

Notes on some freshwater molluscs from Nariva Swamp, Trinidad

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STUDY of published literature on the freshwater mollusca of Trinidad and Tobago revealed a paucity of information on their distribution and ecology. Several papers exist giving species records and taxonomic data but, as most of these were written during the last century, the taxonomy is in need of revision.

Bland (1862) reported *Marisa* in freshwaters and *Ampullaria rugosa* Lam. in both Trinidad and Tobago. Guppy (1864) noted the presence of *A. effusa* Chemn. (= *A. glauca* Linn.), which produced calcareous, green egg masses laid on trees or rocks just out of the water, and listed three new fluviatile species. These were *A. purpurescens*, for which no indication was given of habitat or distribution, *Bithinia spiralis* from streams in the Northern Range and *Valvata agglutinans* from the surface of rocks and stones in hill streams in northern Trinidad. In 1866, Guppy added to the catalogue of the Trinidad freshwater mollusca the prosobranch *Diplomatina huttoni* Pfeiffer, from a stream near Maracas Waterfall, and the venerid *Cyclas punctifera* Guppy, from a pond at St. Anns. He also revised his 1864 list (Guppy, 1866 b) bringing the total number of species in freshwaters to seven. These were, *Ampullaria urceus* Muller (= *A. rugosa* Lam.) in larger rivers and swamps; *A. effusa* Chemn., typically in rapid streams, with the two varieties *A. conica* and *A. tristis* in slow moving water and ponds respectively; *Marisa cornu-arietis* Linn.; *Anodon leotaudi* new species; and three species normally found in salt or brackish water which may enter freshwater regions of rivers and swamps — *Melampus coffea*, *Nerita viridis* and *N. meleagris*.

The majority of the specimens reported in these papers are probably deposited in the collections of the British Museum of Natural History in London, as no comprehensive museum collection of freshwater molluscs exists in Trinidad and Tobago.

More recently Hynes (1971) reported *Potamopyrgus* sp. in the Arima River at altitudes of from 55 to 250 metres above sea level and Ou Young (1973) listed *Ampullaria gigas* Linn. among edible species found in drainage ditches, rivers and swamps.

In 1977 the Zoology Department, University of the West Indies, began investigations of the fauna of the Nariva Swamp and collected a number of shellfish. Detailed taxonomic and ecological studies of these species are in progress, but some preliminary notes are given here in the hope that local naturalists will be encouraged to collect and study these poorly known freshwater animals.

(a) The rediscovery of *Anodon leotaudi*.

Guppy (1866 b) described a new bivalve from Trinidad. This was about 3.3 inches (8.3 cm) in length, oval-oblong and covered with a shining dark, olive-brown epidermis. He found it only in the southern division of Trinidad, i.e. south of the Caroni Plain, and, from its similarity to *A. amazonensis* Lea, pointed out its affinity to elements of the South American Guianas fauna.

This freshwater mussel has not been reported since and, despite its large size, was unknown to contemporary field naturalists and other persons whom we questioned. It was of some interest, therefore, when one of us (G.S.) collected a large unionid mussel in the Cuche River, near Plum Mitan, Nariva, in May, 1978.

Comparison with the single damaged specimen from Trinidad, presented to the British Museum by J.H. Ponsonby in 1894, confirmed that this was the species referred to as *Anodon leotaudi* by Guppy. The present taxonomic status of the genus and species is being studied, as is its distribution in the Nariva area. The mussel has been found in slow moving, silted channels and rivers, partially buried in soft sediments and appears to be unexpectedly common. Several hundreds were exposed during recent dredging of the Canque River at Plum Mitan and some fishermen from that area informed us that they use it for food.

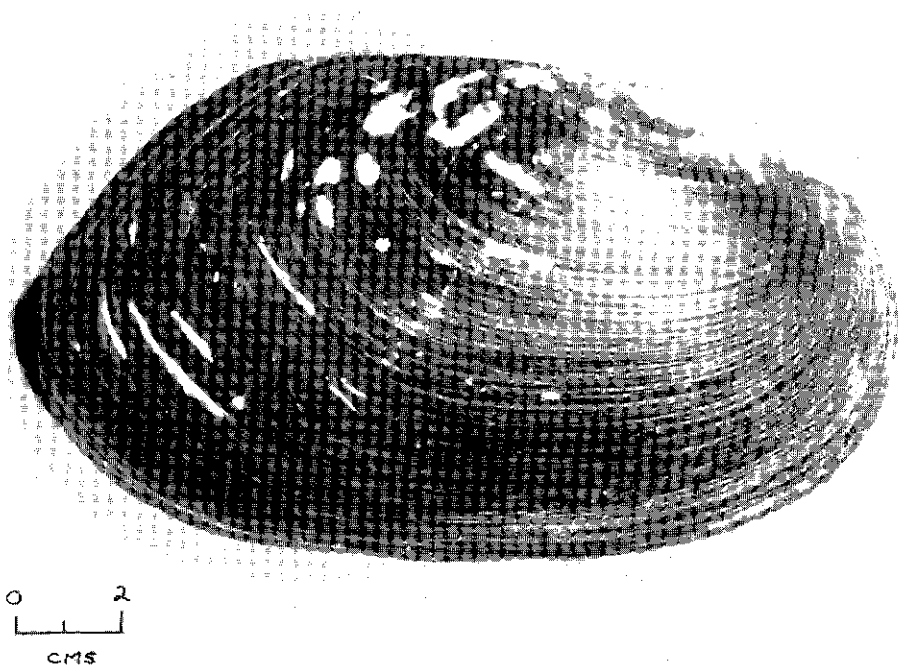


Fig. 1. Lateral view of *Anodon leotaudi* Guppy (Photo by J.S. Kenny).

(b) *Erosion of the shell in Ampullaria gigas*

The freshwater conch, *Ampullaria gigas* Linn., is abundant in the Nariva area. It is found in most water channels and some rice paddies and is most easily collected in patches of the swamp aroid, *Montrichardia arborescens*, on which plant it commonly feeds.

This snail belongs to the family Pilidae (= Ampullariidae) and possesses a large, spiral shell. A two-year old adult may possess a shell up to 130mm long and 100 mm broad. The walls may be up to 3.5 mm thick and the empty shell taken from a one year old animal, 111 mm long, weighed 160 gms. The inner surface is nacreous and the aperture closed by a brown, horny, oval operculum. The outside is coloured black and bears a horny periostracum.

The majority of the larger conchs collected in the Nariva Swamp had imperfect shells, showing erosion of the surface. (Fig. 2) The damage was most marked around the spire, although it occurred frequently on the sides of the whorls also. In several cases the erosion scars were deep, up to 3 mm below the surface, although none was found going through the shell to expose the lumen.

This shell erosion has long attracted the interest of local naturalists and various suggestions have been put forward to explain why and how it occurs. Unsuccessful attacks by predators, such as caimans or snail-kites were a possibility, as was chemical erosion. It was known that in a number of marine bivalve species the older parts of the shell valves are not maintained by the animals so the calcium carbonate matrix gradually dissolves. This produces scars around the umbones, as was pointed out for the swamp mussel, *Mytella guyanensis*, in the Caroni Swamp where the acid nature of the sediments probably caused the erosion (Bacon, 1975). This type of shell decay was noticed in *Anodon leotaudi*, which is also buried in acidic sediments.

The scarring recorded in *A. gigas* differed in that the erosion marks had well defined, smooth margins. During a study of this species in Nariva, one of us (E.J.) noticed that the conchs frequently sat upon each others' shells. This occurred particularly under crowded conditions when water levels fell during dry periods and in laboratory aquaria, but was observed also when adequate space and water were available. As mentioned above, *Ampullaria* was found commonly in clusters around *Montrichardia*. While on top of a neighbour's shell, the conch rasps away at the matrix using its strongly toothed radula. Further observation suggests that some chemical action may be involved also which produces the smoothness of the erosion scars.

It appears, therefore, that *Ampullaria* eats shell material from other individuals, which explains the presence of these scars; but it is not clear why this behaviour occurs. It is unlikely that they are confusing the shell materials with their plant food substrates as the relative hardnesses are so different. It is possible that the production of such large, thick shells by these freshwater molluscs stresses their calcium reserves, particularly in mature animals. This may be important if the water in which they are living is deficient in calcium salts, but it is of interest that the smaller species *A. glauca* and the ramshorn snail, *Marisa cornuarietis*, which are sympatric but have thinner shells, do not exhibit erosion scars. Some further work on this subject is required.

(c) *Other Nariva molluscs*

1. *Omalonyx felinus* Guppy. One specimen of this succineid slug was found on water hyacinth, *Eichhornia crassipes*, in the Petit Poole Canal, Plum Mitan, on 17.1.78 and another in an abandoned rice paddy off the Biche-Ortoire Road on 26.1.78. Dr. S. Tillier, of the Museum National d'Histoire Naturelle, Paris, who kindly identified these specimens, notes that they had been reported previously only from cress and the water lettuce, *Pistia*.

2. *Melanoides tuberculatus* Mueller. This thiarid gastropod was very common in drainage ditches at Plum Mitan on 27.2.78. It is a pan-tropical species which has probably been introduced to the West Indies in association with rice cultivation. Berry & Kadri

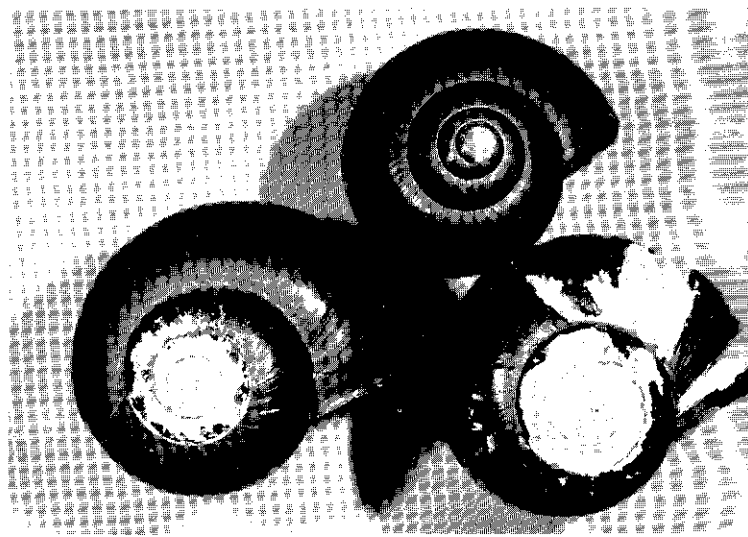


Fig. 2. Erosion scars on *Ampullaria gigas* (Photo by J.S. Kenny)

(1974) and Emerson & Jacobson (1976) report that it carries a trematode parasite that attacks the eyes of water birds in other parts of the world. These have not been isolated from the Nariva specimens to date, but investigations of the ecology of this species are continuing.

REFERENCES

1. BACON, P.R. 1975. Shell form, byssal development & habitat of *Mytella guyanensis* (Lamarck) and *M. falcata* (Orbigny) in Trinidad, West Indies. Proc. Malacol. Soc. London. 41 (6); 511 - 520.
2. BERRY, A.J. & KADRI, A.B.H. 1974. Reproduction in the Malayan cerithiaceous gastropod *Melanoides tuberculata*. J. Zool. Lond. 172; 369 - 381.
3. BLAND, T. 1862. On the geographical distribution of the West Indian land shells. Ann. Lyceum Nat. Hist New York. 7; 335 - 361.
4. EMERSON, W.K. & JACOBSON, M.K. 1976. Guide to shells. Knopf. 482 pages.
5. GUPPY, R.J.L. 1864. Descriptions of new species of fluviatile and terrestrial operculate mollusca from Trinidad. Ann. Mag. Nat. Hist. (Ser. 3), 14; 243 - 248.
6. GUPPY, R.J.L. 1866. Additions to the catalogue of the land and freshwater mollusca of Trinidad. Proc. Scient. Soc. Trinidad. 1; 135 - 139.
7. GUPPY, R.J.L. 1866b. On the terrestrial and fluviatile mollusca of Trinidad. Ann. Mag. Nat. Hist (Ser.3), 17; 42 - 56
8. HYNES, H.B.N. 1971. Zonation of the invertebrate fauna in a West Indian stream. Hydrobiologia. 38 (1); 1 - 8.
9. OU YOUNG, M. 1973. Some edible shellfish of Trinidad & Tobago. Nat. Env. Cons. Council. Research Paper no. 4/73, Mimeographed, 23 pages.