

# **A redescription of *Ruthvenia biciliata* (L. PFEIFFER, 1855), with revised generic diagnosis for *Ruthvenia* GUDE, 1911 (Gastropoda: Pulmonata: Charopidae)**

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## **Abstract**

Several specimens of *Ruthvenia biciliata* from Sri Lanka were studied. An illustrated description of the shell, jaw and reproductive tract of this species from Sri Lanka, with its very peculiar shell, is given. The diagnosis of the genus *Ruthvenia* is defined more precisely.

**Key words:** Gastropoda, Charopidae, *Ruthvenia*, anatomy, Sri Lanka.

## **Zusammenfassung**

Mehrere Individuen von *Ruthvenia biciliata* aus Sri Lanka wurden untersucht. Beschrieben und abgebildet werden die außergewöhnliche Schale, der Kiefer und die Reproduktionsorgane. Darüber hinaus wird die Gattung *Ruthvenia* genauer definiert.

## **Introduction**

Of five known species of the genus *Ruthvenia*, whose distribution is restricted to South India and Sri Lanka, only two have been studied anatomically, including the type species of the genus, *Helix clathratula* L. PFEIFFER, 1850. Conchologically, *R. biciliata* (L. PFEIFFER, 1855) markedly differs from all other species of the genus, predominantly due to its very peculiar shell sculpture. Nevertheless, anatomical investigation has shown that *R. biciliata* does belong to the genus *Ruthvenia*.

## **Material and methods**

Three specimens were dissected, and drawings of the shell and the reproductive tract were made using an Olympus SZ 51 stereo microscope. The material is deposited in the Naturhistorisches Museum Wien, Austria (NHMW) and in the Zoological Museum of Moscow State University, Russia (ZMMU).

## Taxonomy

### *Ruthvenia biciliata* (L. PFEIFFER, 1855)

(Figs 1–6)

*Helix biciliata* L. PFEIFFER, 1855: 112.

*Macrochlamys biciliata*; L. PFEIFFER & CLESSIN, 1881: 45.

*Nanina (Kaliella) biciliata*; PILSBRY, 1886: 67.

*Plectopylis (Sykesia) biciliata*; SYKES, 1898a: 66; 1898b: 160–161.

*Sykesia biciliata*; GODWIN-AUSTEN, 1907: 196.

*Ruthvenia biciliata*; GUDE, 1914: 31.

**Material examined:** Sri Lanka, "Patipole" [Pattipola], coll. Penther, det. A. Schileyko: NHMW 103483, many specimens; ZMMU Lc-37424, 4 specimens (ex NHMW, 3 dissected).

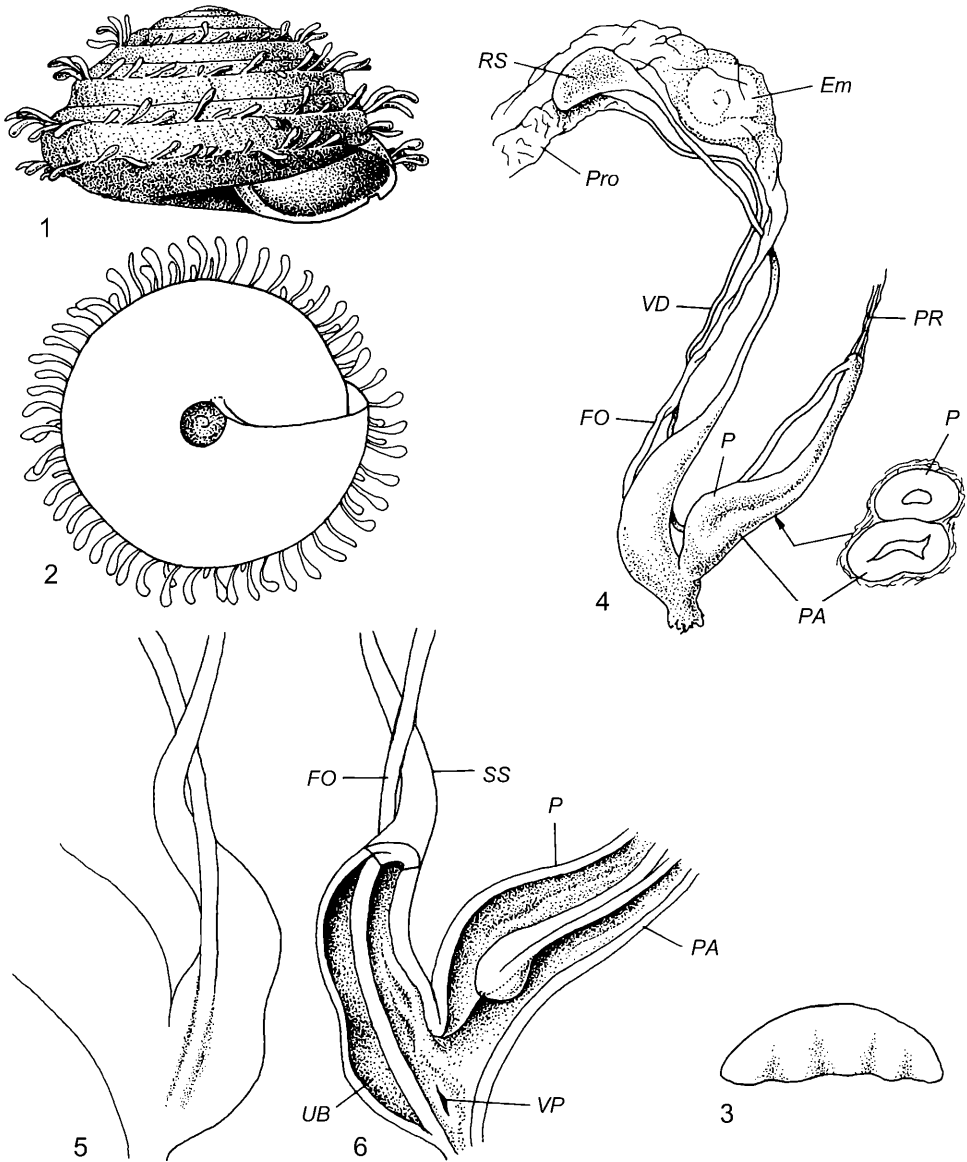
**Description.** Shell (Figs 1, 2) depressed-trochiform, very thin, transparent, of about 4.5 shouldered whorls. Last whorl not descending in front, bearing two keels – above and below middle zone; this zone (between keels) nearly flat. Basal surface only slightly convex. Apex widely rounded. Color corneous or shell colorless, glass-like. Embryonic whorls wide, with smoothed radial wrinklelets and cord-like spiral thread along midline of whorls. Postembryonic sculpture of irregular fine radial wrinklelets and long "hairs" of very peculiar shape: each "hair" represents a flexible spoon- or oar-like plate with thin basal portion and expanded, convex upper half. These "hairs" are arranged in two rows along spiral keels. Radial sculpture remains on basal surface. Aperture is narrow, only slightly oblique, with thin, fragile margins, somewhat similar to parallelogram with rounded angles. Within last whorl, there are 1–2 sets of parietal and palatal folds. Parietal armature consists of two simple, short, obliquely ascending folds, separated by a distance of half a whorl, having upper extremities somewhat attenuated and lower ones truncated. Palatal teeth of three types: a short, axial fold below periphery; three denticles in a line horizontally (posterior one is the strongest); and a short, nearly longitudinal fold near suture. Umbilicus open, moderately wide (contained about 6 times in the shell diameter), subcylindrical. Height up to 3.6, diameter up to 7.7 mm (depicted specimen: 3.5 and 7.6 mm, respectively).

Original description: "H. testa perforata, convexo-lenticulari, tenui, pellucida, cornea, oblique plicata, bicarinata, carinis pilis longis ciliates; spira parum elata, vertice subtili; anfr. 4½ scalaribus, ultimo antice non descendente, basi vix convexo; apertura subobliqua, depresso securiformi; perist. simplicem, recto, marginibus subparallelis, columellari vix reflexiusculo. Diam. maj. 7½, min. 6½, alt. 3½ mill."

The only difference between the original description and shells available to me is the coloration: the latter are colorless and glass-like, whereas Pfeiffer writes that the color is corneous.

Jaw (Fig. 3) bears 3–4 very wide, smoothed ribs.

Vas deferens thin, very long, entering penis laterally and subapically (Fig. 4). Flagellum, epiphallus and penial sheath absent. Penis moderately long, subcylindrical, internally without regular relief. Conical appendix branches off from basal, somewhat expanded section of penis. Appendix tightly bound to penis and surrounded, together with penis, by a common connective-tissue envelope. Internally, appendix with a few (2–3)



Figs 1–6: *Ruthvenia biciliata* (L. PFEIFFER, 1855). Patipole, Sri Lanka. Shell in frontal (1) and basal (2) view; (3) jaw; (4) reproductive tract; (5, 6) distal parts of reproductive tract from opposite sides. *Em*, embryo in uterus; *FO*, free oviduct; *P*, penis; *PA*, penial appendix; *PR*, penial retractor; *Pro*, prostate; *RS*, reservoir of spermatheca; *SS*, spermathecal stalk; *UB*, unilateral bladder; *VD*, vas deferens; *VP*, vaginal pore.

smoothed, broad longitudinal pilasters. Penial retractor attached to penis terminally. One egg or embryo may be present in uterus. Free oviduct extremely long, slender, with very thin, semitransparent walls; its lower part tightly bound to distal section of spermathecal

stalk. Vagina practically absent, pore of free oviduct (vaginal pore) situated immediately above atrium within basal section of spermathecal stalk (Figs 5, 6). Spermathecal stalk very long, its upper section slender, thin-walled; distal section much expanded, with thick walls. This expanded section of stalk unilaterally surrounded by a thin-walled bladder. Reservoir of spermatheca flattened, roughly semicircular, bound to sperm-oviduct and not reaching albumen gland.

**Type locality.** "Ceylon" (Sri Lanka).

### Discussion

Currently, the genus *Ruthvenia* comprises five species (GUDE, 1914): *R. retifera* (L. PFEIFFER, 1845) [South India], *R. clathratuloides* (GUDE, 1897) [South India], *R. clathratula* (L. PFEIFFER, 1850) with var. *compressa* (SYKES, 1898) [Sri Lanka], *R. caliginosa* (SYKES, 1898) [Sri Lanka], and *R. biciliata* (L. PFEIFFER, 1855) [Sri Lanka].

GODWIN-AUSTEN (1904: pl. 112 fig. 3) described and illustrated the reproductive tract of *R. biciliata* under the generic name *Sykesia* (see above). SCHILEYKO (2001: 923–924, fig. 1209) presented a description and illustration of the structure of the reproductive tract and jaw of the type species of the genus *Ruthvenia* GUDE, 1911 (*Helix clathratula* L. PFEIFFER, 1850) and reformulated the diagnosis of the genus *Ruthvenia*. Note that at that time I unfortunately did not discern the presence of the penial appendix in *R. clathratula*. I re-investigated the material of *R. clathratula* and established that the penial appendix does indeed occur in this species as well. Furthermore, the unilateral bladder of the spermathecal stalk is present in *R. clathratula*, but scarcely developed.

Comparison of *Ruthvenia clathratula* and *R. biciliata* shows the close similarity of these species. The data presented below permit a more precise diagnosis of the genus *Ruthvenia*.

The family placement of the genus *Ruthvenia* is unclear. GUDE (1914) placed it into Endodontidae. However, according to the family diagnosis for Charopidae given by SOLEM (1983: 59) *Ruthvenia* should be placed in this family. This is tentatively followed here. A detailed discussion on this topic would go beyond the scope of this paper.

### Family Charopidae HUTTON, 1884

#### *Ruthvenia* GUDE, 1911

*Austenia* GUDE, 1897a: 300 [name preoccupied. Not *Austenia* NEVILL, 1878 (Ariophantidae); type species *Helix clathratula* L. PFEIFFER, 1850, by original designation].

*Sykesia* GUDE, 1897b: 332 [new name for *Austenia* GUDE, 1897; name preoccupied, not POMEL, 1883 (Echinodermata)].

*Ruthvenia* GUDE, 1911: 271 (new name for *Sykesia* GUDE, 1897b).

**Diagnosis.** Shell depressed-trochoid to lentiform, translucent to transparent, of 4.5–6 whorls. Last whorl with 1 or 2 cord-like keels. Shell uniformly light-corneous or shell colorless. Embryonic sculpture of smoothed radial wrinklets. Postembryonic whorls with periostracal radial riblets on upper surface; riblets locally may form hairs of various

appearance arranged on keel(s). Basal surface lacks regular sculpture or with fine radial wrinkles. Aperture narrow, angulated, only slightly oblique; deeply within last whorl are usually one or two sets of teeth; each set consists of one or two transverse parietal lamella(e) and several small palatal folds. Umbilicus moderately broad, funnel-like and perspective, or subcylindrical. Height 2.5–4.0 mm, diameter 4.0–7.7 mm.

Jaw entire, with a few very broad, smoothed vertical folds.

Ovotestis of several (5–7) clumps of elongated, clavate acini. Hermaphroditic duct not convoluted. Uterus sometimes containing an egg or embryo. Vas deferens thin, very long, entering penis subterminally through a simple pore. Penis internally with smoothed, irregular longitudinal folds. From basal part of penis, a conical appendix is produced; penis and appendix surrounded and tightly bound together by a common connective-tissue envelope. Free oviduct very long, straight or more or less convoluted, its lower section tightly bound to distal part of spermathecal stalk. Vagina extremely short (nearly absent). Spermathecal stalk very long, its upper section slender, basal section much expanded, thick-walled, and unilaterally surrounded by a thin-walled, variously developed bladder. Reservoir of spermatheca flattened, roughly semicircular or bean-shaped, not reaching albumen gland.

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