

## First Records for the Yellow Lamp Mussel (*Lampsilis cariosa*) in the Roanoke River System of Virginia

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### INTRODUCTION

By virtue of its shell shape and singular, waxy-yellow periostracum, *Lampsilis cariosa* (Say, 1817) is one of the more distinctive unionids of the Atlantic slope drainages between Nova Scotia and Georgia. In that part of the range south of the Potomac River, *L. cariosa* is largely confined to the Piedmont region, and only a few of the records cited by Johnson (1970: 384) are from localities below the Fall Line. The two collections from Virginia cited by Johnson appear to be the only published documentation for the species in this state.

Collecting efforts by personnel of the Virginia Museum of Natural History and the Division of Natural Heritage, Virginia Department of Conservation and Recreation (DNH-DCR), since 1988 have greatly improved knowledge of the in-state distribution of *L. cariosa*, showing it to be not uncommon in several drainage basins but unknown from others, a familiar pattern for many unionid species. This very phenomenon of widely scattered (relictually isolated?) populations provides a special incentive for thorough sampling of as many river systems as possible, as new and unexpected finds are always possible. The case of *L. cariosa* itself provides a good example. Several years ago I found fresh shells of the species at two localities on the Pigg River in Franklin Co., Virginia, where, on the basis of then-known records, I would have considered it unlikely. Publication of this new river system and inlandmost population was deferred for years in the hope that the source population of the shells could be located, but in the face of several unsuccessful attempts and increasingly reduced time to continue the search, the information is put forward now. Perhaps the interest of other naturalists will be piqued, and additional searches stimulated.

### SUMMARY OF HISTORICAL RECORDS

A brief historical survey of regional unionid surveys - with respect to *L. cariosa* - may provide background of interest. Early explorations generally failed to locate the

species in Virginia:

a. *Potomac River system* [Maryland]: Monocacy River at Rt. 26 bridge, NE of Frederick (Ortmann, 1919); District of Columbia (Reardon, 1929); Potomac River from Great Falls to the District of Columbia (Johnson, 1970).

b. *Upper Rappahannock River system*. A. E. Ortmann, the Nestor of unionid studies at the onset of the 20th century, did not find the species around Remington, Fauquier Co., or Rapidan, Culpeper Co., in 1912, although he obtained seven other species.

c. *James River system*. North (now Maury) River headwaters (Calfpasture River), sampled by T. A. Conrad near Goshen in 1845. He collected eight species of unionids (Conrad, 1846), but *L. cariosa* was not among them. Ortmann waded the same water (Lexington to Goshen) in May 1912, and added two species, again without *L. cariosa* (Ortmann, 1913). Further downstream, in the Scottsville-Richmond segment of the James, Clench & Boss (1967) found eight species at several major crossings, but no *L. cariosa*. This was also the experience of David H. Stansbery (pers. comm.), who in 1966 sampled the Rivanna River and the main stem of the James River at five crossings between Scottsville and Maidens; although he found such species as *Pleurobema collina* (Conrad) in great abundance at most stations (Ohio State Museum collection). During his studies of the latter species, Hove (1990) surveyed 240 sites in the middle and upper James system, finding a total of eleven species, but *L. cariosa* was not among them. This persuasive cumulative record has been confirmed repeatedly by more recent collectors in the James River basin: still no known populations of *L. cariosa*.

d. *York River system*. Pamunkey River, 2 miles N of Hanover [US Hwy 301], Hanover-Caroline cos. (Johnson: 1970). This site has been confirmed by collections both above and downstream (see records below). Riddick (1973) found *L. cariosa* at four sites in the Pamunkey drainage, the inlandmost in the South Anna River at the U. S. Hwy. 1 bridge.

e. *Chowan River system*. The only published record for this southeastern river basin is that of Johnson (1970: 384) for the Nottoway River at the U.S. Hwy. 1 bridge, 2 mi E Rawlings. Subsequent work has been successful in the Blackwater, Nottoway, and Meherrin rivers, as evident from the list of collections that follows. *Lampsilis cariosa* follows the latter two streams far headward onto the Piedmont: the Nottoway as far as the Falls, the Meherrin to its headwaters in western Lunenburg County.

f. *Roanoke River system*. The upper part of Roanoke River was sampled in Roanoke County by Ortmann in 1912, disclosing only a very depauperate fauna of three species (Ortmann, 1913). My own recent sampling in the South Fork of the Roanoke found no unionids, and only *Elliptio complanata* and *Villosa constricta* in the North Fork. Heretofore essentially NO collecting for these molluscs has been done in the entire reach of the Roanoke, or its major tributaries, between Vinton and Clarksville. Several species of interest have been found recently (DNH-DCR surveys) in the J. H. Kerr Reservoir and its smaller peripheral streams, but nothing remotely like *L. cariosa*. The discovery of that species in the Pigg River, therefore, starts to close the vast lacuna represented by the Roanoke basin, and throws it open to renewed, determined investigation.

h. *North Carolina river basins*. Johnson (1970: 384) cited localities in the Neuse, Tar, and Cape Fear river basins, some of them as far inland as Raleigh and Durham (Eno River). Clarke (1983) added localities in the Tar River, some well up on the Piedmont. Shelley (1987) recorded an additional locality each for the Haw and Deep rivers (Cape Fear basin), both on the Piedmont.

## SUMMARY OF RECENT RECORDS

### Potomac River basin

*Shenandoah River*: [Shenandoah Co.]: North Fork at Farmer's Mill, by Rte 661, 2 mi. S Mauertown, two unmatched valves, old and encrusted, 10 September 1990, M. L. Lipford (VMNH 329). An unpublished DNH-DCR occurrence data report compiled in November 1991 cites three additional finds of relict shells in the Strasburg-Mauertown reach of the North Fork. Personal searches in the South Fork near Bentonville and Grottoes disclosed no trace of *L. cariosa* (or any other unionid). The species may be extirpated in both forks of the Shenandoah, except possibly in larger tributaries or headward in the North Fork.

*Goose Creek*: [Loudoun Co.]: Rte 626 bridge, 2 mi. NW Middleburg, five sets, 2 November 1990, P. H. Stevenson (VMNH 1017). One of these specimens, although not differing from the others in any observable

shell characters, is unusual in that the posterior half of the shells is provided with 5-6 narrow dark green lines, the only such case I have seen in Virginia material, although mentioned by Johnson (1970: 383) as occasionally present in this species.

### York River basin

*Pamunkey River*: [Hanover-King William cos.]: Norman's Bridge, Rte 614, E of Hanover Court House, one set of worn valves, 6 September 1991, P. H. Stevenson (VMNH 578); [King William Co.]: Rte 602 landing, ca 4 mi. W Manquin, off Rte 604, one valve set, 6 September 1991, Stevenson (VMNH 577); "between Rtes 615 and 602 bridges", ca. 5 mi. S Mangohick, one live adult, 28 June 1983, State Water Control Board team (VMNH 759).

*Mattaponi River*: [King and Queen-King William cos.]: ca. 0.12 mi. upstream of Rte 628 bridge, six live adults and two relict shells, 19 October 1992, Stevenson (DNH-DCR data base).

### Roanoke River basin

*Pigg River*: [Franklin Co.]: downstream of Rte 646 bridge, 2 mi. SSW Glade Hill, one set of valves, 2 April 1988 (VMNH 315); same site, two sets, 14 April 1988 (VMNH 318). Fralin Bridge, Rte 646, 2 mi. NW Truevine, one set, 27 February 1988 (VMNH 316) (all RLH).

### Chowan River basin

*Nottoway River*: [Brunswick-Dinwiddie cos.]: Rte. 609 bridge, 6 mi. SE McKenney, one set of fresh valves, 1 October 1988 (VMNH 317); same site, one set of worn valves, 6 October 1990, M. L. Lipford, C. A. Pague, R. L. Hoffman (VMNH 321); same site, six live specimens, 24 June 1997, R. J. Neves et al. (Neves, pers. comm.). [Southampton Co.]: one mile upstream of Rte. 653 bridge, 3 mi. SW Sebrell, one set of badly eroded valves, 23 May 1989 M.L. Lipford (VMNH 324); just below Rte. 653 bridge, live specimen, 26 September 1988, Hoffman (VMNH 755), same site, 4 June 1966, J. J. Johnson (OSM 16434). [Nottoway-Lunenburg cos.]: Below Nottoway Falls, several collections, no retentions, May and June 1990, DNH-DCR personnel. [Southampton Co.]: Rte 684 bridge, ca. 5 mi SW Franklin, one living, one set of worn valves, 24 July 1996, R. J. Neves et al (Neves, pers. comm.).

*Blackwater River*: [Isle of Wight Co.]: Zuni Pine Barrens, 4 mi S Zuni, one live specimen, 20 July 1991, C. A. Pague (VMNH 759).

*Meherrin River*: [Greensville Co.]: Emporia, eddy

above CSX RR bridge, one set of valves, 20 August 1990, Lipford and Pague (VMNH 322); same site, live adult male, 14 July 1993, Hoffman (VMNH 1122). [Lunenburg Co.]: North Meherin at Rte 712 bridge, ca. 2 mi. E Traffic, three sets of valves, 11 August 1988, Hoffman (VMNH 319); same site, downstream of bridge, three live adults, 11 August 1988, Hoffman (VMNH 758); same site, one set, 26 May 1989, Hoffman (VMNH 320); same site, two sets, 6 July 1990, Lipford, Pague, Hoffman (VMNH 328); upstream of Va. Hwy. 49 bridge, 2 mi. NE Rehoboth, live adult, 18 June 1988, Hoffman (VMNH 761). Middle Meherrin at Rte. 634 bridge, 4.6 mi SSE Rehoboth (two live adults, not retained), 6 July 1990, DNH-DCR survey. South Meherrin at site of Reeks Mill, 4 mi NW Northview, two sets, 13 November 1989, Lipford and Pague (VMNH 323).

## DISCUSSION

Preparation of the distribution map (Fig. 1) disclosed the interesting fact that most of the known localities are either above the limits of tidal influence in Coastal Plain streams, or in the Piedmont itself. This generalization seems to apply likewise in the Carolinas and Georgia. Further north in its range, *L. cariosa* appears to be more associated with waters under tidal influence.

The absence of *L. cariosa* from the James River system remains inexplicable, particularly when contrasted with the exclusive presence there of *Pleurobema collina* (and many endemic species of freshwater fishes). At present, *L. cariosa* seems to be present and apparently secure in only the Pamunkey, Nottoway, and Meherrin rivers. Extirpation from the Shenandoah basin seems to

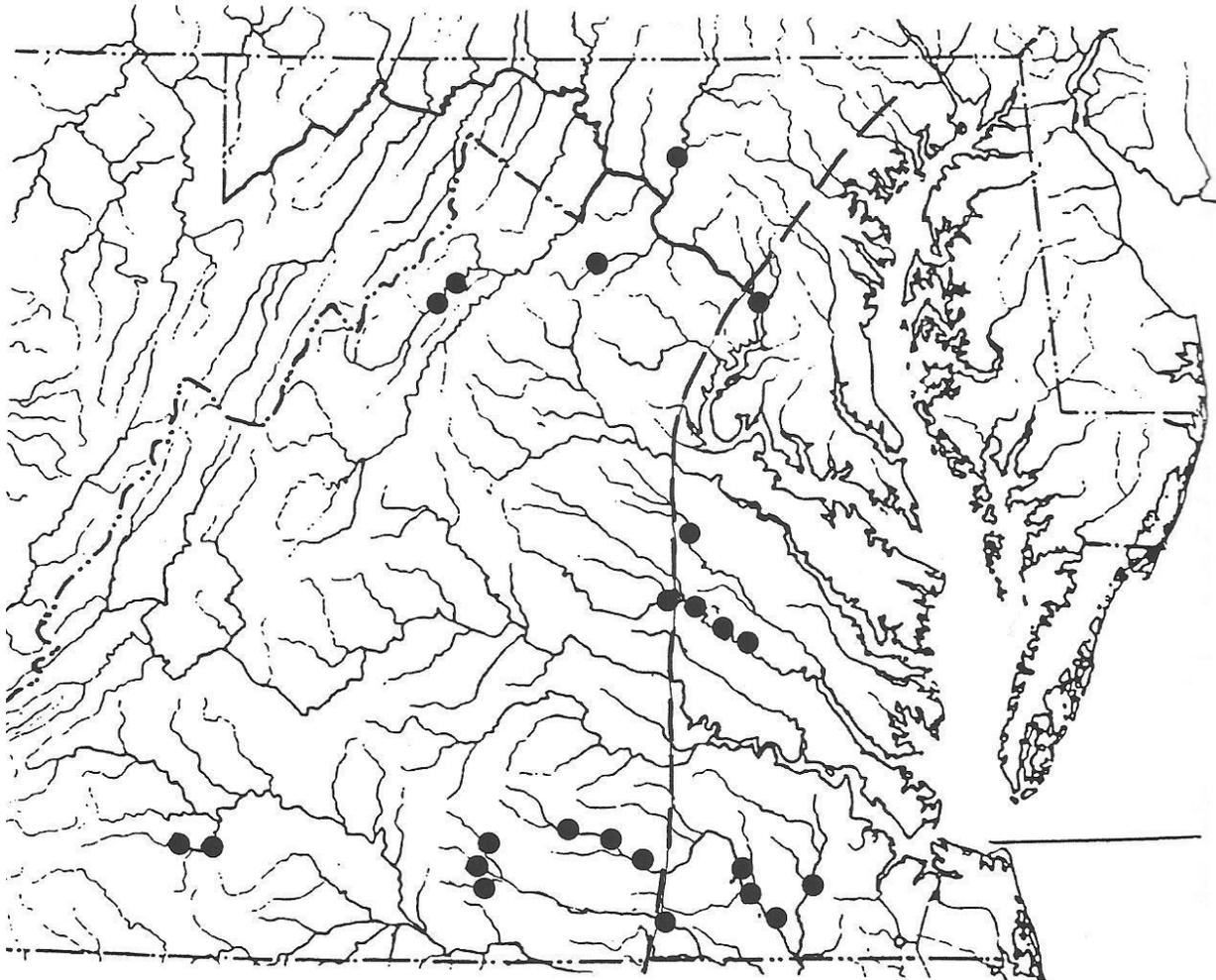


Fig. 1. Distribution of *Lampsilis cariosa* in Virginia. Several adjacent sites may be covered by one symbol. For the Potomac River system, only records based on live or freshly dead specimens are shown, owing to the possibility of confusing worn relict shells with those of *Lampsilis cardium*.

have occurred fairly recently. The status of the species in the Pigg River system invites serious investigation. Such sizeable tributaries as Big Chestnut Creek may have escaped serious contamination and now represent local refuges.

Although the present disjunct occurrence of populations of *L. cariosa* in Virginia may be due to some extent to the vagaries of glochidial transport by fish and other natural causes, the influence of adverse human impacts cannot be too strongly emphasized. Piedmont streams, which often appear optimal to the eye but are devoid of unionids, may have been terminally stressed over a century ago, when a large part of that region south of the James River was devoted to tobacco culture. Pest control at that time depended to a considerable extent on the use of lead- and arsenic-based compounds applied to tobacco leaves as dust. Inevitably, such poisons would be washed into the ground and find their way into nearby streams.

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#### LITERATURE CITED

- Clarke, A. H. 1983. Status survey of the Tar River spiny mussel. Final Project Report to the U. S. Fish and Wildlife Service, Asheville, NC.
- Clench, W. J., & K. J. Boss, 1957. Freshwater Mollusca from James River, Virginia. *Nautilus* 80: 99-101.
- Conrad, T. A. 1846. Notices of fresh water shells, &c., of Rockbridge County, Virginia. *American Journal of Science*, series 2, 1 (3): 405-407.
- Hove, M. C. 1990. Distribution and life history of the endangered James Spiny mussel, *Pleurobema collina* (Bivalvia: Unionidae). Master's Thesis, Virginia Polytechnic Institute and State University, Blacksburg, VA. 112 pp.
- Johnson, R. I. 1970. The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the Southern Atlantic Slope. *Bulletin of the Museum of Comparative Zoology* 140: 263-450.
- Ortmann, A. E. 1913. The Alleghenian Divide and its influence upon the freshwater fauna. *Proceedings of the American Philosophical Society* 52: 287-390.
- Ortmann, A. E. 1919. A monograph on the naiades of Pennsylvania. Part 3. Systematic account of the genera and species. *Memoirs of the Carnegie Museum* 8: i-xiv, 1-384.
- Reardon, L. 1929. A contribution to our knowledge of the anatomy of the fresh-water mussels of the District of Columbia. *Proceedings of the United States National Museum* 75(11): 1-11, pls. 1-5.
- Riddick, M. B. 1973. Freshwater mussels of the Pamunkey River system, Virginia. Master's Thesis, Virginia Commonwealth University, Richmond, VA. 105 pp.
- Shelley, R. M. 1987. Unionid mollusks from the upper Cape Fear River basin, North Carolina, with a comparison of the faunas of the Neuse, Tar, and Cape Fear drainages (Bivalvia: Unionacea). *Brimleyana* 13: 67-89.