HEARD
Gulf Coast Research Laboratory,
Ocean Springs, Mississippi 39564

ABSTRACT The gastropod genus *Probythinella* Thiele, 1928, is considered a senior synonym of *Vioscalba* Morrison, 1965. *Probythinella louisianae* (Morrison, 1965) n. comb. tentatively is recognized as a valid species distinct from the closely related *P. lacustris* (Baker, 1928) and *P. protera* Pilsbry, 1953. The eastern range of *P. louisianae* is extended to Mobile Bay, Alabama. Limited observations on the habitat and reproduction of *P. louisianae* are reported.

TAXONOMY

Confusion has existed concerning the taxonomy of the gastropod genera *Probythinella* Thiele, 1928, and *Vioscalba* Morrison, 1965, which have been reported from brackish water of the northern Gulf of Mexico. During the past several years, in conjunction with various benthic and parasitologic studies, I have collected and observed large numbers of *Probythinella* from estuarine areas in this region. Using these observations and the existing literature, I have been able to clarify the taxonomic status of the genus *Vioscalba* and to give an opinion on the specific identity of the northern Gulf populations of *Probythinella.*

Two species of the genus *Probythinella* Thiele, 1928, have been described; both are known only from North America. *Probythinella lacustris* (Baker, 1928), a freshwater species, has been reported from central Canada and from the central United States as far south as Arkansas (Hibbard and Taylor 1960). The second species, *P. protera* Pilsbry, 1953, was described from "fossil" shells taken from Pleiocene deposits near Tampa Bay, Florida (Pilsbry 1953). Solem (1961) reported a living population of *P. protera* from estuarine habitats in Lake Pontchartrain, Louisiana, and concluded that other living gastropod species were known from the Pleiocene period and that the phenomenon was not as significant as it would seem. There also is the possibility that Pilsbry's specimens of *P. protera* were of recent origin and were not fossil shells. William G. Lyons (personal communication, 1979) indicated that the type locality for *P. protera*, a dredge-fill area, has a mixture of recent and fossil mollusk shells.

Without referring to Solem's (1961) study, Morrison (1965) described a new genus and species, *Vioscalba louisianae.* He reported large populations of this gastropod from Lakes Pontchartrain and Borgne, and dead shells from Hopedale, Louisiana, and Heron Bay, Mississippi. Morrison further stated that *V. louisianae* and *P. protera* were closely related but distinct species, and transferred *P. protera* to the genus *Vioscalba.* The name *Vioscalba louisianae* has been used for this species in subsequent publications (Tarver and Dugas 1973; Dugas, Tarver and Nutwell 1974; Tarver and Savoie 1976; Andrews 1977). Andrews reported *V. louisianae* to be a common brackish-water species along the Texas coast. She listed it under the family Stenothyridae and mentioned that it might be a synonym of *V. protera* [=*Probythinella protera*]. I have compared my material with published descriptions of *P. lacustris, P. protera* and *V. louisianae.* I also have examined shells of *P. lacustris* from Ohio in the collections of the Florida State Museum. Based on these observations, especially the similarity of the male copulatory organs (verges) and the shells, I conclude that the genus *Vioscalba* Morrison, 1965, definitely is a junior synonym of *Probythinella* Thiele, 1928.

The specific designation for living populations of *Probythinella* occurring in estuarine areas of the northern Gulf is more difficult to determine with certainty. Morrison (1965) distinguished *P. protera* from *V. louisianae* as follows: "*V. protera* has a more abruptly truncated spire; the body whorl and the penultimate whorl of *protera* are flatter toward the suture; in contrast all whorls of *louisianae* are more regularly rounded from suture to suture. The shells of *louisianae* appear markedly more obese than the specimens of *protera* seen." Solem (1961) reported that *P. protera* appeared to be closely related to the freshwater species, *P. lacustris,* which has its earliest known occurrences in the late Pleistocene (Hibbard and Taylor 1960). Considerable variation in shell morphology of *P. lacustris* had been reported, and this variation, coupled with other factors, created considerable taxonomic confusion. Hibbard and Taylor (1960) clarified the taxonomy of *P. lacustris,* listing its synonyms and summarizing what was known of its biology. Concerning intraspecific variation they stated: "There is no warrant for taxonomic recognition of the known variation within *Probythinella lacustris.*" Solem (1961) also noted considerable variation in the shell morphology within the population of *Probythinella protera* from Lake Pontchartrain and stated that the constricted aperture of *P. protera* was the most consistent

Manuscript received September 4, 1979; accepted October 3, 1979.

difference between the two species. He further suggested that the constricted aperture of *P. protera* and two other gastropods, *Texadina sphinctostoma* Abbott and Ladd, 1951, and *Amphithalamus dystatus* Pilsbry and McGinty, 1950, might be "a convergent response to some unknown ecological factor in the Gulf Coast estuarine environment, since it has occurred in [their] three distinct lineages."

Shell variation within the northern Gulf populations of *Probythinella* is great enough to make them nearly, if not completely, indistinguishable from the fossil shells of *P. protera,* as well as some of the shell forms of *P. lacustris.* Figure 1 illustrates two shells of *Probythinella* from Lake Pontchartrain showing differences in their spires and apertures. The soft parts are illustrated in Figure 2, which shows the pigmentation of the mantle and visceral mass (A) and two aspects of the male copulatory organ, the verge (B, C).

If *P. protera sensu* Pilsbry, 1951, proves not to be a fossil form and extant populations are found in the Tampa Bay area, a careful comparison of the verge, radula, pigmentation pattern, and other morphological features of the soft body parts of this species with those of the northern Gulf populations of *Probythinella* will be needed to determine if they are conspecific or distinct species. If, on the other hand, *P. protera* is a true fossil species, its specific status in relation to *P. lacustris* and the brackish-water forms from the northern Gulf of Mexico becomes largely a matter of taxonomic conjecture.

Based on the information available, three taxonomic options exist concerning the specific name for the populations of *Probythinella* occurring in the northern Gulf: (1) all known specimens of *Probythinella*, including fossil and brackish-water forms, are variants or ecotypes of a single species—*P. lacustris*; (2) all fossil and living specimens of the genus from coastal areas of the Gulf of Mexico are *P. protera;* (3) there are three distinct species presently known in North America—*P. lacustris* (Baker, 1928); *P. protera* Pilsbry, 1953; and *P. louisianae* (Morrison, 1965). Pending additional collections and biological studies, I accept the third option and recognize *Probythinella louisianae* (Morrison, 1965) n. comb. as a distinct species, which is conspecific with *P. protera* sensu Solem, 1961. If living specimens of *Probythinella* with constricted apertures characteristic of *P. protera* and *P. louisianae* should be collected in brackish-water areas along the west coast of Florida near the Tampa Bay area, then option 2, or Solem's (1961) designation for the northern Gulf specimens as *"P. protera,"* will probably be correct, with *P. louisianae* becoming its junior synonym. Detailed morphologic, ecologic, physiologic, and behavioral comparisons of *P. lacustris* and *P. louisianae* will be needed to

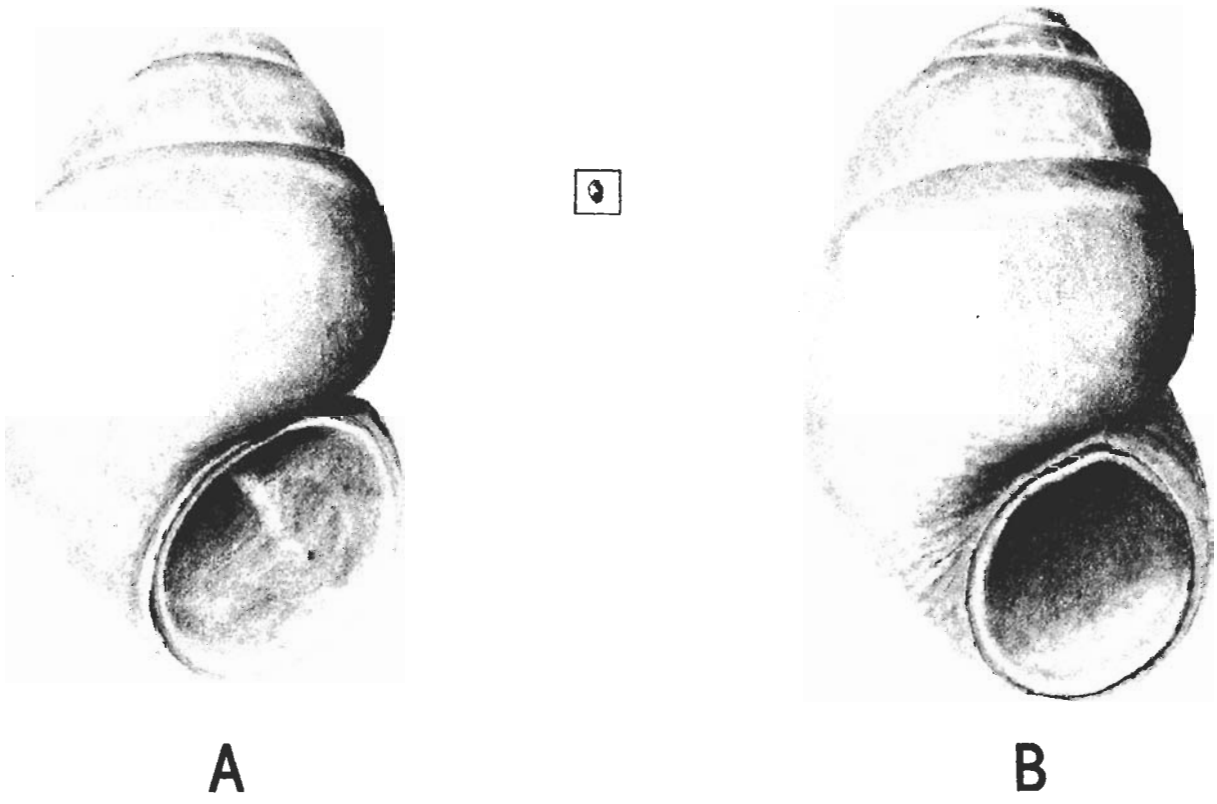

Figure 1. ***Probythinella louisianae*** **(Morrison, 1965) from Lake Pontchartrain, Louisiana; shells A and B demonstrate morphological variation from same population; specimen within box represents life size of adult snail.**

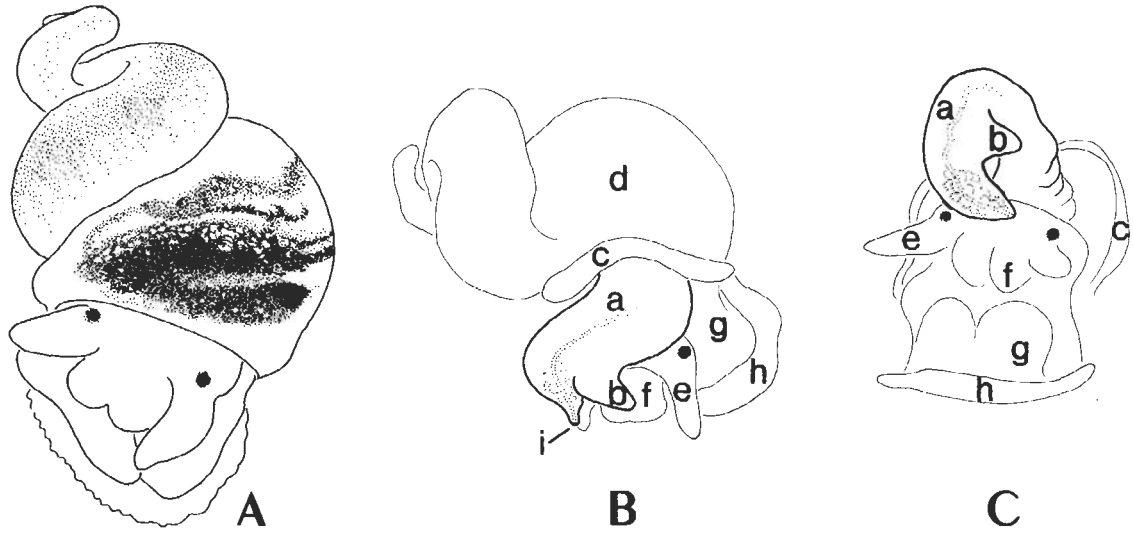

Figure 2. *Probythinella louisianae* **(Morrison, 1965) from Lake Pontchartrain, Louisiana; A–adult female, dorsal aspect (shell removed), showing pigmentation on mantle and visceral mass; B–adult male, dorsal aspect (shell removed); C–adult male, frontal aspect; a–verge (penis), b–single lobe on convex margin of verge, c–edge of mantle, d–visceral mass, e–tentacles, f–snout, g–foot, h–operculum, i–opening of sperm duct (vas deferens) at tip of verge.**

refute or validate option 1. Cross-breeding experiments between the two species would be especially useful.

BIOLOGICAL NOTES

I have made some limited observations on the distribution, ecology, and reproduction of *P. louisianae,* which are included here as a possible stimulus for futher study. I have found *P. louisianae* in several locations east of its published range–in Mississippi (St. Louis Bay, Back Bay of Biloxi, Davis, Simmons, and Heron bayous, and the West Pascagoula River) and in Alabama (mouth of East Fowl River and Mobile Bay). The Alabama record extends the known eastern range of *P. louisianae* approximately 113 kilometers. My attempts to find this species in a number of areas along the eastern Alabama and western Florida coasts, including Escambia, Appalachicola and Tampa bays, were unsuccessful; however, my collections were limited, leaving the possibility that *Probythinella* may still occur in these areas.

Specimens of *P. louisianae* collected during this study were all from areas with low salinities, usually less than 10 ppt and in some instances approaching freshwater conditions. Living specimens were always found subtidally, usually in water depths greater than a meter. The largest concentrations occurred on fine sand-silt bottoms, but some specimens were occasionally found in muddy areas. My observations of specimens maintained in the laboratory indicate that *P. louisianae* usually occurs partly covered by the bottom sediment or just under it. As the snails move through the sediment they leave distinct tracks. I never observed specimens of *P. louisianae* penetrating deeper than 3 to 4 mm into the sediment. A number of other invertebrates occurred in association with *P. louisianae,* including *Texadina sphinctostoma* Abbott and Ladd, 1951; *Neritina reclivata* (Say, 1822); *Rangia cuneata* (Gray, 1831); *Mulinia* sp.; *Macoma mitchelli* Dall, 1895; *Mytilopsis leucophaeta* (Conrad, 1831); *Corophium lacustre* Vanhoffen, 1811; *Hargaria rapax* (Hargar, 1879); *Hypaniola florida* (Hartman, 1951); *Streblospio benedicti* Webster, 1879; and chironomid midge larvae. The smooth, cream-colored shells of *P. louisianae* were often fouled with reddish-brown or rust-colored encrustations. These encrustations appeared to be due, at least in part, to small invertebrate (turbellarian?) egg cases and associated microflora.

While maintaining *P. louisianae* in glass culture bowls in the laboratory, I observed female snails depositing egg capsules on hard surfaces, including pieces of dead shell and wood, the shells of other *P. louisianae*, and the bottoms and sides of the culture bowls. Each newly deposited egg capsule contained a single egg in an early stage of cleavage. When viewed dorsally, the capsules were circular with diameters of 0.5 to 0.6 mm. In lateral aspect, the capsules were dome-shaped with flattened proximal surfaces attached to the substrate by a mucoid adhesive. After 8 to 12 days of development, a small juvenile snail with fully formed protoconch emerges from each capsule. There is no planktonic veliger stage, and the newly hatched snails crawl about on the bottom sediments and begin feeding.

Probythinella louisianae can occur in relatively large numbers, often exceeding 1,000 per square meter, but little is known about its bionomics. Morrison (1965) reported that the snails are eaten by wild ducks; however, there are no other published data on their impact on the estuarine food chain as either consumers or prey for other organisms. It is probable that *P. louisianae* and its even more numerous gastropod associate *T. sphinctostoma* play an important role in the reworking and enrichment of the sediments on which

they occur. My observations indicate that both these snails are deposit feeders. Individuals of either species, despite their small size (2.5 to 3.5 mm shell length), consume a considerable amount of bottom material and daily produce large numbers of fecal pellets. The ecological and nutritional importance of fecal material from estuarine and marine invertebrates and its probable role in the food web have been discussed and documented by Newell (1965), Johannes and Satomi (1966), Frankenberg, Coles, and Johannes (1967), Frankenberg and Smith (1967), and Kraeuter (1976). Since *P. louisianae* and *T. sphinctostoma* often occur in great numbers over large areas of bay bottom, studies are needed of their nutritional and overall ecological impact on northern Gulf estuarine systems.

ACKNOWLEDGMENTS

This study was supported in part by a grant entitled "Helminths of the Gulf of Mexico" from the State of Mississippi to R. M. Overstreet, and by a contract (No. DACN–29–77–C–02 53) from the U.S. Army Corps of Engineers to the Center for Wetland Resources, Louisiana State University. Appreciation is extended to B. Heard for preparing the illustrations, and to R. M. Overstreet and Walter B. Sikora for their constructive comments and suggestions on the manuscript. Fred G. Thompson kindly allowed me to examine specimens of *P. lacustris* in the collections of the Florida State Museum.

REFERENCES CITED

Andrews, J. 1977. *Shells and Shores of Texas.* Univ. of Texas Press, Austin. 365 pp.

Dugas, R. J., J. W. Tarver & L. S. Nutwell. 1974. The mollusk communities of Lakes Pontchartrain and Maurepas, Louisiana. *La. Wildl. Fish. Tech. Bull.* 10:1–13.

Frankenberg, D., S. L. Coles & R. E. Johannes. 1967. The potential trophic significance of *Callianassa major* fecal pellets. *Limnol. Oceanogr.* 12(1):113–120.

_____ & K. L. Smith. 1967. Coprophagy in marine animals. *Limnol. Oceanogr.* 12(3):443–450.

Hibbard, C. W. & D. W. Taylor. 1960. Two late Pleistocene faunas from southwestern Kansas. *Contrib. Mus. Paleontol. Univ. Mich.* 16(1):1–223.

Johannes, R. E. & M. Satomi. 1966. Composition and nutritive value of fecal pellets of a marine crustacean. *Limnol. Oceanogr.* 11(2): 191–197.

Kraeuter, J. N. 1976. Biodeposition by salt-marsh invertebrates. *Mar. Biol.* 35:215–223.

Morrison, J. P. E. 1965. New brackish water mollusks from Louisiana. *Proc. Biol. Soc. Wash.* 78(27):217–224.

Newell, R. 1965. The role of detritus in the nutrition of two marine deposit feeders, the prosobranch *Hydrobia ulvae* and the bivalve *Macoma balthica. Proc. Zool. Soc. Lond.* 144:25–45.

Pilsbry, H. A. 1953. Plieocene Mollusca of southern Florida, with special reference to those from North Saint Petersburg: Vitrinellidae and fresh water mollusks. *Monogr. Acad. Nat. Sci. Phila.* 8:411–447.

Solem, A. 1961. Hydrobiid snails from Lake Pontchartrain, Louisiana. *Nautilus* 74(4):157–160.

Tarver, J. W. & R. J. Dugas. 1973. A study of the clam, *Rangia cuneata,* in Lake Pontchartrain and Lake Maurepas, Louisiana. *La. Wildl. Fish. Comm. Tech. Bull.* 5:1–87.

_____ & L. B. Savoie, 1976. An inventory and study of the Lake Pontchartrain-Lake Maurepas estuarine complex. Phase II–Biology. *La. Wildl. Fish. Comm. Tech. Bull.* 19:7–99.