

## A new valvatoïd shelled hydrobiid from Liguria (Italy) (Gastropoda: Prosobranchia)\*.

By

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With 1 figure and 2 plates.

### Introduction.

Populations of small prosobranchs have recently been discovered in the subterranean waters of some Ligurian karst areas. Their valvatoïd shell is similar to that of other Italian species belonging to genera such as: *Hauffenia*, *Arganiella* and *Islamia*<sup>1)</sup>. The karst areas are situated in two different formations: the "Lama di La Spezia" (eastern Liguria) and the marly limestone of M. Antola (coastal areas between Genoa and Chiavari, and in the inland, especially in coincidence with the basin of the Scrivia stream).

In the first zone (La Spezia) the populations belong to the genus *Islamia* (see GIUSTI, PEZZOLI & BODON 1981) and are close to those living in nearby Tuscany and in other areas of the Apennines. The populations living in the second zone (Genoa province) on the contrary, appear to be unique and unrelated to other known Italian taxa.

As we have stressed elsewhere (see GIUSTI & BODON 1984), peculiar combinations of anatomical characters (such as penis with or without glandular lobes or appendices, number of seminal receptacles, presence or absence of a bursa copulatrix) clearly distinguish different species complexes, and inevitably invite the creation of new generic taxa, one for each single combination of characters. Consequently in the present case we could not do otherwise but describe the following new genus.

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<sup>1)</sup> No data exist in the literature about the presence in Liguria of valvatoïd-shelled freshwater hydrobiids. Nevertheless, in the ALZONA-collection (Civic Museum of Natural History, Milan) unnamed valvatoïd shells collected in the debris of the Bisagno stream (Genoa) are conserved.

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### *Pezzolia* n. gen.

Shell: small (major diameter 0.95-1.30 mm), valvatoid, rarely planorboid. Spira formed by 2¼-3¼ whorls, the last one sometimes slightly descending. Sutures deep. Peristome uninterrupted; umbilicus wide (½-¾ of the shell's major diameter).

Genital tract of males: characterized by a penis which is subcylindrical, depressed and slightly widened near its apex. The penis ends with a short and pointed tip. Any kind of penial glandular lobes, appendices or excrescences is totally lacking.

Genital tract of females: characterized by the presence of two seminal receptacles situated far apart from one another, and of a very reduced bursa copulatrix, having the same dimensions as a seminal receptacle.

Radula: taenioglossan, similar to that of other Hydrobiidae, characterized by a butterfly-shaped central tooth showing an apical margin with small denticles, two lateral wings and two basal cusps. The latter rise, one on each side, from the zone between the body and the lateral wing. The body is prolonged downwards in a plough structure.

Other anatomical characters: body depigmented, ocular spots absent. Operculum oligogyrous, corneous, thin but a little thickened in the central zone of the inner face. Stomach lacking a caecal diverticulum. Ctenidium absent.

Derivatio nominis: The new genus is dedicated to our friend and colleague ENRICO PEZZOLI from Milan (Italy).

Type species: *Pezzolia radapalladis* n. gen. n. sp.

Discussion: The new genus, according to recent data on the higher systematics of the fresh-water and brackish hydrobioids, can be included in the family Hydrobiidae, subfamily Hydrobiinae (see GIUSTI & BODON 1984, GIUSTI & PEZZOLI 1984). Even if the shell and the penis of males are very similar to those known in *Arganiella* GIUSTI & PEZZOLI, the new genus is sufficiently distinguished from the latter by the presence in the females of a small bursa copulatrix (= gametolytic gland) and two seminal receptacles. In fact, in the only known species of *Arganiella*, *A. pescei* GIUSTI & PEZZOLI, the females present a large bursa copulatrix and only one seminal receptacle (see GIUSTI & PEZZOLI 1980, 1981).

A small bursa copulatrix is also present in the subgenera of *Hauffenia* POLLONERA: *Hauffenia* (s. str.) and *Neohoratia* SCHÜTT; nevertheless the females are provided with only one seminal receptacle and males have a penis with a different shape [for anatomical data on *H.* (s. str.) *tellinii* (POLLONERA), *H.* (*Neohoratia*) *subpiscinalis* (KUŠČER), *H.* (*Neohoratia*) *minuta* (DRAPARNAUD) and others see BERNASCONI 1975; BOLE 1967, 1970; RADOMAN 1983].

No relations exist between the new genus and *Islamia* RADOMAN which includes species with a similar valvatoid shell. These species are characterized by females totally lacking a bursa copulatrix and provided with two closely situated seminal receptacles, the first (the one which lies nearer to the pallial oviduct) is smaller than the second (GIUSTI, PEZZOLI & BODON 1981, RADOMAN 1983).

The characters of the genital tract of females (bursa copulatrix and two seminal receptacles) seem to suggest relationships between the new taxon and other valvatoid-shelled genera living in south-eastern Europe (*Bracenicca*, *Daphniola*, *Gocea*, *Horatia*, *Ohridohauffenia*, *Ohrigocea*, *Prespolitorea*, *Pseudoislamia*) and in Western Europe (*Fissuria*). Nevertheless, in south-eastern European genera the bursa

Table 1. The scheme shows the different complexes of anatomical characters which distinguish the valvatoid shelled genera of the Hydrobiidae whose soft parts have been described. The first seminal receptacle (RS<sub>1</sub>) is that which lies near the bursa copulatrix (BC), the second seminal receptacle (RS<sub>2</sub>) is that which is inserted, far from the first one, on the loop of the renal oviduct.

♀ \ ♂	Penis lacking excrescences	Penis with simple excrescences	Penis with glandular excrescences
BC + RS <sub>1</sub> + RS <sub>2</sub>	<i>Pezzolia</i>	<i>Bracenicla</i> <i>Ohrigocea</i> <i>Daphniola</i> <i>Prespolitorea</i> <i>Gocea</i> <i>Pseudoislamia</i> <i>Horatia</i> <i>Ohrldohauffenia</i>	<i>Fissuria</i>
BC + RS <sub>1</sub>	<i>Arganiella</i>	<i>Kerkia</i>	
BC + RS <sub>2</sub>	<i>Zaumia</i>	<i>Hauffenia</i> <i>Pseudohoratia</i> <i>Strugia</i> <i>Erythropomatiana</i>	
two RS			<i>Islamia</i>

copulatrix is larger or, if reduced (*Pseudoislamia*), is provided with a long ductus. Moreover, their penes are always provided with penial appendices (see RADOMAN 1983). The genus *Fissuria* BOETERS, from southern France, has a reduced bursa copulatrix which is provided with an evident ductus. However, its penis is characterized by a series of glandular structures (BOETERS 1981).

### *Pezzolia radapalladis* n. sp.

**Description:** Shell valvatoid, a little translucent, waxen, whitish, showing thin growth-lines. Spira more or less raised, rarely depressed and planorboid, rapidly growing, formed by 2 $\frac{3}{4}$ -3 $\frac{3}{4}$  convex whorls. Last whorl wide, a little expanded at its end and slightly descending. Sutures deep. Mouth oval, sometimes slightly piriform, a little oblique. Peristome uninterrupted, in contact with the last whorl wall, with thin and slightly reflected margins. Umbilicus wide ( $\frac{1}{5}$ - $\frac{2}{7}$  of the shell's major diameter) permitting a view of the entire winding of the spire.

Dimensions: height: 0.60-1.05 mm; major diameter: 0.95-1.30 mm.

The genital tract of males is formed by a testis, a slender spermiduct, an oval-shaped prostatic gland, a slender vas deferens and a copulatory organ (penis). The vas deferens crosses the dorsal wall of the body, then enters the penis, traversing it to the tip. The penis is contained inside the pallial cavity and is bent on itself; it has a slightly flattened shape, corrugated sides, and its terminal portion widens a little before ending in a short, pointed conical-flattened apex. No excrescence, appendix or glandular structure is present on the penis.

The genital tract of females is formed by an ovary attached to a slender oviduct. The latter widens after the point where the gono-pericardial duct is inserted, forming a loop which lies on the posterior portion of the pallial oviduct (= albumen gland). Two seminal receptacles, far apart from one another, are inserted in the region of the loop. They are usually small, sometimes one is larger than the other. One (rs2) is inserted on the distal ansa of the loop, the other (rs1) at the end of the loop, close to the bursa copulatrix. The bursa copulatrix (= gametolytic gland), no larger than a seminal receptacle, is present in the region just before the renal oviduct ends in the pallial oviduct. The last portion of the pallial oviduct (= capsule gland) opens inside the pallear cavity with a small gonoporus.

The radula is formed by a series of rows of seven teeth each. The central tooth is butterfly-shaped. Its apex has a V-shape and is provided with a margin with 15-19 small denticles, the central one larger than the laterals. On each side of the tooth there is a long and slender lateral wing. At the point where each lateral wing rises from the body of the tooth there is a long and pointed basal cusp. The body of the tooth is extended downwards in a plough structure which is wedged in the curved apex of the following central tooth. The lateral teeth show an elongated body and a widened apex provided with a row of 13-18 denticles, the central one longer and stronger than the laterals. The first marginal teeth have a rake shape. Their body is elongated and their apex is provided with a long row of 11-16 denticles on its external margin. The second marginal teeth have a similar shape but their apex is smaller, spoon-shaped and is provided with denticles on its inner margin.

Other anatomical characters: tentacles lack ocular spots; body almost totally unpigmented (traces of black pigment are present only on the walls of the visceral sac). Operculum corneous, oligogyrous, with subcentral nucleus, thin but slightly thickened in the middle of its inner side. Stomach lacking a caecal diverticulum; intestine forming two loops, the first on the sides of the anterior portion of the stomach, the second on the inner walls of the pallear cavity, close to the osphradium; anus opening near the pallear margin. Ctenidium absent; osphradium oval or reniform.

Locus typicus: spring inside the Rio di Tonnego, close to the Ponte della Vittoria, Rapallo (Genoa). Long. 3°14'34"; lat. 44°22'14"; 30 m a. s. l. Square on the map of the Military Geographic Institute: 83 II SO, Rapallo. The source is situated on the left bank of the stream, at the base of marly limestones, shortly upstream the confluence of the Foggia stream. The downflow is heavy in winter and spring (many litres per second), but stops completely during summer, for subsiding of the water-bearing stratus. Also the water of the stream, usually re-emerging here, disappears during summer in this tract.

Physico-chemical data: water temperature: 12.5°C; total hardness: 18.8°F (4. 4. 1981).

Other Prosobranchia present: *Avenionia ligustica* GIUSTI & BODON, *Bythinella schmidtii* (KÜSTER).

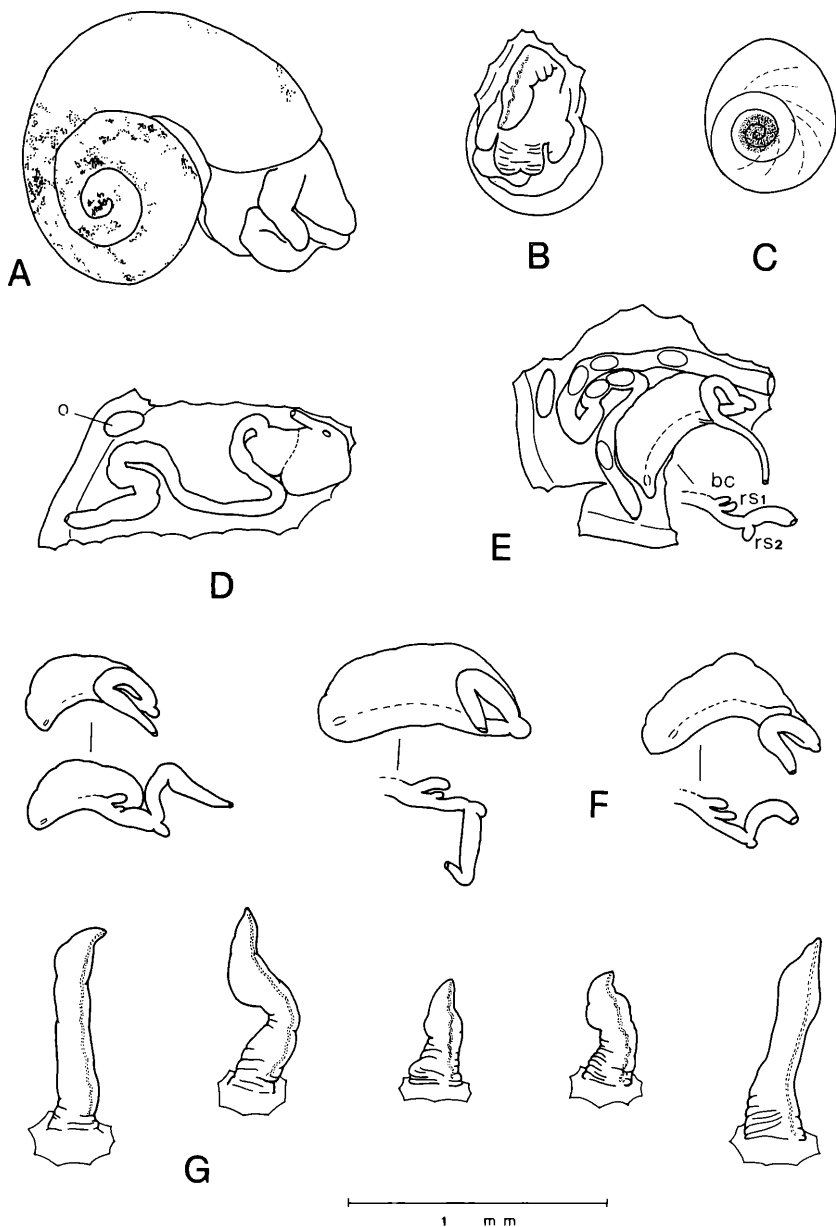


Fig. 1. *Pezzolia radapalladis* n. sp., anatomical characters. A-B) The body and the anterior portion of a male. The penis is bent back on the head; C) operculum; D) stomach and intestine of a male; E) last portion of the intestine and distal genital tract of a female; F) distal genital tract of three females (ovary and first portion of the oviduct have been omitted); G) the penis of five males. — bc = bursa copulatrix, o = osphradium, rs1 = first seminal receptacle, rs2 = second seminal receptacle.

**Holotype:** Spring inside the Rio di Tonnego, Rapallo (Genoa), 25. 12. 1979, M. BODON leg. In coll. Natur-Museum Senckenberg (Frankfurt am Main) [SMF 305486].

**Paratypes:** Spring inside the Rio di Tonnego, Rapallo (Genoa), 31. 12. 1979, 2 ♂; 5. 1. 1980, 1 undissected spec.; 29. 11. 1980, 1 ♀ and 2 undissected spec.; 3. 12. 1980, 1 ♀; 4. 4. 1981, 1 ♀ and 1 ♂ juv.; 3. 4. 1981, 1 ♂ and 1 ♀; 16. 5. 1981, 1 ♀ and 1 undissected spec.; 4. 10. 1981, 2 ♂ and 1 ♀ juv.; 6. 11. 1981, 2 ♂ and 1 ♀. Many shells have been collected in the period between 16. 12. 1979 and 6. 11. 1982. M. BODON leg. In coll. Natur-Museum Senckenberg [SMF 305487/1]; in coll. Museo Civico di Storia Naturale G. Doria of Genoa; in coll. BODON, Genoa; in coll. GIUSTI, Siena; in coll. E. PEZZOLI, Milan.

**Derivatio nominis:** the name of the new species derives from the latin name of Rapallo: "Rada Palladis"

**Discussion:** The presence in the genital tract of females of two seminal receptacles and of a reduced bursa copulatrix clearly distinguishes the new species from *Arganiella pescei* GIUSTI & PEZZOLI even if this latter is almost identical in its shell shape and in the penial structure of males. The simple penial structure and the above-cited characteres of the genital tract of females do not permit any supposition of relationships with other species described in the past (see discussion on the new genus).

The remarkable adaptation to the subterranean habitat (absence of eyes, unpigmented body walls, elongation of intestine) indicates it as a typical stigobiont<sup>2)</sup>, endemic of a small area in eastern Liguria.

### Summary

The new genus *Pezzolia* is here described for a new species of the Hydrobiidae: *P. radapal-ladis* n. sp. This species has been found living in the subterranean waters of a karst system which is located near to Rapallo (Genoa, Italy).

### References.

- BERNASCONI, R. (1975): Les Hydrobides (Mollusques Gastéropodes) cavernicoles de Suisse et des régions limitrophes. V. Révision des *Hauffenia* POLLONERA. — Ann. Spéleol., 30 (2): 303-311.
- BOETERS, H. D. (1981): Unbekannte westeuropäische Prosobranchia, 2. — Arch. Moll., 111 (1/3): 55-61.
- BOLE, J. (1967): Taksonomska, ekološka in zoogeografska problematika družine Hydrobiidae (Gastropoda) iz porečja Ljubljane. — Razprave SAZU, 10 (2): 75-108.
- BOLE, J. (1970): Prispevek k poznavanju anatomije in taksonomije podzemeljskih Hidrobiid (Gastropoda, Prosobranchia). — Razprave SAZU, 13 (2): 87-111.
- GIUSTI, F. & BODON, M. (1984): Notulae Malacologicae, XXXI. Nuove Hydrobiidae dell'Italia nord-occidentale (Gastropoda: Prosobranchia). — Arch. Moll., 114 (4/6): 157-181.

<sup>2)</sup> The species is strictly restricted to subterranean karst waters. It does not live in the interstitial habitat of the river-bed, neither in the spring cup. In other perpetual springs of the neighbourhood of Rapallo only shell materials have been collected (these have not been considered because the lack of anatomical data). The living specimens come out with the water during strong floods. To collect them the method of the filtering net has been adopted (PEZZOLI 1978).

- GIUSTI, F. & PEZZOLI, E. (1980): Guide per il riconoscimento delle specie animali delle acque interne italiane. 8. Gasteropodi, 2. (Gastropoda: Prosobranchia: Hydrobioidea, Pyrguloidea). — Collana del progetto finalizzato "Promozione della qualità dell'ambiente", C. N. R.: 67 pp.
- GIUSTI, F. & PEZZOLI, E. (1981): Notulae Malacologicae, XXV. Hydrobioidea nuove o poco conosciute dell'Italia appenninica. (Gastropoda: Prosobranchia). — Arch. Moll., **111** (4/6): 207-222.
- GIUSTI, F. & PEZZOLI, E. (1984): Notulae Malacologicae, XXIX. Gli Hydrobiidae salmastri delle acque costiere italiane: primi cenni sulla sistematica del gruppo e sui caratteri distintivi delle singole morfospecie. — Lavori Soc. ital. Malac., **21**: 117-148.
- GIUSTI, F., PEZZOLI, E. & BODON, M. (1981): Notulae Malacologicae, XXVII. Primo contributo alla revisione del genere *Islamia* (RADOMAN, 1973) in Italia. — Lavori Soc. ital. Malac., Atti V. Convegno S. I. M.: 49-71.
- RADOMAN, P. (1983): Hydrobioidea a superfamily of Prosobranchia (Gastropoda). I. Systematics. — Monogr. Serbian Acad. Sci. Arts, **547** (Dept. Sci. **57**): 1-256.
- PEZZOLI, E. (1978): Appunti sulla malacofauna ipogea italiana terrestre e dulciacquicola. — "Natura Bresciana", Ann. Mus. civ. St. nat. Brescia, **15**: 202-216.

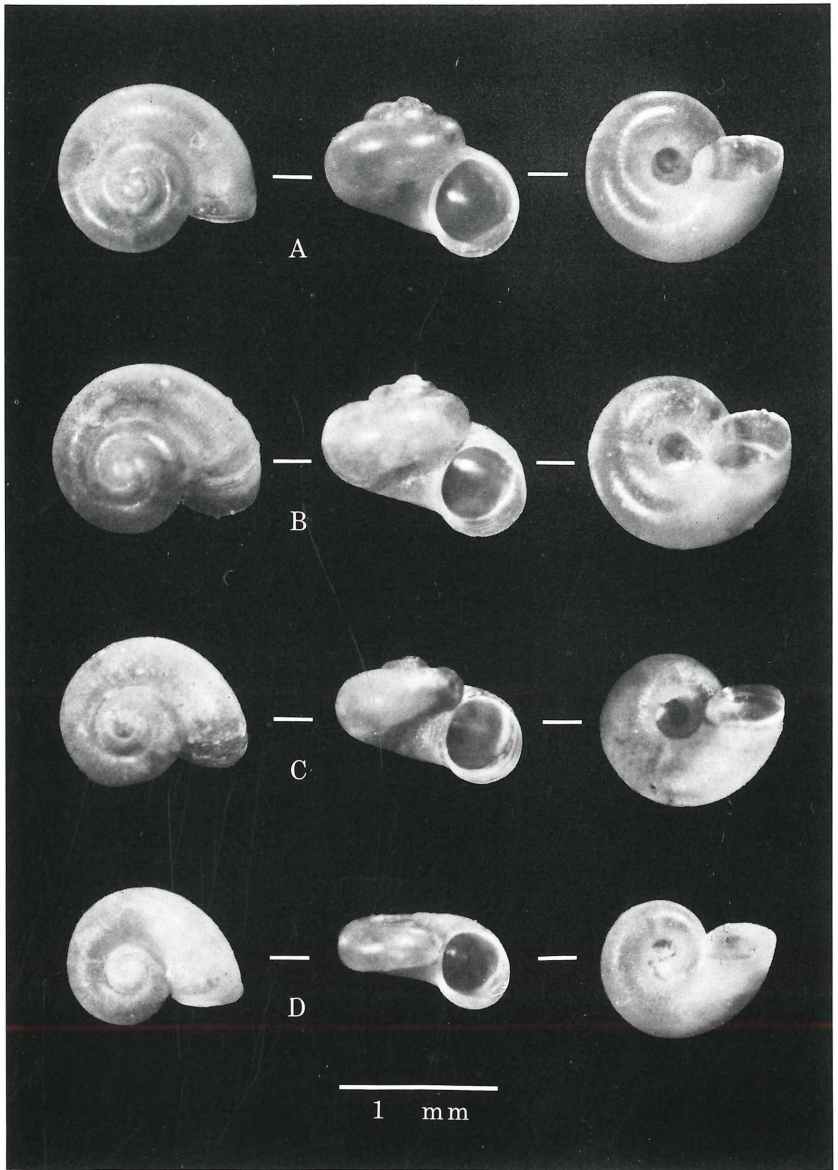
### Explanation of plate 1.

*Pezzolia radapalladis* n. sp.

Shells of four specimens collected in the spring inside the Rio di Tonnego, Rapallo (Genoa, Italy). The shape of Fig. B and C is more frequent, the one of Fig. A and D is peculiar.

A, B, D) paratypes; C) holotype [SMF 305486].





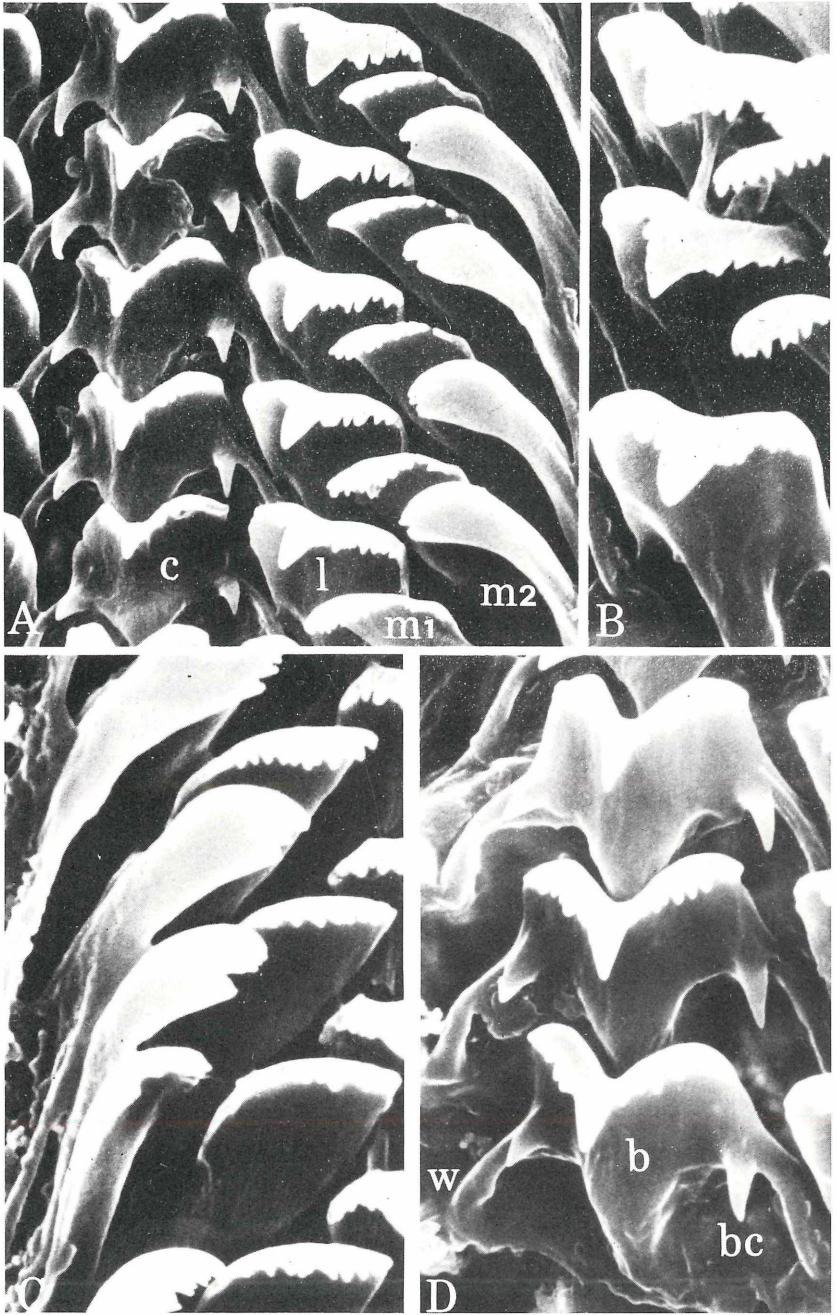
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### Explanation of plate 2.

The radula of *Pezzolia radapalladis* n. sp.

A) general view of a portion of the radula,  $\times 3000$ ; B) apical region of some lateral teeth,  $\times 4000$ ; C) some first and second marginal teeth,  $\times 4000$ ; D) some central teeth,  $\times 4000$ .

b = body of the tooth, bc = basal cusps, c = central tooth, l = lateral tooth, m1 = first marginal tooth, m2 = second marginal tooth, w = lateral wing.



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