

Costa Rican Land and Freshwater  
Mollusks

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## COSTA RICAN LAND AND FRESHWATER MOLLUSKS.

BY HENRY A. PILSBRY.

The mollusks enumerated below were collected by Dr. Philip P. Calvert and Mrs. (Amelia S.) Calvert in the year of their residence in Costa Rica, from May, 1909, to May, 1910.<sup>1</sup> As their chief object was to study life histories and transformations of tropical dragonflies, other material was taken only when encountered in the course of this pursuit.

Much of their field work was done in districts where Prof. Paul Biolley<sup>2</sup> and H. Pittier had collected shells, yet some eight species new to Costa Rica were found, five of them new to science. This large proportion, in a total of 28 species taken, is evidence that our knowledge of the fauna is still very incomplete, though as von Martens remarks, it is "one of the best known within Central America."

Biolley has carefully recorded the elevation of localities where he collected shells, and some additions to this subject are now made; but on tabulating the data it appears that so many species are known from few localities, or but one, that conclusions as to zonal distribution would be too crude to have value. Some species have a wide vertical range; the apparent restriction of others in the same districts may probably be due to deficient collecting.

Costa Rica is known as farthest north for a number of characteristically South American genera, such as *Labyrinthus*, *Solaropsis* and *Marisa*. The Brazilian genus *Uncancylus*, now reported, is an interesting addition to this series.

<sup>1</sup> Calvert, Amelia S. and Philip P. A Year of Costa Rican Natural History New York. The Macmillan Company, 1917. Besides details as to the localities where collecting was done, this interesting book contains a map and a bibliography of Costa Rican natural history, and related subjects.

<sup>2</sup> Biolley, P. Moluscos terrestres y fluviales de la meseta central de Costa Rica. San José. Tipografía Nacional, 1897. Fifty-nine species are listed, with localities and comments.

<sup>3</sup> The material collected by Biolley and Pittier was determined and the new forms described by Professor E. von Martens in his fine volume on land and freshwater mollusks in the Biología Centrali-Americana, 1890-1901.



## CYCLOPHORIDÆ.

✓ *Aperostoma dysoni* (Pfr.)

Bonnefil Farm, Rio Surubres, 700 ft. Oct. 20, 1909.

## HELICINIDÆ

✓ *Helicina funcki* Angas.

Guapiles, 980 ft. Nov. 18, 1909.

*Helicina deppeana parvidens* n. subsp.

Juan Viñas, farther waterfall, 3300 ft.; also on the road to Rio Reventazón, 3000 ft. Type, No. 105286, A. N. S. P.

The shell resembles *H. deppeana* v. Martens, of eastern Mexico, except that there is only a very low, rather wide prominence at the junction of the columella and basal lip, with no appearance of a notch below it.

Alt. 10, diam. 13.3 mm.

## OLEACINIDÆ.

✓ *Streptostyla viridula* Angas.

Near Juan Viñas, on road to Rio Reventazón, between 2500 and 3000 ft. July 23, 1909.

## ZONITIDÆ.

✓ *Guppya calverti* n. sp. Fig. 1.

Stream near the railroad west of Juan Viñas, 3300 ft. Type No. 105266, A. N. S. P.

The shell is perforate, pyramidal, fragile, pale yellow. The apex is obtuse, outlines of the spire straight; periphery acutely keeled; base convex. The surface is smooth and glossy. The whorls are convex, the last very narrowly concave on both sides of the thin median keel, the concavity forming a narrow impressed margin above the last coil of the suture. The base is impressed around the narrow perforation. The aperture is rhombic, acutely angular at the termination of the peripheral keel. Columella is short, sub-vertical, the columellar margin reflexed in a triangular plate half covering the perforation.

Alt. 2.5, diam. 3 mm.; 5 whorls.

This species is very distinct by its acute peripheral keel. The only form of the region approaching it is the much larger *G. angasi* Tryon,<sup>3</sup> which differs in proportions.

<sup>3</sup> *Stenopus guildingi* Angas, Proc. Zool. Soc., 1879, p. 284, not of Bland, 1865. Renamed *Hyalinia (Stenopus) angasi* Tryon, Manual of Conchology (2) II, 1886, p. 182; and again, *Guppya angasi* v. Martens, Biologia Centrali-Americana, Moll., 1892, p. 120.



*Guppya costaricana* n. sp. Fig. 2.

Alajuela, 3200 ft. Type No. 105285, A. N. S. P.

The shell is minutely perforate, globosely conic, very fragile, light yellow; outlines of the spire are perceptibly concave, the periphery bluntly carinate. The surface is very glossy, marked with weak growth-wrinkles, and under the microscope a very fine, close, vertical striation and minute spiral lines almost equally close are seen on the second to fourth whorls, very weak on the fourth. The apex is rather acute. The whorls are strongly convex; base very convex, impressed around the oblique perforation. The aperture is broadly lunate. Columellar margin is dilated upward.

Alt. 5, diam. 6.1 mm.;  $5\frac{3}{4}$  whorls.

The pedal grooves are well-marked, rising at the tail. There is a wedge-shaped caudal pore, a short, blunt horn above it. The top of the tail is rounded. Sole narrow, tripartite.



Fig. 1. *Guppya calverti*. Fig. 2. *Guppya costaricana*. Fig. 3. *Guppya c. elation*.

This species is closely related to *G. trochulina* (Morel.), of which *Helix selenkai* Pfr. has been shown to be a synonym.<sup>4</sup> It differs by the slightly concave outlines of the spire, the greater convexity of the individual whorls, the higher first whorl and the microscopic sculpture, the vertical striae being much more distinct and the spirals closer. In topotypes of *selenkai* from Dr. Berendt, the original collector, the spirals are far more widely spaced (as noted by von Martens also for a paratype of *trochulina*), and they continue on the last whorl, while the vertical striation is so weak that it has not been noticed by any of the authors who have treated of *trochulina* or *selenkai*.

The Canal Zone species of this group, *Guppya browni* Pils., has the straight contour of *trochulina*, but it differs by the very distinct and beautiful microscopic sculpture.

<sup>4</sup> BIOLOGIA, p. 120.



✓ *Guppya costaricana elatior* n. subsp. Fig. 3.

Brook near the Rio Reventazón, Juan Viñas, at 2500 ft. Type No. 105276, A. N. S. P.

The shell is smaller than *costaricana* but with nearly the same number of whorls; more elevated, with the peripheral carina stronger; outlines of the spire more concave.

Alt. 4, diam. 4 mm.;  $5\frac{1}{2}$  whorls.

*Zonitoides hoffmanni* (v. Martens).

Bank of Rio Reventazón, Cachi. Mar. 10, 1910. 3300 ft.

#### ACHATINIDÆ.

✓ *Subulina octona* (Brug.)

Near town of Turrialba, 2200 ft.

*Opeas beckianum* (Pfr.)

Banana River, 30 ft. Nov. 10, 1910.

#### BULIMULIDÆ.

✓ *Oxystyla princeps* (Brod.)

Forest, Guacimo.

*Oxystyla ferussaci tricineta* (v. Martens).

Bonnefil Farm, Rio Surubres, 700 ft.

*Drymaeus sulphureus* (Pfr.)

Near Guapiles, 980 ft.; Bonnefil Farm, Rio Surubres, 700 ft., on *Heliconia*, Oct. 16-21, 1909; Reventazón valley near Juan Viñas, 2500 ft., in a Bromeliad. Also on the road to Rio Reventazón at 3000 ft.

Calvert notes that the living animal, from the last locality, has the foot greenish-blue with whitish edges, the tentacles greenish-brown. Those from the first three localities have the rather short form of var. *citronellus* (Angas); the fourth is a longer shell.

*Drymaeus costaricensis* (Pfr.)

Juan Viñas, on a Bromeliad; also road to Rio Reventazón, 2500-3000 ft.; Cachi, 3450 ft.

A second lot from Cachi, on *Solanum*, consists partly of more slender shells, in contour resembling *D. attenuatus*, but associated with others of stouter contour, all having the coloration of *costaricensis*.

*Drymaeus attenuatus pittieri* (v. Martens).

Road from Juan Viñas to Rio Reventazón, 3000 ft. One specimen with typical markings. There is another from Juan Viñas,



2500 ft. without dark markings, which seems to be an albino mutation of *pittieri*, parallel to the mutation *concolor* of eastern Mexico rather than directly referable to that form.<sup>5</sup> Von Martens has noted that in the State of Vera Cruz "the white variety [mut. *concolor*] has been found with typically colored specimens" of *D. attenuatus*.

*Drymaeus josephus* (Angas).

A shell of the uniform white mutation was taken at Guapiles by D. E. Harrower.

#### SUCCINEIDÆ.

*Succinea recisa* Morelet.

Juan Viñas, nearer waterfall, 3300 ft.

*Succinea guatemalensis* Morelet.

Rio Reventazón, foot of waterfall near bridge, below Juan Viñas; also at 2500 ft. on petiole of "Hoja de Pato";<sup>6</sup> near Cachi, 3450 ft.

#### PHYSIDÆ.

*Aplexa fuliginea* (Morelet).

S. Isidro del Tejar, 4500 ft.

*Aplexa spiculata guatemalensis* Fischer & Crosse.

Ditch at the south end of Cartago and other places about the city, 4750 ft.; Rio Zapote at confluence with Rio Reventazón, Cachi, 3450 ft.

#### PLANORBIDÆ.

*Planorbis tenuis* Phil.

Rio de la Cañas north of Santa Cruz, Guanacaste, abundant.<sup>7</sup> 150 ft.

*Planorbis caribaeus* Orb.

East of Cartago and four miles southwest of the same place; S. Isidro del Tejar, 4500 ft.

*Planorbis hondurasensis* Clessin.

Ditch along the road from San José to La Verbena, 3800 ft.

<sup>5</sup> Cf. Billely, Moll. terr. y fluv. de la meseta central de Costa Rica, 1897, p. 13.

<sup>6</sup> "An Aroid plant with gigantic arrow- or heart-shaped leaves and strong, partly recumbent stems three to six inches thick." A Year of Costa Rican Natural History, pp. 167, 334.

<sup>7</sup> A Year of Costa Rican Natural History, p. 469.



## ANCYLIDÆ.

*Uncancylus calverti* n. sp. Fig. 4.

Brook near Rio Reventazón, Juan Viñas, 2500 ft., Apr. 28, 1910.  
Type and paratypes, No. 105277, A. N. S. P.

The shell is oval, moderately elevated, the altitude half the width, the apex acute, recurved or hooked, at the posterior fourth of the length and about half way between the median line and the right margin. The anterior and left slopes are convex above, nearly straight near the margins; posterior strongly concave, the right slope much less so. Isabella colored, rather opaque, not glossy. Sculpture of many raised striae radiating from the summit, a few in the middle, anteriorly, coarse, the rest fine and narrow; on the sides and behind they are scarcely to be seen except by transmitted light. The interior has a translucent-whitish layer.

Length 7.4, width 4.6, alt. 2.3 mm.

*Ancylus concentricus* Orb., which appears to be nearly related, is less symmetrical in contour, with the apex further towards the right, and with about the same length it is more elevated.

*Ancylus radiatus* Guilding,<sup>8</sup> which is known to me only from Guilding's account, resembles *A. calverti* in sculpture, but it is narrower relative to the length, if Guilding's figures are accurate; moreover, the apical part is not abruptly narrowed near the tip, as it is in *U. calverti*. Practically all authors who have considered the question agree in considering *A. excentricus* Morel. identical with *A. radiatus*. The former is a well known species, quite distinct from *U. calverti*.

The writer is indebted to Dr. Bryant Walker for reviewing the determination of this species, and indicating differences from *A. radiatus*. He also called attention to an error in H. & A. Adams, "Genera of Recent Mollusca", II, p. 265, pl. 84, fig. 5, said to represent *A. radiatus*, but really copied from one of Guilding's figures of *A. irroratus*. This mistake has been perpetuated in the works of Bourguignat and Clessin.

The genus *Uncancylus* is new to North America. The known species are chiefly Brazilian. It was proposed for South American Anchyli with the spire strongly hooked towards the right side, the shell therefore sinistral. Type *Ancylus barilensis* Moric.<sup>9</sup>

<sup>8</sup> *The Zoological Journal*, III, 1828, p. 536, Suppl. pl. 26, figs. 7, 8, 9. On dead leaves in ditches, St. Vincent.

<sup>9</sup> *Proc. A. N. S. Phila.*, 1913, p. 671.



This species is closely related in shell characters to the type of the genus *Uncancylus*. Since the teeth are unknown in that and other groups of South American Ancyliidae, and the system of the family, as developed by Dr. Bryant Walker, is largely based upon the modes of specialization of the teeth, its dentition becomes of interest.

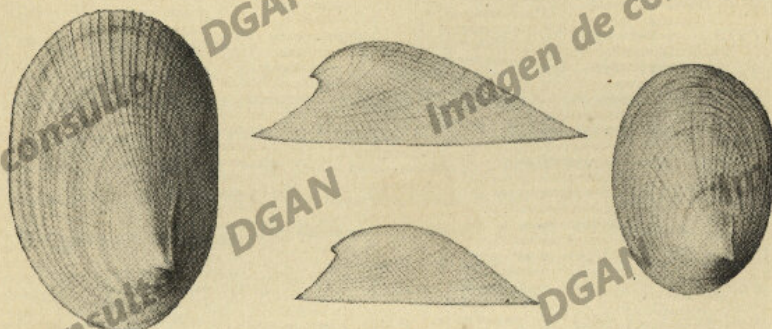


Fig. 4. Left and upper figures, *U. calverti*. Right and lower figures, *U. ameliae*.

In *U. calverti* there are 21-1-21 teeth in nearly straight transverse rows. The central tooth is bicuspid, the cusps very short, deeply separated. The laterals have three major cusps, the entocone and mesocone more or less united; between them and the ectocone there is a minute accessory cusp. Outside of the ectocone there is a minute cusp in the inner laterals, then two, and in the middle teeth of the lateral series, four or five little cusps. In some teeth a minute cusp appears between mesocone and entocone, and in the median and outer laterals another arises on the inner side of the entocone. The laterals are rather widely spaced, more so towards the edges of the radula. The basal plates are shorter than the cusps and very indistinct.

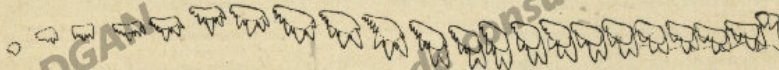


Fig. 5.—*Uncancylus calverti*, half row of teeth.

The jaw is long, slender, of wide, very short plates and with no lateral processes.

On comparison with the series of illustrations of Ancylid teeth prepared by Walker it is obvious that *Uncancylus* is closely related to the African genus *Burnupia* Walker. Except for the greater



development of small accessory cusps in the American species there is no material difference. No North American genus has similar teeth.

*Uncancylus ameliae* n. sp. Fig. 4, left and lower figures.

Rio Zapote, at confluence with the Rio Reventazón, 3450 ft. March 4, 1910. Type and paratypes, No. 105260, A. N. S. P.

With a general resemblance to *U. calverti*, this species is smaller, relatively wider and higher. The periphery is elliptical, bilaterally symmetrical. Anterior and left slopes are convex, right slope concave and very steep, posterior slope somewhat concave; the apex recurved, hook-like, and very close to the right side, at the posterior sixth of the length. Isabella colored, without gloss. Sculpture of fine, thread-like radial striae, which are a little larger and more widely spaced in front.

Length 4.8, width 3.4, alt. 1.6 mm.

#### AMPULLARIIDÆ.

*Ampullaria flagellata* Say.

Rio del Canas north of Santa Cruz, Guanacaste, 150 ft.

#### AMNICOLIDÆ.

*Amnicola tryoni* Pils.

Brook near Rio Reventazón. Juan Viñas, 2500 ft. Four miles southwest of Cartago, 4500 ft. A very young specimen, probably of this species, was found attached to a dragonfly exuvia (*Palaemnema* sp.) at the nearer waterfall, Juan Viñas, 3300 ft. This species was originally described from Javali, in the Chontales district, Nicaragua, at 1750 ft.

#### UNIONIDÆ.

*Nephronaias tempisqueensis* n. sp. Fig. 6.

Rio Tempisque, Filadelfia, Jan. 18, 1910, 50 ft. Type and paratypes (2 whole specimens and 4 valves), No. 105225, A. N. S. P.

The shell is oblong, the length slightly exceeding twice the alt., beaks at about the anterior third. The dorsal and ventral margins are but weakly convex, the anterior end rounded, posterior end obliquely subtruncate. The beaks are eroded, but little projecting. Surface somewhat glossy, under the lens showing very fine, hair-like and somewhat waved threads in the direction of growth lines, more prominent on the posterior end. Color deep colonial buff with numerous green rays. Interior white. The cardinal teeth are compressed, in the left valve subequal, strongly crenulated, the



single cardinal of the right valve high and oblique. The lateral teeth are smooth and not very long.

Length 28.3, alt. 15, diam. 10 mm.

" 30.7, " 16.3, " 9 "

This species stands near *N. macneilii* (Lea), but differs as follows: it is not biangular behind, is relatively longer, the striation less crowded. *N. dysoni* (Lea) is also broader with the cardinal teeth less compressed.



Fig. 6.—*Nephronaias tempisquensis*.

No species of the family has hitherto been reported from the Rio Tempisque, or from any Costa Rican stream draining into the Pacific.

#### MUTELIDÆ.

*Anodontites luteolus* (Lea).

Rio Tempisque, Filadelfia, Jan. 18, 1910, 50 ft. Lea's type of this species was said to be from the Isthmus of Darien, but his figures were drawn from a larger specimen from Lake Nicaragua (Gabb), No. 41833, A. N. S. P. In the single specimen from the Rio Tempisque the hinge line is straight instead of somewhat curved as in the type and that from Lake Nicaragua.