Ruthenica, 2020, vol. 30, No. 3: 149-154.
Published online 03.07.2020.

http: ruthenica.net

A second extant species of *Pontophaedusa* Lindholm, 1924 (Gastropoda, Pulmonata, Clausiliidae) from Georgia

Levan MUMLADZE[1], Miklós SZEKERES[2,3]

[1] *Institute of Zoology, Ilia State University, Chavchavadze ave. 32, Tbilisi, GEORGIA. E-mail: lmumladze@gmail.com*
[2] *Zoology Department, Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, HUNGARY*
[3] *Institute of Plant Biology, Biological Research Centre of the Hungarian Academy of Sciences, Temesvári krt. 62, 6726 Szeged, HUNGARY. E-mail: szekeres@brc.hu, corresponding author*

ABSTRACT. *Pontophaedusa* ***gregoi*** sp. nov. is described from the Imereti Region of Georgia. This is the second species of a Tertiary relict genus that represents a very early diverged lineage of the Phaedusinae subfamily. The differences between the shell characters and climatic preferences of the *Pontophaedusa* species are discussed.

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Второй современный вид рода *Pontophaedusa* Lindholm, 1924 (Gastropoda, Pulmonata, Clausiliidae) из Грузии

Леван МУМЛАДЗЕ[1], Миклош СЕКЕРЕШ[2,3]

[1] *Institute of Zoology, Ilia State University, Chavchavadze ave. 32, 0179 Tbilisi, GEORGIA. E-mail: lmumladze@gmail.com*
[2] *Zoology Department, Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, HUNGARY*
[3] *Institute of Plant Biology, Biological Research Centre of the Hungarian Academy of Sciences, Temesvári krt. 62, 6726 Szeged, HUNGARY. E-mail: szekeres@brc.hu, автор-корреспондент*

РЕЗЮМЕ. Новый вид *Pontophaedusa* ***gregoi*** sp. nov. описан из Имеретинского региона Грузии. Это второй вид рода, представляющего собой реликт третичного периода, очень рано дивергировавшую линию подсемейства Phaedusinae. Обсуждаются различия в морфологии раковины раковины видов *Pontophaedusa*, а также их климатические предпочтения.

Introduction

More or less continuous forestation in the mountainous Colchis refugia of the southern and eastern Black Sea coast during the entire Quaternary helped to preserve and create a rich flora and fauna in these regions [Bottema *et al*., 1994; van Andel, Tzedakis, 1996; Tarkhnishvili *et al*., 2012]. Ample, year-round precipitation and a narrow range of seasonal temperature changes ensured the survival of multiple Tertiary relicts. In the case of the relatively well-studied land snails these favourable conditions resulted in a particularly high diversity of species [Pokryszko *et al*., 2011; Neiber, Hausdorf, 2015], of which more than 80% are endemic [Schütt, 2010; Sysoev, Schileyko, 2009].

Along the southeastern coastal regions of the Black Sea and in the Caucasus the land snail family Clausiliidae is represented by 26 genera, of which eight belong to the subfamily Phaedusinae. At present the main distribution area of this subfamily is in East and Southeast Asia, whereas its few Western Palearctic genera, occurring in the southern Balkans, northern Anatolia, the Caucasus and the Hyrcanian region, are considered Tertiary relics [Nordsieck, 1978; Reischütz *et al*., 2016]. Out of ten species native to the surroundings of the Black Sea six narrow endemics were discovered only from the early 1960s [Brandt, 1961; Majoros *et al*., 1994; Nordsieck, 1994; Németh, Szekeres, 1995, 2004; Grego, Szekeres, 2017]. Here we introduce a new species of *Pontophaedusa* Lindholm, 1924, a genus hitherto thought to have only one extant representative.

Material and methods

The studied samples were collected in 2013 and 2014 during a field project aimed at surveying range-restricted, local endemic forest snail species of Georgia. This was carried out using soil sieving at a

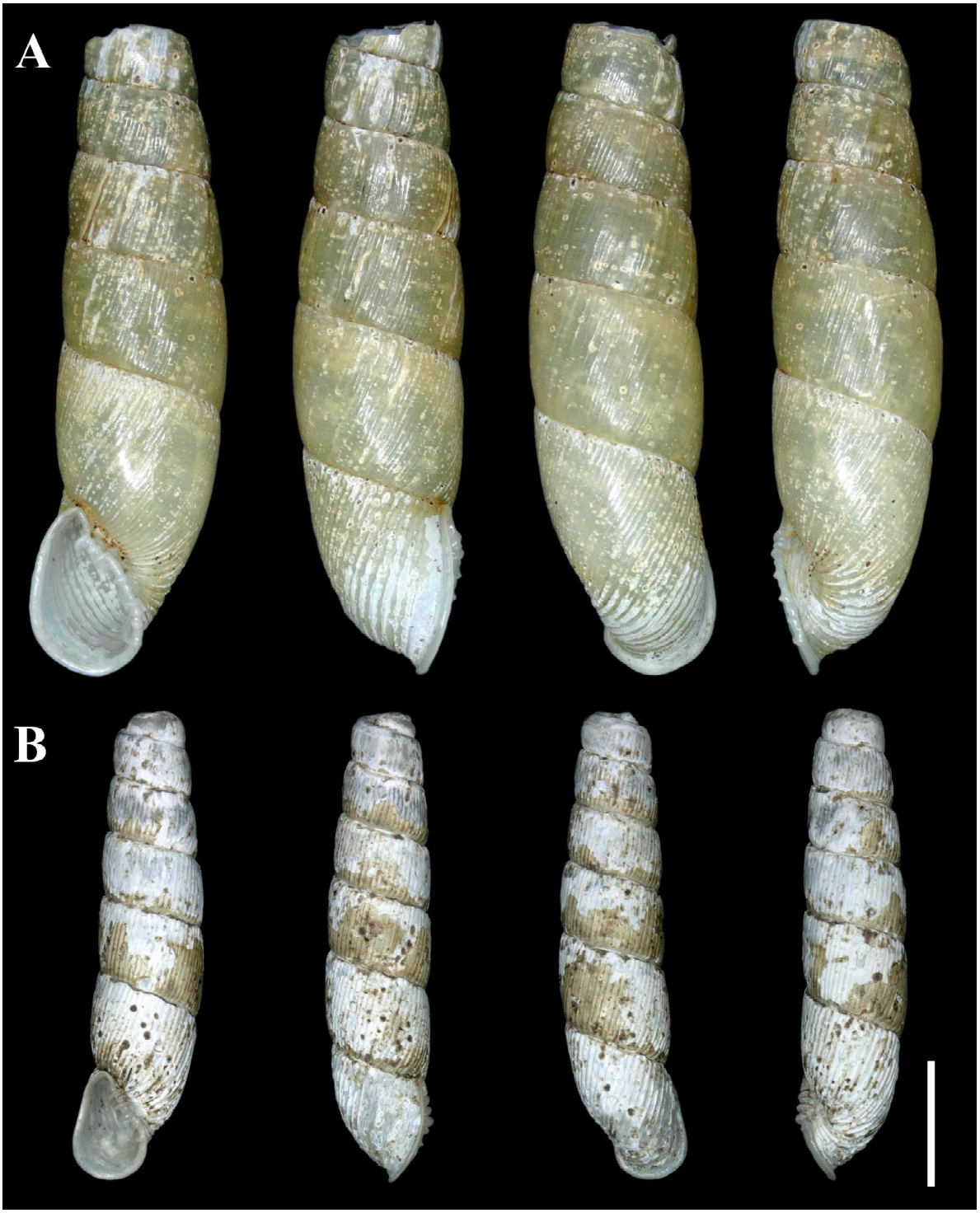

FIG. 1. **A.** *Pontophaedusa funiculum* (Mousson, 1856), Georgia, Adjara Region, Makhinjauri near Batumi. **B.** *Pontophaedusa* ***gregoi*** sp. nov., holotype (ISU TM-T001-H). Scale bar: 3 mm.

РИС. 1. **A.** *Pontophaedusa funiculum* (Mousson, 1856), Грузия, Махинджаури возле Батуми. **B.** *Pontophaedusa* ***gregoi*** sp. nov., голотип (ISU TM-T001-H). Масштабная линейка: 3 mm.

wide variety of visually identified suitable habitats throughout the country. The type material of the described new species has been deposited in the collection of Institute of Zoology, Ilia State University (ISU, Tbilisi), as well as the private collection of M. Szekeres (SZ, Budapest).

Systematic part

Family Clausiliidae Gray, 1855
Subfamily Phaedusinae A.J. Wagner, 1922
Genus *Pontophaedusa* Lindholm, 1924

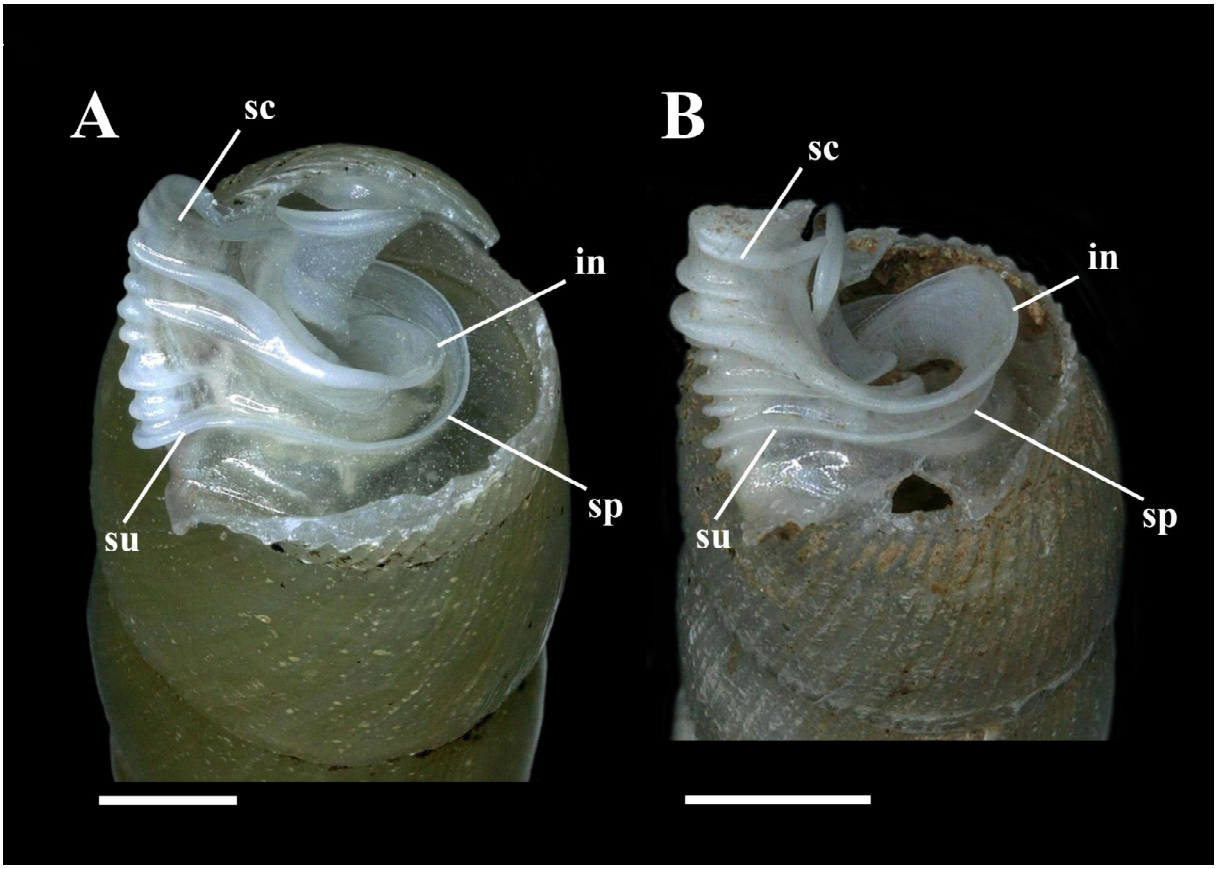

FIG. 2. Lamella positions in *Pontophaedusa funiculum* (Mousson, 1856) (**A)** and *Pontophaedusa* ***gregoi*** sp. nov. (**B**). Lamellae superior (su), spiralis (sp), inferior (in), subcolumellaris (sc). Scale bars: 1 mm.

РИС. 2. Расположение пластинок у *Pontophaedusa funiculum* (Mousson, 1856) (**A**) и *Pontophaedusa* ***gregoi*** sp. nov. (**B**). Верхняя (su), спиральная (sc), нижняя (in), субколумеллярная (su) пластинка. Масштабные линейки: 1 mm.

Type species: *Clausilia funiculum* Mousson, 1856 (OD)

The distribution area of *P. funiculum* is a narrow, not more than 20 km wide strip along the Black Sea coast between Trabzon and Sochi. A fossil species, *P. praefuniculum* Likharev, 1962, was described from Late Miocene deposits near Bamut in Chechnya and Maykop in Adygea [Likharev, 1962]. A molecular phylogenetic study by Uit de Weerd and Gittenberger [2013] estimated that the divergence of the *Pontophaedusa* lineage from those of other Phaedusinae occurred about 30 million years ago, much earlier than the split between the main Asiatic and Western Palaearctic clades in the subfamily.

Pontophaedusa ***gregoi*** sp. nov.
(Figs 1B, 2B)

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Type material. Holotype: ISU TM-T001-H, Georgia, Imereti Region, E of the village Katskhi (42°16’59.7"N, 43°12’40.1"E, 500 m), coll. L. Mumladze, 11.06.2013. Paratypes, ISU TM-T001-P1-3 (1 spm), SZ (1 spm), same data as those of the holotype; ISU TM-T001-P2 (1 spm), Imereti Region, along the Zestafoni to Kharagauli road near the Dzirula River (42°04'26.7"N, 43°09'45.3"E, 260 m), coll. L. Mumladze, 17.07.2014; ISU TM-T001-P3 (1 spm), Imereti Region, along the Zestafoni to Kharagauli road near the village Lashe (42°03'20.8"N, 43°10’44.8"E, 270 m), coll. L. Mumladze, 19.07.2014. The localities are shown in Fig. 3.

Diagnosis. Differs from *P. funiculum* by its much smaller shell, stronger sculpture, and more closely spaced lamellae at the aperture.

Description. The decollated shell of pale yellowish colour consists of 5.3 to 6.0 flat whorls. The surface is covered with regular blunt ribs that become stronger, sharper, and wider-spaced at the rounded neck. The pear-shaped peristome with a thin margin is detached, its sinulus is somewhat pointed. The lamellae and plicae reaching and folding over the peristome make its columellar margin serrate. The lamella superior is continuous with the lamella spiralis, which becomes more emerged be-

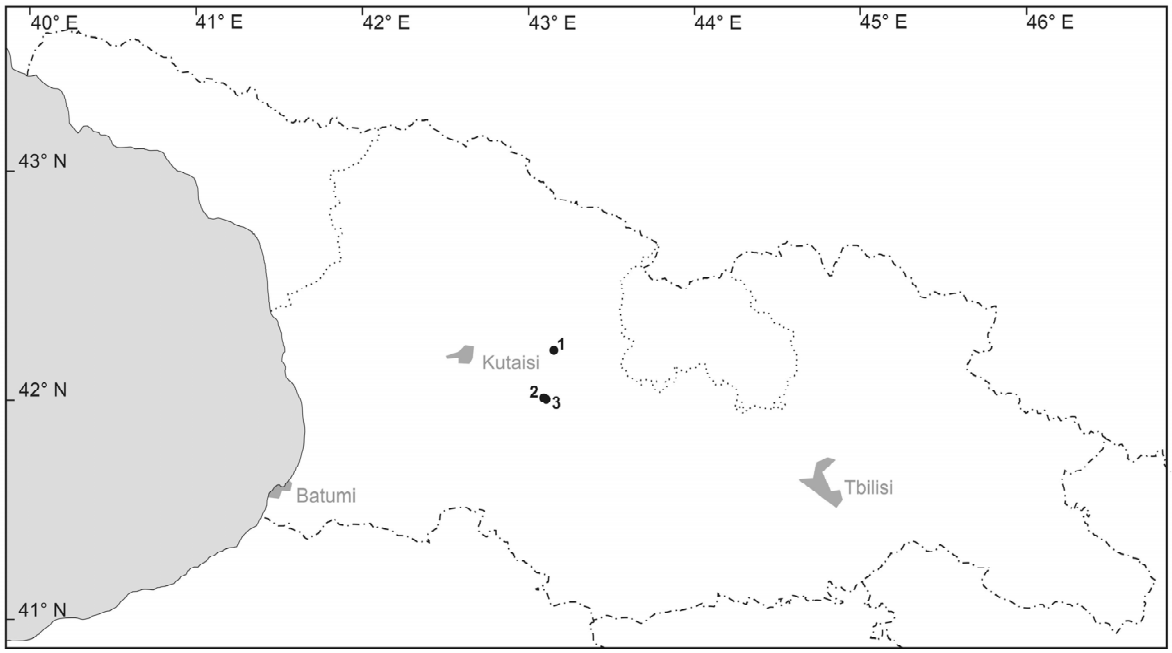

FIG. 3. Map showing the localities of *Pontophaedusa* ***gregoi*** sp. nov. in Georgia: Katskhi (1, type locality), Dzirula (2), Lashe (3).

РИС. 3. Карта с указанием находок *Pontophaedusa* ***gregoi*** sp. nov. в Грузии: Кацки (1, типовое местонахождение), Дзирула (2), Лаше (3).

fore receding and terminating at the ventral side. The lamella inferior reaches the peristome above half height of the aperture. Its end is separated from that of the lamella superior by one large and three smaller plicae. Inward it strongly widens and bends outward, so that on the dorsal side its edge becomes more parietal than the lamella spiralis. The lamella subcolumellaris ends close to the lamella inferior, separated from it by a further strong plica. The positions of the lamellae are shown in Fig. 2. The plica principalis starts ventrally and ends dorsally. Below it, on the ventrolateral side, the upper and lower ends of the lunella are continuous with those of the upper and lower plicae, forming together an elongate, smoothly bent arch. The wide clausilium plate with almost parallel sides ends abruptly in a pointed tip. It is not visible through the aperture.

Measurements. Holotype: height of decollated shell (Hs) 10.7 mm, spire width (Ws) 2.5 mm, aperture height (Ha) 2.5 mm, aperture width (Wa) 1.7 mm. Two paratypes from the type locality: Hs 9.8 mm, Ws 2.5 mm, Ha 2.4 mm, Wa 1.8 mm, and Hs 10.6 mm, Ws 2.4 mm, Ha 2.5 mm, Wa 1.7 mm. Paratype from Lashe: Hs 10.3 mm, Ws 2.5 mm, Ha 2.3 mm, Wa 1.8 mm.

Habitat. At the type locality the specimens were found under small to medium-size blocks of limestone in a low-stand secondary mixed forest of *Carpinus betulus* and *Quercus* sp. (Fig. 4A), whereas near Lashe and Dzirula under leaf litter around decaying tree stumps in natural forests of *Castanea sativa* and *Fagus orientalis* (Fig. 4B). At the latter two sites they were accompanied by *Mucronaria duboisi* (Charpentier, 1852) or also *Quadriplicata lederi* (Boettger, 1878), respectively. Only empty shells could be collected.

Etymology. This species is dedicated to Jozef Grego, a Slovak malacologist who has been doing pioneering research on the subterranean gastropods of Georgia.

Remarks. The apparent morphological similarity to *P. funiculum* (Figs 1A, 2A) supports the classification of the new species in the same genus. However, *P.* ***gregoi*** sp. nov. differs from the type species of the genus by its much smaller size, stronger sculpture, more crowded lamellae and plicae in the aperture, strongly emerged and parietally bent inner part of the lamella inferior, and deeper positioned lunella and clausilium. Remakably, *P. funiculum* inhabits humid and mild coastal areas, whereas the new species occurs inland, about 120–150 km from the coast, under drier climate with colder winters. This may indicate that the species needs microhabitats capable of providing sufficient protection even under these less favourable conditions.

FIG. 4. Habitats of *Pontophaedusa* ***gregoi*** sp. nov. at the type locality (**A**) and near Lashe (**B**).

РИС. 4. Места обитания *Pontophaedusa* ***gregoi*** sp. nov. в типовом местонахождении (**A**) и близи Лаше (**B**).

Acknowledgements

The authors are thankful to Jozef Grego (Banská Bystrica) for valuable discussions and Barna Páll-Gergely (Plant Protection Institute, HAS, Budapest) for help with the photo images. Helpful comments of an anonymous reviewer are also appreciated. This study was supported by a Rufford Small Grant (project no. 14845-2) to L.M.

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