
Mysterious *Erepta odontina* (Morelet, 1851) (Gastropoda, Pulmonata, Helicarionidae)

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ABSTRACT. Anatomical study of five specimens of an endemic species of the Mauritius Island, *Erepta odontina* showed that within one population disappearing of additional organs of the reproductive tract (epiphallic caecum, penial caecum, penial appendix, flagellum and retractor of penis) occurs in four different combinations. It is significant that the shells of all five specimens were practically identical. It is assumed that the described phenomenon has a mutagenic nature and is regarded as a rare (if not unique) case of reduction (up to complete disappearance) of additional organs within one population.

Introduction

The terrestrial malacofauna of the Mascarene Islands, including the fauna of the Mauritius island, is studied quite fully mainly due to two extensive works performed in the early twentieth century [Godwin-Austen, 1908; Germain, 1921]. However, as a result of human activities in recent decades, the natural landscapes of Mauritius have undergone catastrophic changes, resulting in extinction of many species or coming close to extinction [Griffiths, Florens, 2006]. Fortunately, in European museums, in particular, in Naturhistorisches Museum Wien, materials on a number of species of land mollusks were preserved, which made it possible to study their anatomy [Schileyko, 2000, 2018a]. Among them is the endemic species of Mauritius – *Erepta odontina* (Morelet, 1851), in which an unusual case of intrapopulation variability of anatomical characters was discovered.

Material and methods

10 specimens are housed in Naturhistorisches Museum Wien, No. 42652, with the label “Afrika; Mauritius, coll. Dr. Penther”; 5 of them were dissected. In the Registration book of the Museum “Sammlung der Mollusken Molluskoideen und Tunnicaten, Dr. Penther leg. et don., Acqu. Nos. 41421-

50220” it is indicated that the material was collected in 1906.

The anatomical study was performed by traditional methods of manual dissection under the binocular microscope Olympus SZ.

Abbreviations in figures: E – epiphallus, EC – epiphallic caecum, F – flagellum, FO – free oviduct, P – penis, PC – penial caecum, PS – penis sheath, PR – retractor of penis, Pro – prostate, RS – reservoir of spermatheca, V – vagina, VD – vas deferens.

Systematic part

Helicarionidae Bourguignat, 1883 Ereptinae Godwin-Austen, 1908

Godwin-Austen, 1908: 432; Schileyko, 2002: 1234 (in Ariophantidae).

Erepta Albers, 1850

Stylodonta (*Erepta*) Albers, 1850: 109.

Microstylodonta Germain, 1921: 123, 462, type species *Helix stylodon* L. Pfeiffer, 1842, by subsequent designation of Schileyko, 2002.

Type species – *Helix stylodon* L. Pfeiffer, 1842, by monotypy.

Erepta odontina (Morelet, 1851) (Figs 1-5)

Helix odontina Morelet, 1851: 219.

Microstylodonta odontina. – Germain, 1921: 124, fig. 10.

Erepta odontina. – Godwin-Austen, 1908: 431, pl. XI, fig. 3; Schileyko, 2002: 1237, fig. 1624.

Type locality – “insulam Mauritius”

Shell depressed-conic, moderately thin-walled, somewhat translucent, with nearly conical outline of spire, of 5-6 moderately convex whorls. Last whorl is not descending in front, with rounded periphery. Color uniformly yellowish or corneous, sometimes with darker supraperipheral band. Em-

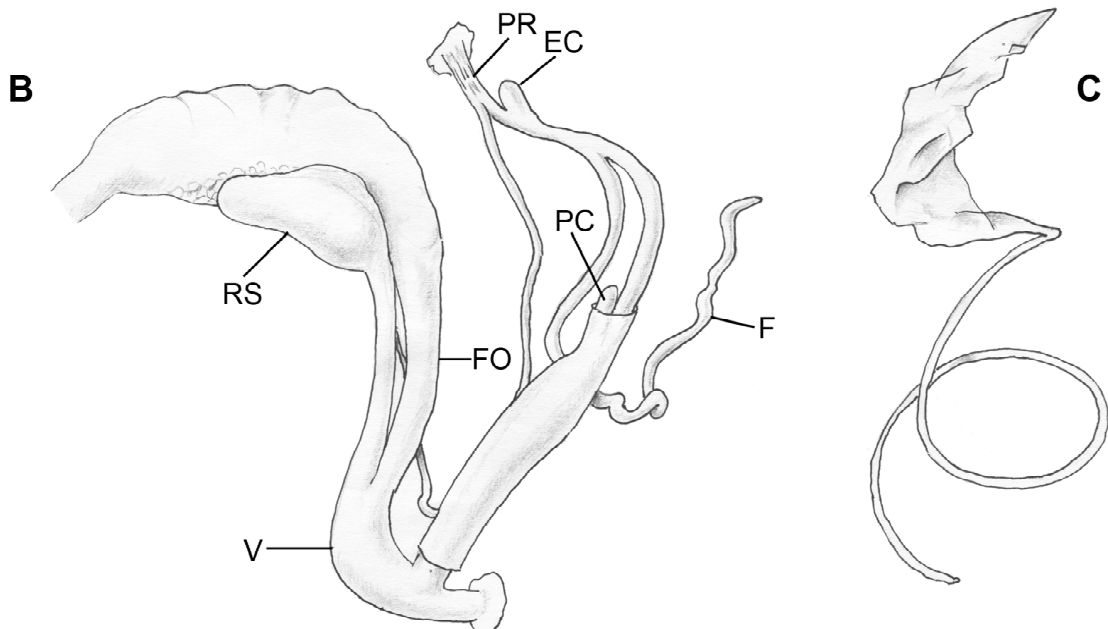


FIG. 1. **A.** Shell of *Erepta odontina*, specimen No. 1 in different views. **B.** Reproductive tract. **C.** Spermaphore.

РИС. 1. **A.** Раковина *Erepta odontina*, экз. № 1. **B.** Репродуктивный тракт. **C.** Сперматофор.

bryonic whorls with delicate but quite distinct regular spiral cords. Sculpture of later whorls of fine irregular radial striation and microscopic, silky spiral striation. Aperture rounded, moderately oblique, with thin, sharp, slightly reflexed margins. Columellar margin with rounded, callus-like nodule. Umbilicus dot-like. Height 6-9, diameter 9.0-11.5 mm.

Sole is tripartite, caudal fossa and caudal horn well developed.

Vas deferens evenly thin. Flagellum long, vermiform (but see Fig. 4 B). Small epiphallic (proximal) caecum is located near the attachment of penial retractor (but see Fig. 4 B). There is penial (distal) caecum whose basal portion is surrounded by penis

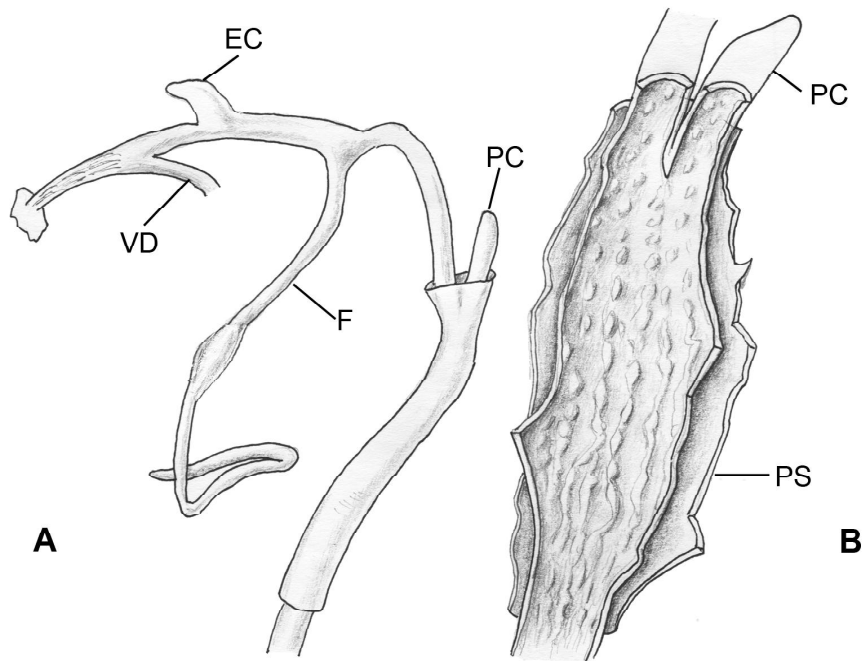


FIG. 2. *Erepta odontina*, specimen No. 2. **A.** Copulatory apparatus. **B.** Inner structure of penis.

РИС. 2. *Erepta odontina*, экз. № 2. **A.** Копулятивный аппарат. **B.** Внутреннее строение пениса.

sheath. In specimen No. 3 (Fig. 3), there is a long appendix with a slightly thickened apex, attached to penis under the penis sheath. Penis tubular, internally with irregular longitudinal folds that in proximal (upper) part disintegrated into series of small tubercles. Penial retractor (when present) is attached to a sharp bend at the vas deferens/epiphallus junction. Spermathecal stalk not long, voluminous reservoir lies on middle portion of spermoviduct. In specimen No. 1 (Fig. 1C) inside spermatheca a spermatophore was found, consisting of thin-walled ampulla and thin, spineless tail thread. Ampulla was empty, with very thin, transparent, wrinkly walls.

Remark. Godwin-Austen [1908, pl. XI, fig. 3] depicted fusiform thickening of epiphallus without comment in the text. In five my specimens there was no such a thickening, but in the specimen No. 2 (Fig. 2) there is something like that in the flagellum; this thickening was filled with a whitish mass (seemingly, aggregation of spermatozoa).

Discussion

Initially, the reproductive tract in helicarionoid mollusks (Helicarionidae+Ariophantidae) is characterized by the presence of a number of additional organs: the penis sheath, sarcobelum, epiphallic and/or penial caecum, and flagellum; in this list a

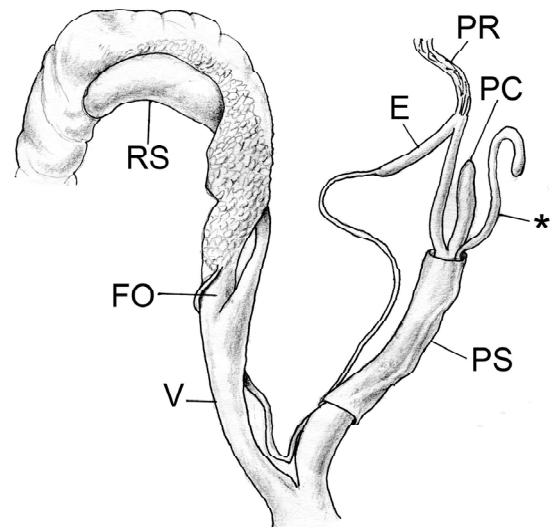


FIG. 3. *Erepta odontina*, specimen No. 3. Copulatory apparatus. Asterisk – penial appendix

РИС. 3. *Erepta odontina*, экз. № 3. Копулятивный аппарат. Звёздочка – пениальный аппендикс.

penial retractor can also be included. However, in the recent species numerous cases of reduction of additional organs in various combinations were observed [Schileyko, 1991] and the presence/absence

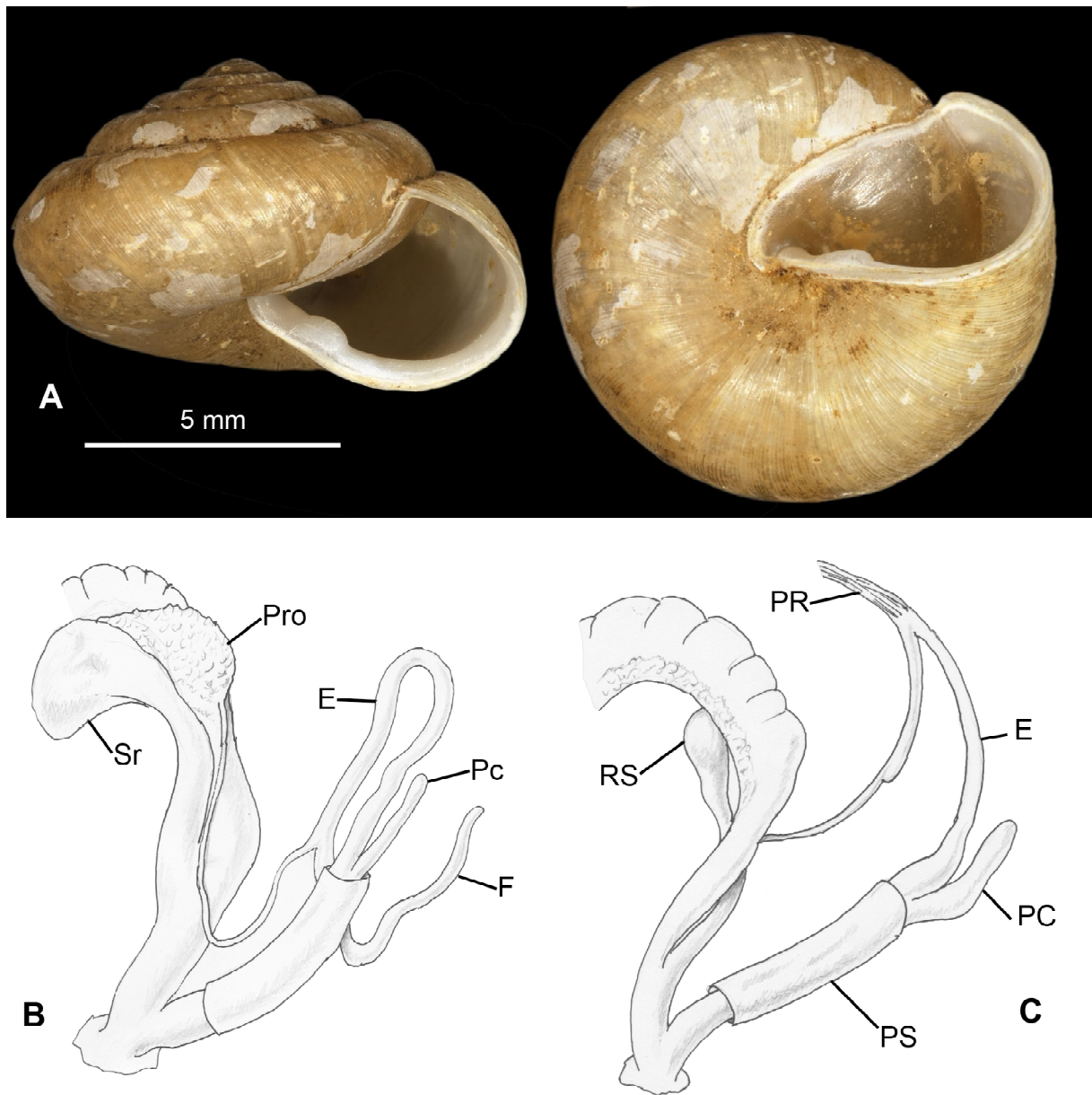


FIG. 4. *Erepta odontina*, specimen No. 4 (A-B). A. Shell. B. Reproductive tract. *Erepta odontina*, specimen No. 5 (C). C. Reproductive tract.

FIG. 4. *Erepta odontina*, экз. № 4 (A-B). A. Раковина. B. Репродуктивный тракт. *Erepta odontina*, экз. № 5. (C). C. Репродуктивный тракт.

of additional organs is often used for diagnostics of taxa of the generic rank.

The complete set of additional organs of the reproductive tract in *Erepta odontina* includes six elements: epiphallic caecum, penial caecum, penial appendix, penis sheath, flagellum, and retractor of penis. From those, only two elements are present in all five dissected specimens — penial caecum and penis sheath. Other structures in different specimens are present/absent in various combinations:

1. The epiphallic caecum is present in specimens Nos. 1, 2 and, possibly, 5 (the latter has a

slight thickening at the vas deferens/epiphallus junction, which can be interpreted as a rudimentary caecum) (Figs 1B, 2 and 4C).

2. An organ that is designated as a penial appendix is present only in specimen No. 3 (Fig. 3).

3. Flagellum is present in specimens Nos. 1, 2 and 4 (Figs 1B, 2, and 4B).

4. The retractor of the penis is present in all specimens except for No. 4 (Fig. 4B).

In addition, specimens differ in the relative length of the vagina and free oviduct: in specimens Nos. 1 and 5 the vagina is approximately half as long as the

oviduct, in specimen No. 3 vagina is approximately three times longer than the oviduct, in specimen No. 4 these ducts are approximately equal in length; in specimen No. 2 these parameters are not identified.

I see two theoretically possible explanations for such an extraordinary situation. 1. These are several different species, which share the same, rather characteristic shell, penial caecum and penis sheath. 2. This is one species within which there are multiple mutations that are externally manifested in full or partial (No. 5, Fig. 4C) reduction of particular accessory organs of the reproductive tract.

The first explanation seems highly unlikely by evident reasons. Indeed, it is hard to believe that several species with indistinguishable shell (including such peculiar characters as a spiral sculpture of embryonic whorls and a characteristic nodule in the aperture) and at least two identical anatomical features (the presence of a penis sheath and penial caecum) would live in the same place.

At the same time, the reduction of additional organs is one of the important directions of pulmonate evolution [Schileyko, 2003, 2018b]; therefore I assume that in the given case we see a very rare (if not unique) case of loss of additional elements of the sexual apparatus within one population, at that organ loss occurs in various combinations. In other words, the intrapopulational variability of the reproductive tract of *Erepta odontina* represents all the main manifestations of variability observed in the Helicarionidae family at the level of taxa of the generic rank.

Cases are known, when the reduction (disappearance) of additional organs in various combinations is observed in representatives of different populations of the same species, as, for example, in *Circassina frutis* (L. Pfeiffer, 1859) [Schileyko, 1978], or closely related genera in Enidae family (*Improvisa* – *Senaridenta* – *Multidentula*) [Schileyko, 1984]. But with such a phenomenon, when the loss of additional organs occurs within one population, the author faces for the first time.

Unfortunately, obtaining additional material is problematic, since currently *Erepta odontina* is in the IUCN Red List of Threatened Species [e.T8002A12881028.<http://dx.doi.org/10.2305/IUCN.UK.1996.RLTS.T8002A12881028.en>], [Griffiths, 1996; Griffiths, Florens, 2006].

Acknowledgements

Drs. Zoltan Fehér and Oliver Macek made the photographs of the shells, Dr. Helmut Sattmann and Mag. Anita Eschner helped me to come to the Museum and to study the material. I express my deep gratitude to the named colleagues.

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Загадочный вид *Erepta odontina* (Morelet 1851)
(Gastropoda, Pulmonata, Helicarionidae)

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РЕЗЮМЕ. Исследование пяти экземпляров эндемика о. Маврикий *Erepta odontina* (Morelet, 1851) показало, что в пределах одной популяции имеет место редукция дополнительных органов репродуктивного тракта (цекум эпифаллуса, цекум пениса, пениальный аппендикс, флагеллум и ретрактор пениса) в четырёх различных комбинациях. Существенно, что раковины всех пяти экземпляров практически идентичны. Предполагается, что описанное явление имеет мутагенную природу и расценивается как редкий (если не уникальный) случай редукции дополнительных органов в пределах одной популяции.

