

# New information on *Pleurolucina hendersoni* (Britton, 1972) (Bivalvia, Lucinidae) from the Dutch island of St. Eustatius, West Indies

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*Pleurolucina hendersoni* is a West Indian lucinid, of which virtually no records exist other than that of the species description. In 2015, two valves of the species were found in shallow water off St. Eustatius, in contrast to the type material, which was from c. 100–220 m depth. Both 2015 valves exceed the maximum-known size, and one has a predation drill hole. Comments are made on these valves and also on valves that the senior author found in beach drift on St. Kitts. The authors speculate about possible habitat preferences.

Key words: Lucinidae, Statia Marine Expedition 2015, Caribbean Sea, Lesser Antilles.

## INTRODUCTION

In June 2015, the Statia Marine Biodiversity Expedition 2015 took place on the Caribbean Netherlands island of St. Eustatius (also known as Statia), Leeward Islands, Lesser Antilles. As part of the investigation, live molluscs, empty shells, and samples of shell hash were gathered via SCUBA diving, and were passed to the first two authors for sorting and identification.

The third author was part of the SCUBA team. At two field stations off the west coast of the island, his samples included one valve of *Pleurolucina hendersoni* (Britton, 1972) (Bivalvia, Lucinidae). This lucinid species is data-poor. It has apparently never been found alive; nothing is known about its habitat; and

the species is sparsely mentioned in the literature.

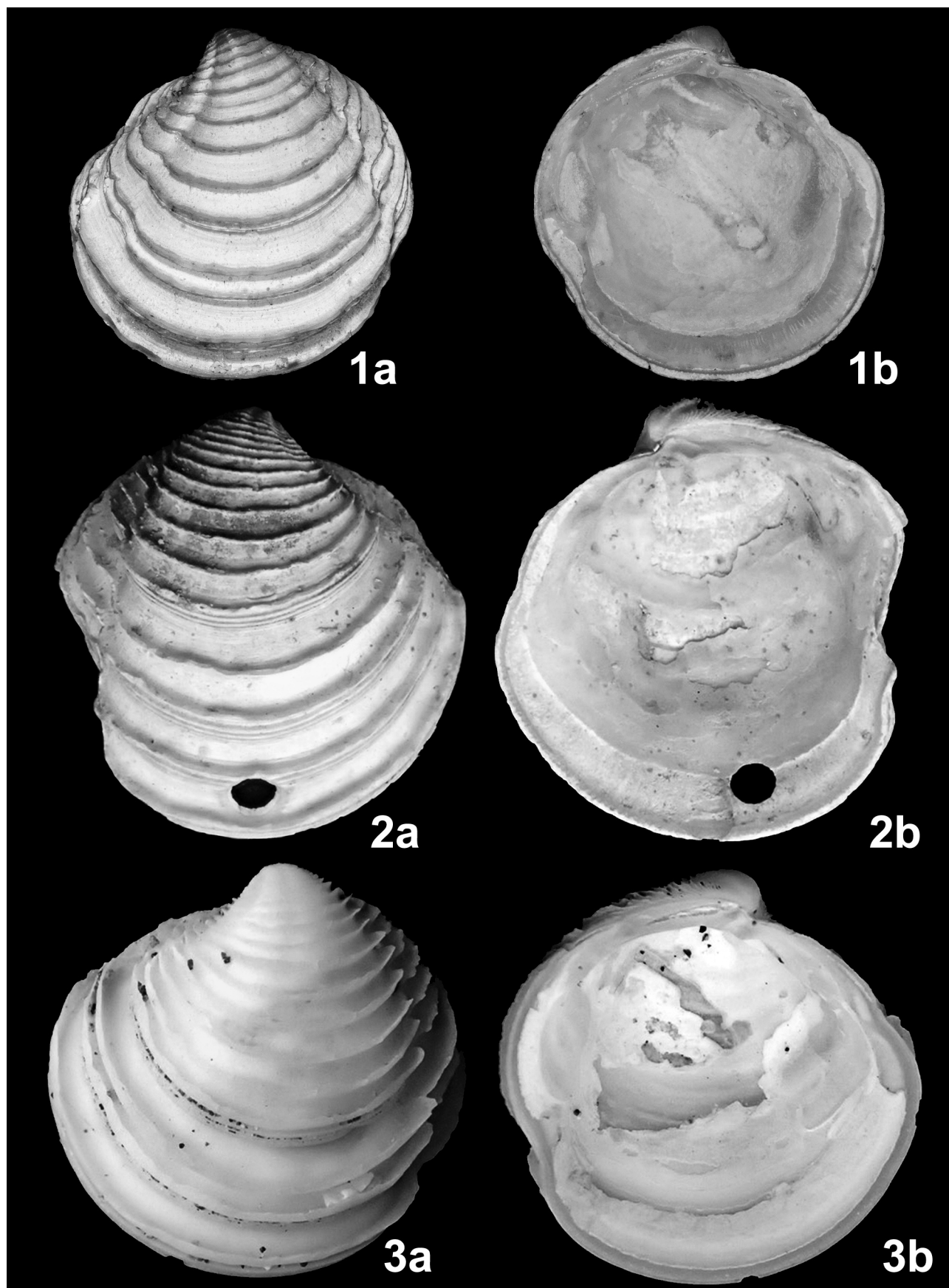
Abbreviations: NMNH = National Museum of Natural History, Smithsonian Institution, in Washington D.C, formerly USNM; RMNH = Rijksmuseum van Natuurlijke Historie, now Naturalis Biodiversity Center, Leiden, The Netherlands.

## ON *PLEUROLUCINA HENDERSONI* (BRITTON, 1972)

Britton's paper and Smithsonian material. — Britton (1972) described the species as *Lucina* (*Pleurolucina*) *hendersoni*, from material which had been dredged by John Brooks Henderson in 1918 on an "Eolis" cruise. The holotype is from off English Harbour, Antigua, at 219 m depth. The online Smithsonian catalogue lists the holotype lot as USNM 503399. A new photograph of the holotype is shown here as Figure 1.

Britton (1972) illustrates five paratypes (a growth series), and he lists the dimensions of three paratypes (USNM 712452), but he does not state how many paratypes there are in total. The Smithsonian online catalogue indicates that this lot contains 16 valves, and Britton's original label describes them as paratypes (Ellen Strong, pers. comm., April 2016).

Britton's paper also lists eight valves from Henderson's 1918 material from off two other islands, all of it found at considerable depth: seven valves from Barbados, and one from Cuba. However, the Smithsonian collection contains more valves collected by Henderson than those mentioned by Britton. From Barbados there are five valves in NMNH 503400; four in NMNH 503401; one in NMNH 503402; and two in NMNH



**Figs 1-3.** Valves of *Pleurolucina hendersoni*. 1, exterior (a) and interior (b) of holotype valve of *Pleurolucina hendersoni* from Antigua (USNM 503399, height 12.3 mm); 2 a-b, exterior (a) and interior (b) of valve of *P. hendersoni* from STENAPA Reef, St. Eustatius (height 15.4 mm); 3 a-b, exterior (a) and interior (b) of valve of *P. hendersoni* from The Blocks, St. Eustatius (height 14.4 mm).



Fig. 4. Detail of surface of valve from The Blocks.

503403. From Cuba there are six in NMNH 64274, for an overall total of 18 specimens.

Recent finds. — From 1972 until 2013, there seem to be no published records of this species. Hewitt (2013) reported one worn left valve (8.5 mm long) in May 2012 in beach drift at south-facing Majors Bay on the island of Saint Kitts. In March/April 2013, Hewitt (pers. observ.) found five smaller valves there.

The Hewitt (2015) checklist of 183 species found on St. Eustatius from 2000 to 2011 did not include this species. However, on 8 June 2015, during the Naturalis and ANEMOON Statia Marine Biodiversity Expedition, a chipped and discoloured right valve (15.4 mm long RMNH 5004015), was found at 20 m depth at a dive site called "STENAPA Reef" (17°29'03.7"N, 62°59'50.5"W). This valve (Figs 2a, 2b) was in a sample of shell hash taken from a sandy substrate with seagrass, near sunken ships. On 14 June 2015, a much fresher left valve (14.2 mm long, RMNH 5004016) was found at 17 m depth at a dive site called "The Blocks" (17°27'50.9"N, 62°59'06.8"W). This second specimen (Figs 3a and 3b) was found on sand surrounding lava blocks with soft corals growing on them. Both valves are recorded as observations on iNaturalist, numbers <http://www.inaturalist.org/observations/3310304> and <http://www.inaturalist.org/observations/3310339>.

Shell morphology. — The *Statia* valves correspond well to Britton's type description, with features that include valves moderately inflated; on the exterior surface three anterior sulci and one posterior sulcus extending from the beak to ventral margin; concentric sculpture of erect lamellae with numerous very fine secondary concentric lines in interspaces; and prosogyrate umbos projecting above the shell body. No prodissoconch is visible on either of the two *Statia* valves, and there is no sign of a periostracum, even on the fresher valve from The Blocks.

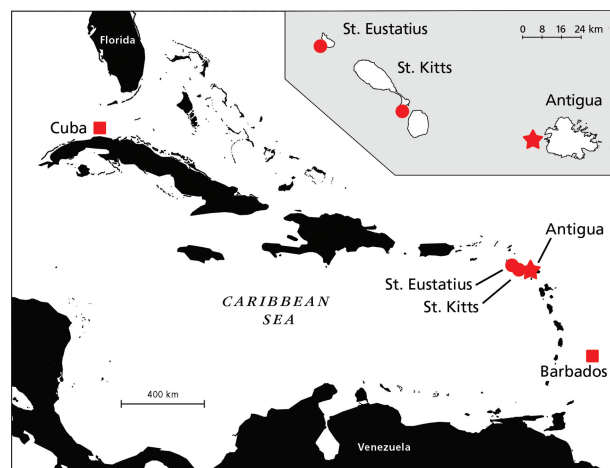


Fig. 5. Map of West Indies showing known distribution of *P. hendersoni*, star = type locality, squares = other localities by Henderson and Britton, circles = new localities by Hewitt, Van Leeuwen & Schrieken.

There are approximately 30 to 35 primary lamellae on each *Statia* valve. At a shell height of 9 to 10 mm, the first growth stage is visible, marked by 3 or 4 concentric ridges at the underside of the preceding lamella (Fig. 4). This pattern is repeated roughly every 2 mm. During the second growth stage, two new lamellae were formed; during later growth stages, one new lamella was formed.

The chipped STENAPA reef valve broke further while being examined. The break revealed that close to the shell margin and near a lamella, the shell is approximately 1 mm thick, but much thinner midway between the lamellae. Details of the shell structure are not clear, but it appears to consist of two layers.

Both *Statia* valves are larger than any listed by Britton. The chipped valve from STENAPA Reef increases the maximum known diameter for the species from the 12.5 mm size listed by Britton to 15.4 mm. An unchipped valve of the same basic dimensions would be slightly larger still.

Ecology. — The STENAPA reef valve has a drill hole, indicating that the clam died by predation. The hole is on the thinnest part of the shell, in between the two lamellae near the shell margin. It is not bevelled on the exterior surface, as would be the case with naticid predation. Moreover, it does not show the characteristic scraping damage made by a cephalopod beak. These observations, along with the almost parallel sides of the hole, indicate that it was made by a muricid. The two *Statia* localities that yielded the *Pleurolucina* valves did not yield any shells of muricid species, but a thorough search was not conducted.

Of the total of 35 valves in the Smithsonian material, eight valves (23%) have drill holes (one valve in



NMNH 503401; one in NMNH 503403; one in NMNH 64274; and five in the paratype lot NMNH 712452). None of the Smithsonian valves show marks from partial drilling. Almost all the holes are near the margin of the valves with none at the umbo (Ellen Strong, pers. comm. April 2016).

**Habitat.** — In the case of dead valves, the place where the valve was found does not necessarily correspond to where the animal had lived. However, shells are not often transported over great distances or lifted up from great depths, except during major storms or in areas where there are strong upwelling currents.

The *Pleurolucina hendersoni* valves from St. Eustatius were found in less than 20 m depth, and the ones from St. Kitts at 0 m. This considerably decreases the minimum known depth for dead valves of the species, the previous minimum having been 91 m, as reported by Britton. Although the species has never been found alive, these newer records suggest the possibility that it might live in shallower depths than those in the original description.

Judging by the geography of the old and new records combined (Fig. 5), one might also suggest that the species somewhat prefers relatively sheltered leeward waters over more exposed localities.

Recent research, including that of Heide et al. (2012), has clarified that lucinids have symbiotic bacteria which oxidize sulphides, and that this family of bivalves tends to live in sulphur-rich environments such as seagrass beds, mangrove swamps, and reduced sediments rich in organic matter (Schweimanns & Felbeck, 1985). Of the two Statia localities, the STENAPA reef includes seagrass beds; the other locality does not. Algae and seagrass habitats are common off Statia to the northwest, however smaller patches occur all around the island (Nieto et al., 2013). In addition to *P. hendersoni*, nine other species of lucinids occur on Statia (Hewitt & Van Leeuwen, in prep.). One valve of *Divalinga dentata* (Wood, 1815) was present in the material from STENAPA reef, and one whole shell of *Lucina pennsylvanica* (Linnaeus, 1758) was found at The Blocks.

**Distribution.** — Britton (1972: 7) commented that the species "appears to be quite uncommonly collected" and "is assumed to occur...from Cuba to the Lesser Antilles". The newer records are within this 2,700 km geographical range; St. Eustatius and St. Kitts lie 95 to 140 km west-northwest of the type locality (Fig. 5). The new records do, however, add three more known localities, for a total of eight, as well as two more West Indian islands, for a total of five islands.

The total known material of this species is 26 separate valves, with no paired valves, and no live-collected material. Because this species has now been found in shallow water at St. Kitts and St. Eustatius, perhaps with thorough searching it may also be found in shal-

low depths around other nearby islands. The authors encourage SCUBA divers in the Leeward Islands, and elsewhere in the West Indies, to search for live specimens of this very uncommon species, as the evidence suggests that it may live within diving depth.

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#### REFERENCES

- BRITTON, J.C., 1972. Two new species and a new genus of Lucinidae (Mollusca: Bivalvia), with notes on certain aspects of lucinid phylogeny. — Smithsonian Contributions to Zoology 129: 1-19. Available at: [http://www.sil.si.edu/smithsonian-contributions/Zoology/pdf\\_hi/SCTZ-0129.pdf](http://www.sil.si.edu/smithsonian-contributions/Zoology/pdf_hi/SCTZ-0129.pdf)
- HEIDE, T. VAN DER, GOVERS, L.L., FOUW, J. DE, OLFF, H.; GEEST, M. VAN DER, KATWIJK, M.M. VAN, PIERSMA, TH., KOPPEL, J. VAN DE, SILLIMAN, B.R., SMOLDERS A.J.P. & GILS J.A. VAN, 2012. Three-stage symbiosis forms the foundation of seagrass ecosystems. — Science 336 (6087): 1432-1434.
- HEWITT, S.J., 2013. Further surveys of the marine mollusc fauna of the island of Saint Kitts, Leeward Islands, West Indies, Part II. — The Festivus 44 (4): 29-33.
- HEWITT, S.J., 2015. Checklist of marine molluscs from the island of Sint Eustatius, Leeward Islands, West Indies. — Basteria 79 (1-3): 39-47.
- HEWITT, S.J. & S.J. VAN LEEUWEN, in prep. Marine molluscs from the island of Sint Eustatius, Leeward Islands, West Indies: results of the Statia Marine Expedition 2015.
- NIETO, P., MÜCHER, C.A., MEESTERS, H.W.G & CLEVERS, J.G.P.W., 2013. Classifying benthic habitats and deriving bathymetry at the Caribbean Netherlands using multispectral imagery. Case study of St. Eustatius. [http://www.sil.si.edu/smithsonian-contributions/Zoology/pdf\\_hi/SCTZ-0129.pdf](http://www.sil.si.edu/smithsonian-contributions/Zoology/pdf_hi/SCTZ-0129.pdf) IMARES rapport C143/13; Alterra rapport 2467: 1-96.
- SCHWEIMANNS, M. & FELBECK, H., 1985. Significance of the occurrence of chemoautotrophic bacterial endosymbionts in lucinid clams from Bermuda. — Marine Ecology Progress Series 24: 113-120.