

ON THE MORPHOLOGY OF *LAEVAPEX VAZI* N. SP. FROM BRAZIL
(MOLLUSCA: PULMONATA: BASOMMATOPHARA: ANCYLIDAE)

SONIA BARBOSA DOS SANTOS

Universidade do Estado do Rio de Janeiro, Instituto de Biologia, Departamento de Biologia Animal e Vegetal,
Rua São Francisco Xavier, 524, 20550 Rio de Janeiro, RJ, Brasil

A description of Laevapex vazi n. sp. based on 8 specimens collected in Ourinhos, state of São Paulo, is presented.

Shell thin, diaphanous, with a light brown periostracum and moderately elliptical opening. Apex not pointed, smooth, situated on the right posterior region of the shell, inclined to the right often reaching the edge of the shell or extending beyond it. Concentric lines clearly visible; radial striation not visible or when perceptible very thin, here and there. Ratios: shell width/shell length = 0,60 – 0,67 (mean = 0,63); shell height/shell length = 0,50 – 0,61 (mean = 0,55); shell height/shell width = 0,33 – 0,40 (mean = 0,35).

Body of normal ancyloid type; mantle pigmentation concentrated on the left side; three muscles are seen: a round posterior one on the left side, an elliptical muscle on the right anterior side and an almost almond-shaped one on the left anterior side. Tentacles with a medium core of black pigment. Pseudobranch two-lobed and folded, the dorsal lobe smaller than the ventral one.

Ovotestis with 20 unbranched diverticula, around a short collecting canal. Ovispermiduct with an enlargement with several round outpocketings constituting the seminal vesicle. Carrefour as a round sac. Albumen gland almost cylindrical with several acinous diverticula. Elongated nidamental gland continuous with the glandular wall of the uterus; uterus flattened and thin-walled. Spermathecal body almost rounded. Pear-shaped prostate without diverticula. Penial complex without flagellum but with well-developed ultra-penis and penis.

Jaw horseshoe shaped. Radular formula 20.1.20; raquidian tooth quadricuspid, asymmetrical.

The genus Laevapex Walker, 1903 is recorded for the first time in Brazil. It is easily distinguished from South American Gundlachia Pfeiffer, 1849 by its penial complex.

Laevapex vazi is dedicated to Dr. Jorge Faria Vaz, from SUCEN-SP, who have been sent to me the specimens.

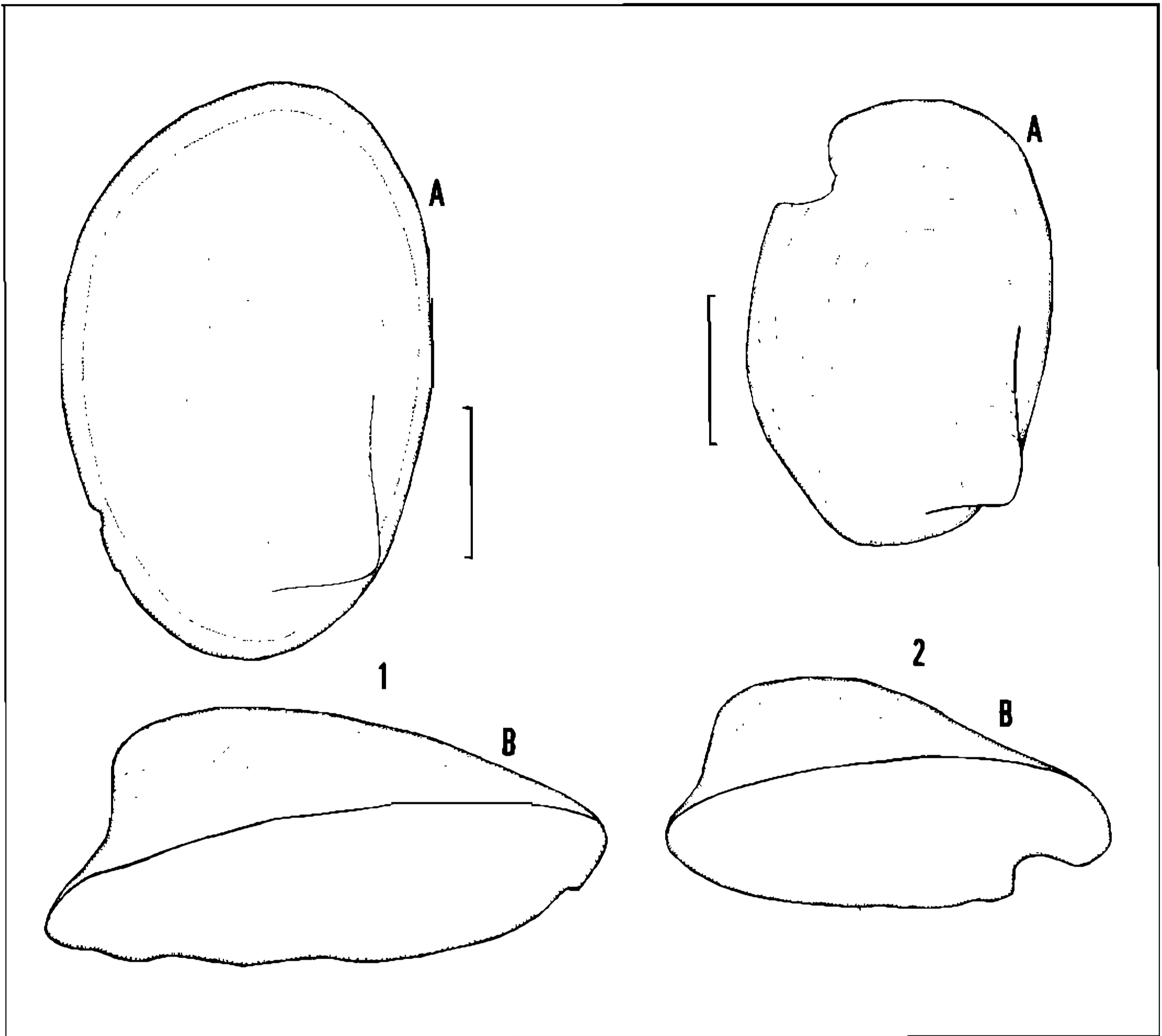
Key words: Mollusca – Ancyliidae – *Laevapex vazi* – morphology

The ancyliids are freshwater snails distributed throughout the world. They are represented in Brazil by the outspreading genus *Gundlachia* Pfeiffer, 1849 with several species cited. In South America, the anatomical knowledge of the ancyliids is still scarce in spite of its abundance and wide distribution, probably because of its small size. The literature deals mainly with conchological data, leading to species taxa based only upon shell characteristics. Anatomical descriptions were presented by Scott (1953), Hubendick (1964), Marcus & Marcus (1962) and by Fernández (1981).

According to Basch (1959, 1963), Hubendick (1964) and Burch & Tottenham (1980), the genus *Laevapex* is restricted to North American western of the Great Plains. There are only two known species: *Laevapex fuscus* (Adams, 1841) and *Laevapex diaphanus* (Haldeman, 1841) but true geographical distribution of these species is still not well established.

MATERIAL AND METHODS

The specimens were collected by Lucia Cargom in 1973 at a small dam in Ourinhos,



Laevapex vazi n. sp. – Fig. 1: shell of highest specimen from Ourinhos (A = dorsal view, B = lateral view). Fig. 2: the same, of smallest specimen. Bar = 1 mm.

state of São Paulo. They were sent to me in 1985, in alcohol, by Dr Jorge Faria Vaz, from SUCEN (Superintendência de Controle de Endemias) for whom the new specific name is dedicated.

From the eight specimens, three are empty shells. The others, the animals were very contracted but not impossible to dissect.

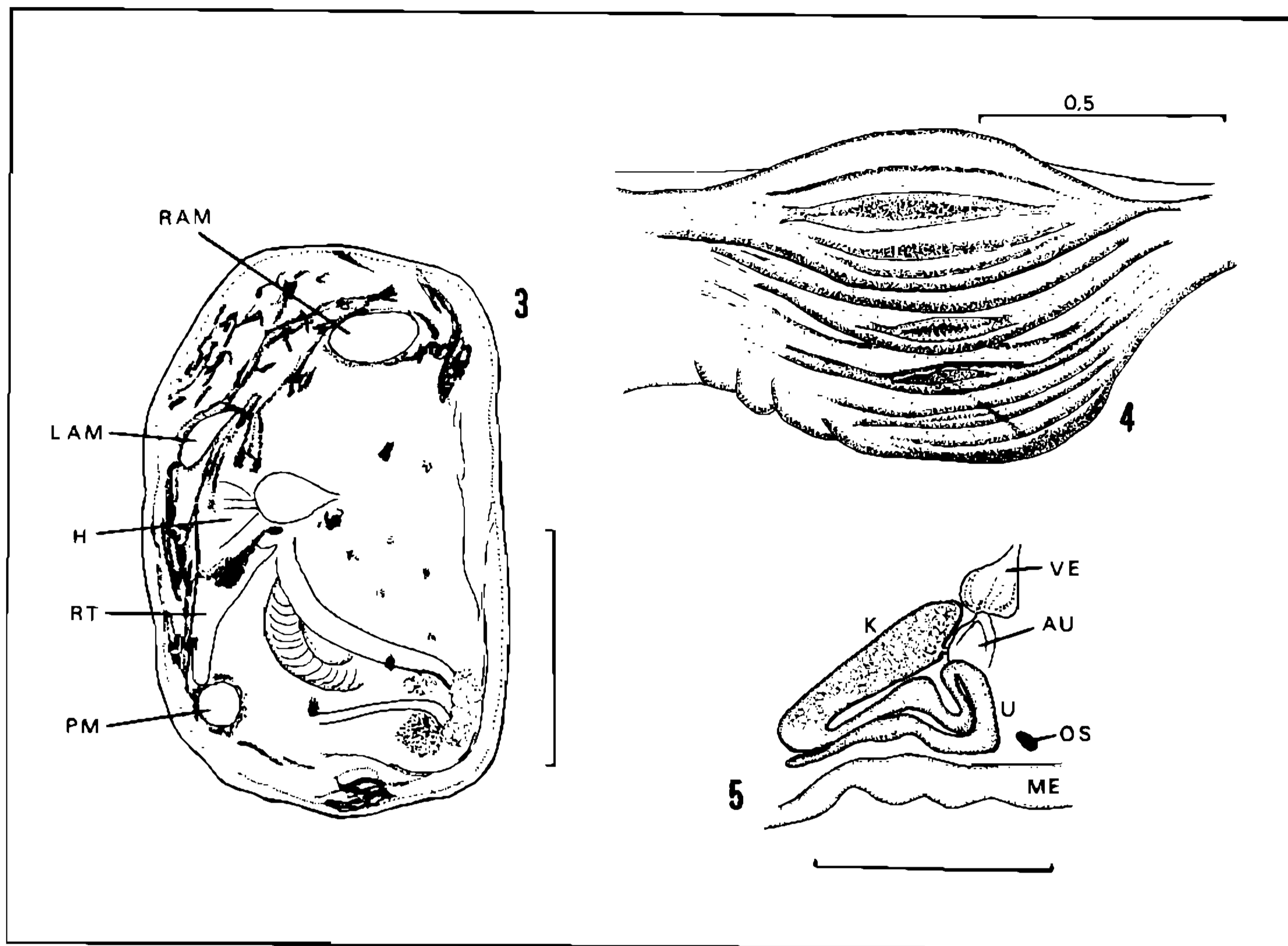
Jaws and radulae from two specimens were removed by means of 5% solution of KOH kept within a 40 °C sterilizer for one day. They were mounted unstained as glycerine mounts. The penial complex was placed into a drop of glycerine and the prepuce was torn away from it. Then, the penial sheath was examined under a cover slip, with a high powered microscope.

All the specimens studied are included in the mollusk collection of the Laboratory of Malacology of UERJ (Universidade do Estado do Rio de Janeiro).

DESCRIPTION

Laevapex vazi n. sp.

Types – Holotype No 5 C. Mol. IB-UERJ, Ourinhos, SP, L. Camargo col. 1973; J. F. Vaz leg. 1985; 7 paratypes No 6 C. Mol. IB-UERJ, with the same data. Depository: Setor de Zoologia, Instituto de Biologia Universidade do Estado do Rio de Janeiro. Type-locality: a small dam in the city of Ourinhos, state of São Paulo, Brazil.



Laevapex vazi n. sp. — Fig. 3: preserved specimen draw from shell, dorsal view. Fig. 4: pseudobranch. Fig. 5: excretory system. au — auricle; dl — dorsal lobe; h — heart; k — kidney; lam — left anterior muscle; me — mantle edge; os — osphradium; pm — posterior muscle; ram — right anterior muscle; rt — renal tube; u — ureter; ve — ventricle; vl — ventral lobe. Bar = 1 mm.

The shell size in the studied specimens ranges from 2,95 mm length x 1,85 mm width x 1,1 mm height to 3,9 mm length x 2,6 mm width x 1,3 mm height, the largest one and the smallest one being shown in Figs. 1, 2. It is thin, the periostracum basically light brown in color, showing various individual shades of color owing to impregnation with environmental material. The shell has a fine concentric growth sculpture and an extremely fine radial sculpture that can be seen in one specimen.

The apex is rounded, smooth, situated in the posterior right side of the shell. It is inclined to right, reaching the edge of the shell or extending beyond it. Ratios: Shell width/shell length = 0,60 — 0,67 (mean = 0,63); shell height/shell length = 0,50 — 0,61 (mean = 0,55); shell height/shell width = 0,33 — 0,40 (mean = 0,35).

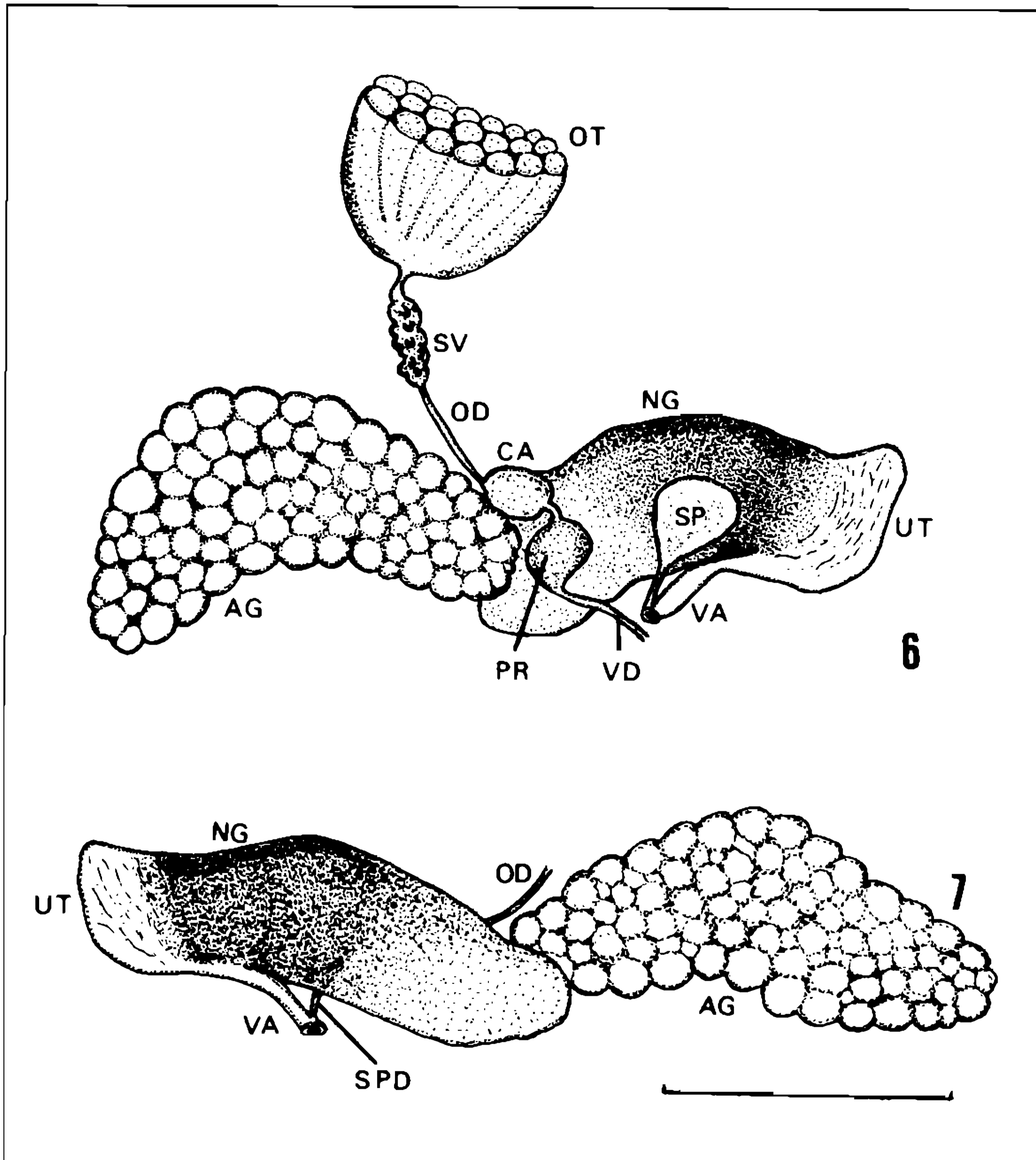
The body has the normal ancyloid type (Fig. 3). The mantle pigmentation is concentrated on

the left side. The almost cylindrical tentacles have an axial core of black pigment. Three muscles can be seen: the rounded posterior and two anterior ones. The elliptical right anterior muscle is larger than the left which is almond-shaped (Fig. 3).

The pseudobranch (Fig. 4) is well-developed and two lobed. The ventral lobe is very folded and larger than the dorsal one.

The left side of the mantle covers the pulmonary cavity which is wide, reaching the midline of the animal. The excretory system (Fig. 5) has the typical serpentine shape of the ancyloid pattern, being a continuous tube with 4 flexures.

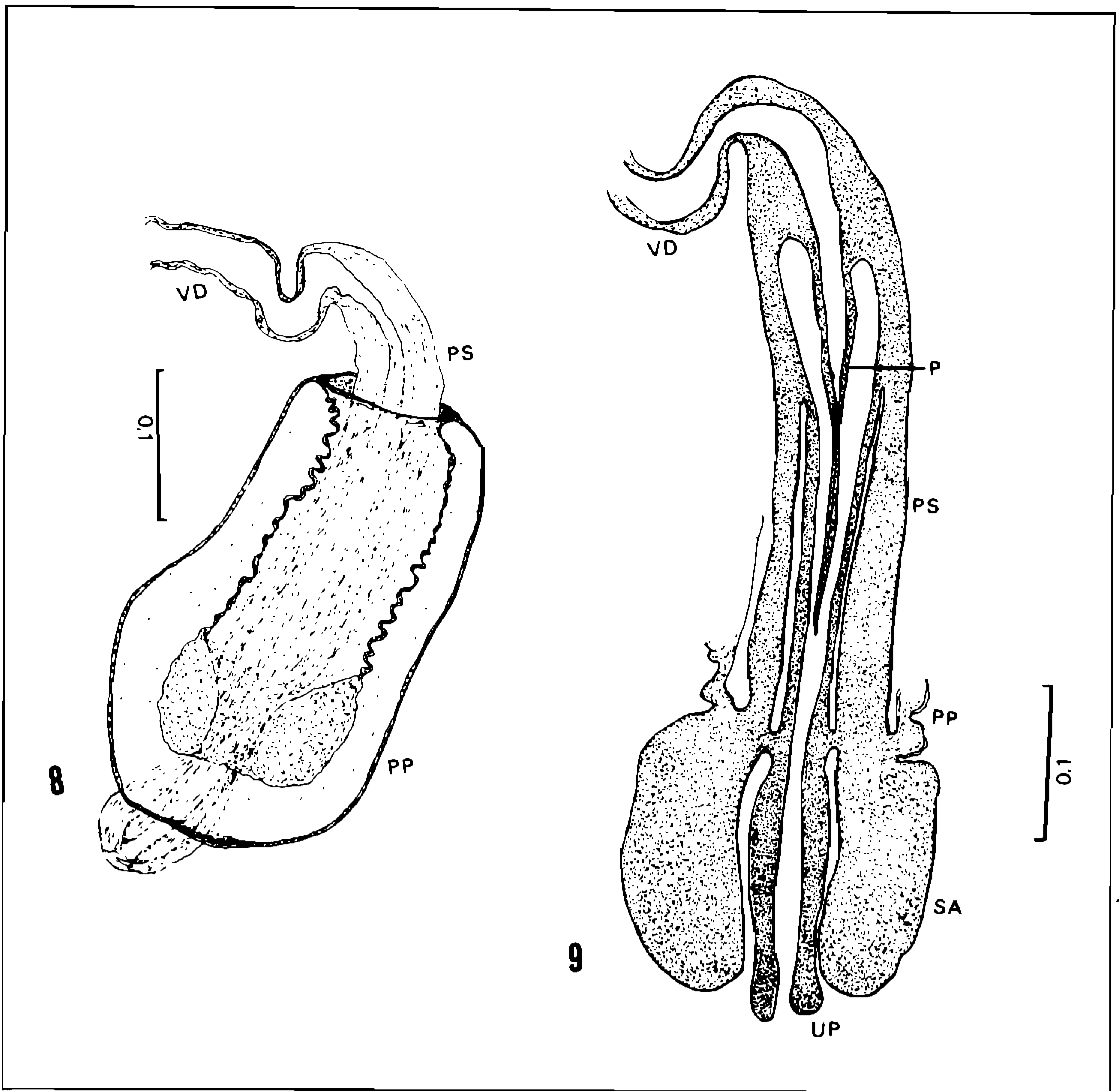
The genital system is shown in Figs. 6, 7. The ovotestis is embedded in the digestive gland, being its apex situated underneath the caudal-most intestinal loop. It consists of 20 unbranched tubular diverticula around a funnellike



Laevapex vazi n. sp. — Fig. 6: genital system, right side. Fig. 7: the same, left side. ag — albumen gland; ca — carrefour; ng — nidamental gland; od — ovispermiduct; ot — ovotestis; pr — prostate; sp — spermatheca; spd — spermathecal duct; sv — seminal vesicle; ut — uterus; va — vagina; vd — vas deferens. Bar = 1 mm.

thin-walled collecting canal which continues into the ovispermiduct. As soon as it arises from the ovotestis it has an enlargement with several irregular outpocketings which form the seminal vesicle. The distal segment of the ovispermiduct discharges eggs and sperm into the carrefour. The latter is a rounded structure situated between the albumen gland and the nidamental gland.

The albumen gland is a large, almost cylindrical organ whose duct empties into the posterior wall of the carrefour. The anterior portion of this gland lies against the right floor of the visceral cavity and the posterior portion is twisted to low and to left, then lying next to the inner face of the posterior muscle. This gland is composed by several closely appressed acinous diverticula.



Laevapex vazi n. sp. – Fig. 8: penial complex. Fig. 9: the same, of another specimen, the prepuce torn away. p – penis; pp – prepuce; ps – penial sheath; sa – sarcobelum; up – ultrapenis; vd – vas deferens. Bar = 0,1 mm.

The nidamental gland is a large yellowish organ in the left side. It appears to be a dorsal prolongation of the glandular wall of the uterus. The anterior portion is near circular in cross-section and the posterior one tends to be more flat.

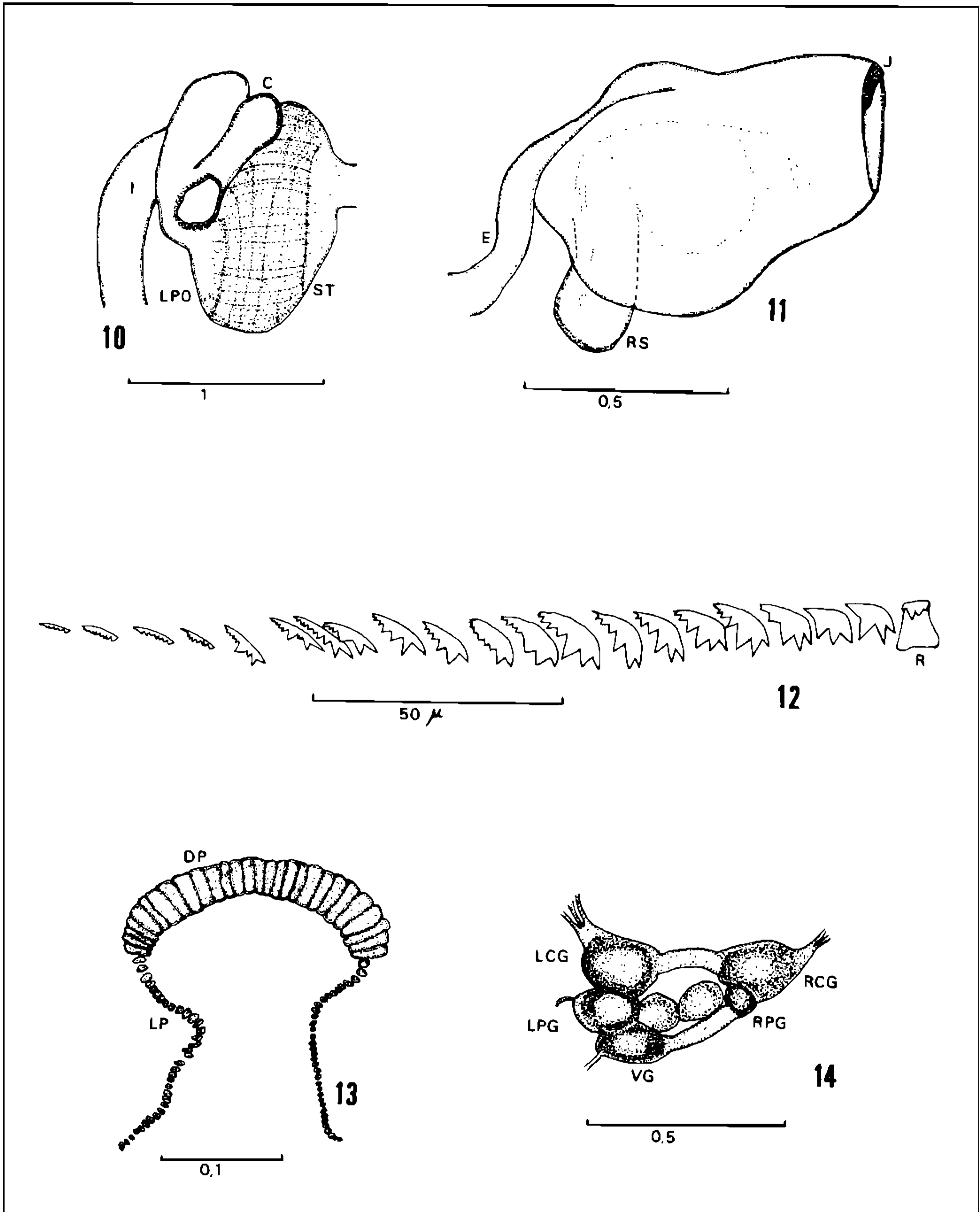
The uterus is flattened and relatively thin-walled. Its anterior portion reaches the penial complex.

The vagina connects with the uterus forming an angle of 180 degrees. Just above the vaginal aperture the duct of the rounded spermatheca empties.

The spermiduct emerges from the anterior wall of the carrefour and soon gives an almost pear-shaped prostate which does not have any diverticula. After, the spermiduct continues into the vas deferens, which runs forward within the body wall to emerge just posterior to the attachment of the prepuce.

The penial complex (Figs. 8, 9) has no flagellum. An ultrapenis and a penis are present. It was not possible to see the penis pore because of the contracted condition of the copulatory organ.

Egg capsules and eggs were not observed.



Laevapex vazi n. sp. — Fig. 10: right side view of stomach. Fig. 11: right side view of buccal mass (salivary gland and nervous system removed). Fig. 12: radula (half a transverse row). Fig. 13: jaw. Fig. 14: central nervous system, dorsal view. c — cecum; dp — dorsal plate; e — esophagus; i — intestine; j — jaw; lcg — left cerebral ganglion; lp — lateral plate; lpg — left parietal ganglion; lpo — liver pore; r — radula; rcg — right cerebral ganglion; rpg — right parietal ganglion; rs — radular sac; st — stomach. Bar (unless otherwise stated) in mm.

The digestive system shows no special features. There is one caecum at the stomach and a single pore to the digestive gland (Fig. 10).

The radular sac is relatively small, about three times smaller than the length of the buccal mass (Fig. 11).

The radula (Fig. 12) has a quadricuspid raquidian tooth, being the two main cusps asymmetrical and the biggest ones. The left median cusp is higher than right one. The first two laterals teeth have three cusps. The other laterals have additional small cusps, which increase in number and decrease in size toward the radular edge. The transition from lateral to marginal teeth is gradual and there are five marginal multicuspid. Radular formula 20.1.20.

The jaw (Fig. 13) is horseshoe shaped. There are 28 dorsal plates and 35 lateral plates.

The central nervous system (Fig. 14) is greatly concentrated. There are three ganglia in the visceral commissure: two parietal ganglia and one visceral ganglion.

REMARKS

According to Basch (1959, 1963) the genus *Laevapex* has an apex very obtuse, almost in the midline of the shell.

The shells here studied resembles those of the typical South American ancyliids as *Gundlachia obliqua* (Broderip & Sowerby, 1832) and *Gundlachia concentrica* (Orbigny, 1835) in having the apex situated in the right posterior region of the shell, deflected to right.

However, based on anatomical data, it is possible to identify the specimens here studied as any species already described to Brazil. The penial complex is sharply different from other freshwater limpets and distinguish *Laevapex* immediately.

All species previously described to Brazil, assigned to *Gundlachia*, have a penial complex with developed glandular flagellum, with ultrapenis but without penis, whereas a penial complex without flagellum but with developed ultrapenis and penis of lateral pore characterize *Laevapex*.

Comparing this new species with the two previously described species of *Laevapex*, we observed the genital system carries the major differences.

The ovotestis has the same appearance as that of *L. fuscus*, that is, an almost hemispherical gland with 20 follicles. Basch (1959) has cited *L. fuscus* have more than 20 follicles and we are able to count at least 40 follicles in his figure. According Hubendick (1964) the

ovotestis of *L. diaphanus* is smaller than that of *L. fuscus*, having about 10 diverticula.

The seminal vesicle is not so wide as that of *L. fuscus* where it is as large as the ovotestis, being an enlargement from the ovispermiduct with several digitiform diverticula. It also differs from that of *L. diaphanus*, where it is a little widening from the ovispermiduct with 5 short diverticula (Basch, 1959; Hubendick, 1964). The seminal vesicle of *L. vazi* n. sp. is similar to those of *G. concentrica* and *G. moricandi*.

The remarkable difference is seen at the prostate. Basch (1959) described the prostate of *L. fuscus* as having 7 to 9 diverticula which project from the spermiduct. Hubendick (1964) described the prostate of *L. diaphanus* being an widening from the spermiduct with 5 diverticula of different size. The specimens described here have no diverticula, the prostate being an almost pear-shaped widening from the spermiduct.

At the jaw, the new species have 28 dorsal plates and 35 small lateral plates. In *L. fuscus* there are 8-10 dorsal plates and 26 lateral plates. In *L. diaphana* there are 25 dorsal plates and 20-25 lateral plates (Basch, 1959; Hubendick, 1964).

The radula is similar to those of the previously described species of *Laevapex*.

REFERENCES

- BASCH, P. F., 1959. The anatomy of *Laevapex fuscus*, a fresh-water limped. *Misc. Publ. Mus. Zool. Univ. Mich.*, Ann Arbor, 108: 1-56.
- BASCH, P. F., 1963. A review of the recent freshwater limpet snails of North America. *Bull. mus. comp. Zool. Harv.*, Cambridge, 19: 401-461.
- BURCH, J. B. & TOTTENHAM, J. L., 1980. North American freshwater snails. Species list. Ranges and illustrations. *Trans. POETS. Soc.*, Ann Arbor, 1: 81-215.
- FERNÁNDEZ, D., 1981. Ancyliidae, 100-109. In R. A. Ringuelet (ed.), *Fauna de água dulce de la República Argentina*, 15. Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina.
- HUBENDICK, B., 1964. Studies on Ancyliidae. The subgroups. *Göteborgs K. Vetensk.-o Vitterh Samh. Handl.*, Göteborgs, 9B: 1-72.
- MARCUS, E. & MARCUS, E., 1962. On *Uncancylus ticagus*. *Bol. Fac. Filos. Ciên. Univ. S. Paulo*, S. Paulo, (Zool. 24), 216: 217-254.
- SCOTT, M. I. H., 1953. Notas sobre morfologia de *Gundlachia* Pfr. (Ancyliidae). *Physis*, Buenos Aires, 20: 467-473.