

ON *POMACEA SORDIDA* (SWAINSON, 1823) (PROSOBRANCHIA,
AMPULLARIIDAE)

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A description of Pomacea sordida (Swainson, 1823) collected in Caxias and Nova Iguaçu, state of Rio de Janeiro, is presented.

The shell is globose, heavy, with greenish or horn-colored periostracum and dark spiral bands; apex subelevated, 4-5 moderately shouldered whorls, increasing rather rapidly and separated by deep suture. Aperture large, moderately round, yellowish or violaceous; lip thick and sometimes dark brown; umbilicus large and deep; operculum corneous and heavy, entirely closing the aperture. Ratios: shell width/shell length = 0.81-0.91 (mean 0.86); aperture length/shell length = 0.66-0.75 (mean 0.70).

Testis, spermiduct and penis pouch as in Pomacea lineata (Spix, 1827). Seminal vesicle whitish and bean-shaped. Prostate cylindrical and narrow, cream in color as the testis. Penis whiplike with a closed circular spermiduct. Penial sheath elongated and tapered, with its distal tip turned to the right; outer basal gland situated on the left; inner median gland rounded; apical gland elongated and wrinkled. Ovary composed of branched whitish tubules lying superficially on the digestive gland; oviduct and seminal receptacle as in P. lineata; albumen gland yellowish - orange. Vestigial male copulatory apparatus (penis and its sheath) present in all females examined.

, Key words: Mollusca - Ampullariidae - *Pomacea sordida* - *Pomacea lineata* - morphology

Pomacea sordida was described by Swainson (1823) as follows (without type-locality): Rio de Janeiro, au Brésil, où elle est assez commune".

Ampullaria sordida: A. Testâ globosâ ferrugineâ; lineis transversis sub-carinatis instructâ, aperture margine tenui; umbilico magno; operculo corneo?

Orbigny (1837) described this species as *Ampullaria intermedia* Férussac in the following terms (without figure):

A. Testa ventricosâ, crassâ, laevigatâ, epidermide brunneo; spirâ elevatâ, erosâ, anfractibus quinque, rotundatis; aperturâ flavâ, subrotundâ; labro crasso, castaneo.

This author also gave the following additional information ". . . Elle est remarquable, d'ailleurs, par sa bouche jaune et par son bord comme brûlé. Nous l'avons rencontrée dans les marais des environs de Saint-Cristophe, près de

Philippi (1851) considered *A. intermedia* as a synonym of *P. sordida* and cited Rio de Janeiro as type-locality. He argued that he never saw a description of *A. intermedia* in Férussac's paper.

Lopes (1955) described the shell, the radula, the albumen gland and the egg cluster and the male copulatory apparatus of *P. sordida* from the state of Rio de Janeiro (foot of Serra de Petrópolis, Itaguaí and Rio de Janeiro city).

In this paper a description of *P. sordida* is presented, based on material collected by the author at Caxias and Nova Iguaçu, state of Rio de Janeiro. These cities are situated nearby Rio de Janeiro city. The specimens were collected from ditches and streams in the periphery of the aforesaid cities because they were not found at São Cristovão, a district of Rio de Janeiro city mentioned by Orbigny (1837). São Cristovão is nowadays an urbanized area where

favorable natural snail habitats are restricted to the Joana river, which crosses the grounds of Museu Nacional and where only specimens similar to *Pomacea lineata* (Spix, 1827) were found.

Pomacea sordida was also found in the localities of Rio das Flores, Rio das Ostras, São Gonçalo, Saquarema and Valença (Rio de Janeiro state).

MATERIAL AND METHODS

Eighty-four snails (64 from Caxias and 20 from Nova Iguaçu) were studied.

Sixteen living specimens from Caxias and 9 from Nova Iguaçu were relaxed in a 0.1% solution of nembutal for 16 hr, drawn from the shell and placed in slightly modified Railliet-Henry's fixative (distilled water 930 ml, sodium chloride 6 g, formalin 50 ml, acetic acid 20 ml). After 48 hr they were dissected under the stereomicroscope.

The radulae were separated from the buccal mass by digestion, for about 2 hr, in a vial with 10% NaOH immersed in gently boiling water.

DESCRIPTION

The shell (Fig. 1) is globose, heavy, with greenish or horn-colored periostracum and dark spiral bands; apex subelevated, 4-5 moderately shouldered whorls, increasing rather rapidly and separated by deep suture. Aperture large, moderately round, yellowish or violaceous; lip thick and sometimes dark brown; umbilicus large and deep; operculum corneous and heavy, entirely closing the aperture. Ratios: shell width/shell length = 0.81-0.91 (mean 0.86); aperture length/shell length = 0.66-0.75 (mean 0.70).

Some specimens have a thick ferruginous layer on the periostracum, some others are wholly dark brown or black, so as to obscure the spiral bands. There are also more elongated shells like that figured by Lopes (1955).

Since in the following description comparison is made with *P. lineata*, the reader is referred to my previous paper on that species (Thiengo, 1987).

The shell of *P. sordida* has shouldered whorls, a large umbilicus and is heavier than

that of *P. lineata*. The operculum is remarkably heavier, entirely closing the aperture.

The jaws and the radula have the same appearance as those of *P. lineata* and other known congeneric species (Figs 2, 3).

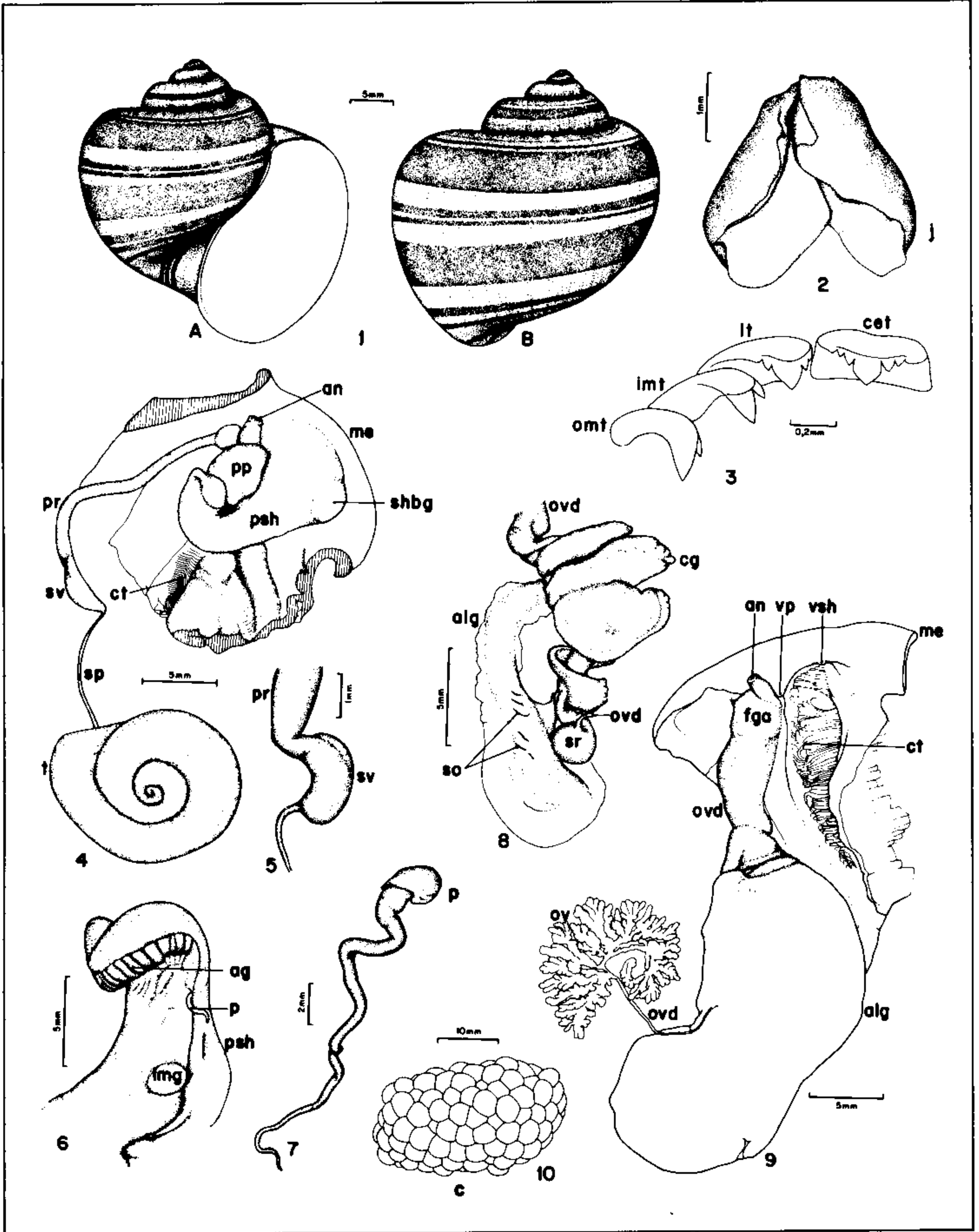
The animal is longisiphonate. The lung and the ctenidium look like those of *P. lineata*.

The testis (Fig. 4) is a cream-colored mass and lies in the first three whorls of the spire. It is also similar to that of *P. lineata*. The spermiduct is very narrow and runs toward the base of the spire, turning to the right near the pericardium, before opening into the seminal vesicle. The latter is whitish and bean-shaped (Fig. 5). The cream-colored prostate is elongated, cylindrical and has a slitlike lumen. It is longer (about 1/3) and narrower than that of *P. lineata*.

The penis (Fig. 7) is whiplike as in *P. lineata*, but it is shorter and thicker (23 mm in length in a 38 mm long specimen). Its duct is circular and closed. When not in use the penis is coiled and housed in an entirely whitish thin-walled pouch, differing from that of *P. lineata* which is pink at its proximal end. There is a flange of tissue in the seminal groove that probably aids in the transference of seminal fluid from prostate to penis.

The well developed penial sheath (Fig. 6) rises to the left of the anus, and is elongated and tapered, with its distal end turned to the right. It is composed of two margins that juxtapose thus forming a median longitudinal channel. The left margin overlaps slightly the right one until the distal tip of the sheath. There are three glands: an apical, elongated and wrinkled; an inner median one usually rounded and an outer gland embedded in the tissue. This latter takes about 1/3 of the left basal portion of the sheath, has a slitlike opening, and is whitish, differing from that of *P. lineata* which is pink.

The ovary (Fig. 9) lies in the same location as the testis and its whitish branched tubules are easily distinguished from the green digestive gland. It is arborescent in shape as in *P. lineata* but its tubules are more branched and swollen. The oviduct looks like that of *P. lineata*. The seminal receptacle is U-shaped and thick-walled, almost completely enclosed by the albumen gland. Its proximal end is rounded and tapers distally (Fig. 8).



Pomacea sordida – Fig. 1: shell of specimen from Caxias (A = ventral view, B = dorsal view). Fig. 2: jaws, ventral view. Fig. 3: radula. Fig. 4: male reproductive system. Fig. 5: seminal vesicle and proximal end of prostate. Fig. 6: inner surface of penial sheath. Fig. 7: penis. Fig. 8: capsule gland. Fig. 9: female reproductive system. Fig. 10: egg cluster.

Abbreviations:

ag: apical gland – alg: albumen gland – an: anus – c: egg cluster – cet: central tooth – cg: capsule gland – ct: ctenidium – e: egg – fga: female genital aperture – img: inner median gland – imt: inner marginal tooth – j: jaws – lt: lateral tooth – me: mantle edge – omt: outer marginal tooth – ov: ovary – ovd: oviduct – p: penis – pp: penis pouch – pr: prostate – psh: penial sheath – so: slitlike openings – sp: spermiduct – sr: seminal receptacle – sv: seminal vesicle – t: testis – vp: vestigial penis – vsh: vestigial penial sheath.

TABLE
Differences between *Pomacea sordida* and *P. lineata*

	<i>P. sordida</i>	<i>P. lineata</i>
Whorls	shouldered	not shouldered
Umbilicus	wide, large	narrow, small
Operculum	heavy; closes the aperture entirely	thin; does not close the aperture entirely
Seminal vesicle	bean-shaped	slightly rounded
Prostate	elongated and narrow	short and thick
Penis	whiplike, shorter and thicker than <i>P. lineata</i>	whiplike, longer and thinner than <i>P. sordida</i>
Penial sheath	distal tip turned to the right whitish outer gland occupying 1/3 of the base apical gland elongated and wrinkled left margin overlapping the right one until the tip	distal tip straight pink outer gland occupying 2/3 of the base apical gland rounded left margin overlapping the right one until the middle
Ovary	swollen multibranched tubules	less numerous branched tubules
Albumen gland	yellowish-orange	pink
egg	prismatic and yellowish orange	spheric and pink

The albumen gland (Fig. 8) is large and yellowish-orange. The capsule gland is entirely enclosed by it, beginning at the receptacle and forming a spiral channel before it emerges from the distal end of the albumen gland. The main duct of the albumen gland is in the adjacent glandular mass. It is very narrow with some slitlike openings for albumen exit.

The vestigial male copulatory apparatus (penis and its sheath) was present in all females examined (Fig. 9).

The yellowish-orange prismatic calcareous-shelled eggs are roughly 3 mm in width and are laid in clusters above the water level (Fig. 10).

DISCUSSION

The maintenance of *P. sordida* under laboratory conditions is more difficult than that of *P. lineata*, because it does not feed well and in spite of mating and spawning few eggs hatch. On the contrary, *P. lineata* feeds voraciously fresh lettuce, mates well and almost all eggs hatch. According to these data and supported by the places where specimens were collected, it is probably that *P. sordida* is being displaced to the periphery owing to competition with species less vulnerable to environmental changes resulting from urbanism.

Pomacea sordida has a characteristic shell which facilitates its discrimination from *P. lineata*. However to identify it with greatest accuracy it is necessary to dissect the animal.

The shells of the specimens here studied are very similar to those figured by Lopes (1955), Philippi (1851), Reeve (1856) and Swainson (1823).

The albumen gland, the egg cluster and the male copulatory apparatus are similar to those described by Lopes (1955).

The differences observed between *P. sordida* and *P. lineata* are shown in the table.

Significant morphological differences between these species are mainly in the male reproductive system. Scott (1957) reported the great morphological similarity in the Ampullariidae and pointed out the male copulatory apparatus for generic discrimination. Keawjam (1987), in a morphological study of *Pila* from Thailand, also observed that only the male reproductive system was different in the various species studied by her.

RESUMO

Sobre *Pomacea sordida* (Swainson, 1823) (Prosobranchia, Ampullariidae) – Neste trabalho é apresentada a descrição de *Pomacea sordida* (Swainson, 1823), coletada em Caxias e Nova Iguaçu, Estado do Rio de Janeiro.

Concha globosa, espessa, com perióstraco esverdeado ou castanho e com faixas espirais escuras; ápice pouco elevado, 4-5 giros moderadamente arredondados, crescendo relativamente rápido, separados por suturas profundas. Aber-

tura grande, moderadamente arredondada, amarelada ou violácea; lábio espesso e algumas vezes marrom escuro; umbílico grande e profundo; opérculo córneo e espesso, fechando completamente a abertura. Razões: largura da concha/comprimento da concha = 0.81-0.91 (média 0.86); comprimento da abertura/comprimento da concha = 0.66-0.75 (média 0.70).

Testículo, espermiduto e bolsa do pênis como em *Pomacea lineata* (Spix, 1827). Vesícula seminal esbranquiçada e em forma de feijão. Próstata cilíndrica e estreita, de cor creme como o testículo. Pênis em forma de chicote, com espermiduto circular e fechado. Bainha do pênis alongada tendo sua largura diminuída da base para a extremidade, sendo esta última voltada para a direita; glândula basal externa situada à esquerda; glândula mediana interna arredondada; glândula apical alongada e com sulcos. Ovário composto de túbulos brancos ramificados dispostos superficialmente sobre a glândula digestiva verde. Oviduto e receptáculo seminal como em *P. lineata*; glândula de albume de cor alaranjada; ovos prismáticos e calcáreos de cor alaranjada. Aparelho copulador masculino vestigial (pênis e sua bainha) presente em todas as fêmeas examinadas.

Palavras-chave: Mollusca – Ampullariidae – *Pomacea sordida* – *Pomacea lineata* – morfologia

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REFERENCES

- KEAWJAM, R. S., 1987. The apple snails of Thailand: aspects of comparative anatomy. *Malacological Review*, 20: 69-89.
- LOPES, H. S., 1955. Sobre duas espécies do gênero *Pomacea* Perry, com um estudo da genitália em ambos os sexos (Mesogastropoda, Architaenioglossa, Mollusca). *Rev. Brasil. Biol.*, 15: 202-210.
- ORBIGNY, A., 1837. *Voyage dans l'Amérique méridionale*. Mollusques, 5. P. Bertrand, Paris.
- PHILIPPI, R. A., 1851. Die Gattung *Ampullaria*, p. 1-74. In Martini & Chemnitz, *Systematisches Conchylien-Cabinet*. Bauer & Raspe, Nürnberg.
- REEVE, L., 1856. Monograph of the genus *Ampullaria*. *Conch. Icon.*, 10.
- SCOTT, M. I. H., 1957. Estudio morfológico y taxonomico de los ampullaridos de la Republica Argentina. *Rev. Mus. Argentino Cienc. Nat. "Bernardino Rivadavia"*, 3: 233-333.
- SPIX, J. B. In Wagner, J. A., 1827. *Testacea fluviatilia quae in itinere per Brasiliam . . .* Monachii, 42 p.
- SWAINSON, W., 1820-1833. *Zoological Illustrations . . .* ser. I, 3.
- THIENGO, S. C., 1987. Observations on the morphology of *Pomacea lineata* (Spix, 1827) (Mollusca, Ampullariidae). *Mem. Inst. Oswaldo Cruz*, 82: 563-570.