

Original paper

***Biokovoamaurops*, a new troglobitic genus of Amauropini (Coleoptera: Staphylinidae: Pselaphinae) from Biokovo Mt., Dalmatia**

Dragan Pavićević¹, Roman Ozimec²

¹Krunska 15, 11 000 Belgrade, Serbia

²ADIPA: Society for Croatian Natural History Diversity Research & Conservation, Orehovečki ogranak 37, 10040 Zagreb, Croatia

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Summary. A new troglobitic genus, *Biokovoamaurops*, and the species *B. nyx* from the tribe Amauropini, are described and illustrated based on a female specimen collected in the Gradska špilja cave above Župa, on Mount Biokovo, Dalmatia. The new genus was found in the middle Dinaric region, opposite two closely related troglobitic genera *Seracamaurops* and *Troglamaurops*, which are distributed in the southern Dinaric region.

Keywords: biospeleology, Croatia, Dinarides, Pselaphinae, taxonomy, new species.

INTRODUCTION

In the Balkan Peninsula, the pselaphine tribe Amauropini is represented by seven genera (*Amauropus* Reitter, 1918, *Paramaurops* Jeannel, 1948, *Protamaurops* Müller, 1944, *Pseudamaurops* Jeannel, 1948, *Seracamaurops* Winkler, 1924, *Troglamaurops* Ganglbauer, 1903 and *Zoufalia* Reitter, 1918), with more than 50 described taxa (Nonveiller and Pavićević 2008; Hlaváč et al. 2008; Hlaváč et al. 2017; Lohaj et al. 2023; Pavićević et al. 2024a,b). Among members of the tribe Amauropini, only two genera, *Troglamaurops* and *Seracamaurops* are exclusively trogllobionts, while representatives of the other above-mentioned genera can be collected in Mesovoid shallow substratum, under the stones at the entrance of the caves, in mould leaf litter, etc.

During biospeleological research of the caves and pits of Mount Biokovo (Central Dalmatia, Central Dinarides) in 2004, one of us (R.O.) discovered a single pselaphine in the biological material collected in Gradska špilja cave, which in

its habitus appeared to be strikingly similar to some smaller *Seracamaurops*, such as *S. popovici* Pavićević, Hlaváč & Lakota, 2008 or *S. cadmei* Pavićević & Ozimec 2013. However, other differences in morphology indicated that it belonged to an unknown new genus and species. For a period of almost 20 years, we have been searching for another specimen, especially a male that would help us determine the correct taxonomic position of this newly discovered genus among the Amauropini, but without success. Finally, we decided to publish the description of the new genus and species, due to the importance of this finding for the taxonomy of Amauropini, but also for the biogeography of the region itself.

MATERIAL AND METHODS

The specimen was studied in the laboratory using LEICA MZ 16 and WILD M 8 ZOOM stereomicroscopes. Specimen measurements were made for: total body length, head length, maximum head width, antennae length, pronotum length,

pronotum width, elytra length, and elytra width.

Drawings of the habitus were made by our colleague, Momčilo Popović.

Abbreviations and acronyms

AL	antennal length
EL	elytral length: linear distance measured along the suture from the elytral base to the apex
EW	maximum width of elytra
HL	head length: measured from the anterior margin of the clypeus to the neck constriction
HR	Croatia
HW	maximum head width
LT	Locus typicus
NHGMV	Natural-History Department of the State Museum of Varaždin city (GMV) (Croatia)
PL	pronotum length
PW	maximum pronotum width
RH	Relative humidity of the air
ROC	Roman Ozimec Collection, Varaždin, part of NHGMV (Croatia)
Ta	Temperature of the air
TL	total body length: measured from the apex of the mandibles to the apex of the last tergite
Ts	Temperature of the substrate

TAXONOMY

Biokovoamaurops, gen. n.

Type species: *Biokovoamaurops nyx* gen. n., sp. n.

Type material: Holotypus, female, Croatia, Middle Dalmatia, Split-Dalmatia County, Biokovo Mountain, Župa, Gradska špilja cave, 746 m a.s.l.; 25-05-2004, leg. P. Rade., Labelled: Inv. Nr. GMV 112635 (NHGMV).

Diagnosis

Amauropini with elongate head, frons with two depressions between antennal tubercles, vertex fovea deep; maxillary palpi small, III blade shaped, mandibles strong, frontal lobe transverse with widely rounded anterior margin; eyes completely atrophied without a trace of either ocular thorns or carinae. Temples strongly rounded and narrowed posteriorly, with long erect setae. Antennae relatively short, all segments elongate. Pronotum barrel-shaped, widest just behind the middle, median fovea elongated, and shallow, lateral fovea well-developed, deep. Elytra simple, elongated. Abdomen slightly wider than elytra, first visible tergite clearly wider than long. External striae diffuse with margin, internal striae very short. The legs long, meso-femora clubbed in the middle.

Etymology

The name of the genus is derived from the name of Mt. Biokovo, and the extension “*amaurops*” is associated with the genera and taxa belonging to Amauropini.

Biokovoamaurops nyx gen. n., sp. n.

Fig. 1

Type locality: same as for the genus

Holotype: same as for the genus

Paratypes: no paratypes

Description

Body (Fig. 1) elongated, shiny, reddish-brown, smooth, covered with long erected setae; length 3.2 mm. Head elongate, longer than wide, HL 0.60, HW 0.50, slightly narrower than pronotum and with short occipital carina in the middle. Frontal lobe transverse, with widely rounded anterior margin, lancet-like; eyes completely atrophied without indication of ocular carinae or thorns. Temples remarkably rounded and narrowed posteriorly, with long, erect setae. Frons with two depressions between antennal tubercles, vertexal foveae well defined, deep; maxillary palpi small, III blade shaped (0.25/0.08) as long as I-II together. Mandibles very strong. Antennae relatively short, distinctly shorter than body. All antennomeres elongate, scape 0.20 mm long / 0.11 mm wide, pedicel 0.17 mm long / 0.08 mm wide, length/width of antennomeres in mm (from III to XI): 0.015/0.057, 0.12/0.05, 0.14/0.05, 0.10/0.04, 0.13/0.04, 0.10/0.04, 0.15/0.08, 0.14/0.09, 0.30/0.10. Pronotum of the same length as head, PL 0.60 mm, PW 0.53 mm, barrel-shaped, almost in the middle slightly wider than head, median fovea shallow and elongate, lateral fovea well defined, deep. Elytra distinctly longer than wide, EL 1.0 mm, EW 0.80 mm. Abdomen almost as wide as elytra, first visible tergite transverse, (0.58 mm long / 0.82 mm wide). External stria diffuse with a tergal margin, internal stria very short, distance between them 0.25 mm, with basal shallow depression. Legs long and slender, mesofemora club shaped. The last abdominal tergite simple, without any fissure-like structures. Pygidium with triangular blunt apex.

Etymology

After Nyx (gr. Νύξ), in Greek mythology the goddess of the night, offspring of Chaos, and the mother of Aether and Hemera (Day) by Erebus (Darkness), which reside in the underworld in the depth of Tartarus.

Habitat and ecology

Basic data	Gradska špilja cave (Figs 2 and 3), at 746 m asl, depth -1.8 m, length 26.5 m, Map in Fig. 4.
Microclimate	Ta = 7.8-11.1 °C; Ts = 6.7-11.7 °C; RH: 99-100%, CO ₂ = 933-2100 ppm; based on measurements performed by the second author on several visits.
Basic habitats	Natura 2000: 8310; NKS H.1.1.4. Caves and cave systems with troglobitic invertebrates
LT for taxa	Neighbouring Samogorska špilja cave is LT for <i>Thaumastocephalus roglici</i> Pavičević, Ozimec, Besuchet & Cuccodoro, 2024. This recently described species occurred also in Gradska špilja cave (Pavičević et al. 2024b).
Other taxa in LT	Gastropoda: <i>Semilimax</i> sp., <i>Spelaeoconcha</i> sp.; Isopoda: <i>Alpioniscus</i> sp., <i>Armadillidium</i> sp., <i>Oroniscus</i> sp., <i>Strouhaloniscus</i> sp., <i>Trichoniscus</i> sp.; Chilopoda: <i>Lithobius</i> sp.; Diplopoda: <i>Apfelbeckia</i> sp., <i>Brachydesmus</i> sp., <i>Dyocerasoma</i> sp., <i>Macrochaetosoma</i> sp.; Acari: <i>Rhagidia</i> sp.; Symphyla: <i>Scutigerella</i> sp.; Araneae: <i>Stalagtia</i> sp., <i>Sulcia</i> sp.; Opiliones: <i>Cyphophthalmus</i> sp., <i>Nelima</i> sp.; Palpigradi: <i>Eukoeneria</i> sp.; Pseudoscorpiones: <i>Chthonius</i> sp., <i>Neobisium</i> sp.; Scorpiones: <i>Euscorpius</i> sp., Collembola: <i>Bilobella</i> sp., <i>Heteromurus</i> sp., <i>Orchesella</i> sp., <i>Tomocerus</i> sp., <i>Verhoeffiella</i> sp.; Diplura: <i>Plusiocampa</i> (<i>Stygiocampa</i>) sp.; Zygentoma: <i>Coletinia</i> sp.; Coleoptera: <i>Neotrechus</i> sp., <i>Speonesiotes</i> sp., <i>Neuraphes</i> sp., <i>Pygaxion</i> sp., <i>Tychobythinus</i> sp., <i>Thaumastocephalus roglici</i> Pavičević, Ozimec, Besuchet & Cuccodoro, 2024; Diptera: <i>Speolepta</i> sp.; Orthoptera: <i>Dolichopoda araneiformis</i> Germar, 1838, <i>Gryllomorpha</i> sp., <i>Troglophilus</i> sp.; Lepidoptera: <i>Triphosa</i> sp. (after Pavičević et al. 2024b, supplemented)
Remark	<i>Biokovoamaurops nyx</i> gen. n., sp. n. is a species found in a small, relatively cold cave, air temperature 7.8-11 °C and substrate 6.7-11 °C, depending on the time of year, but with permanent air humidity 99-100%. For specimens found in small, real cave habitats, it is difficult to exactly define where they can occur, due to the proximity of deeper, inner, still unknown cave habitats, as well as interstitial cracks or channels.

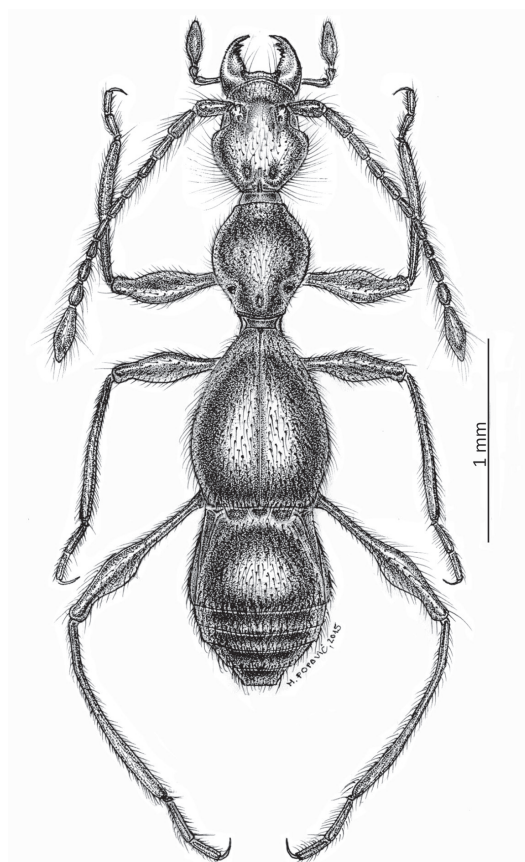


Fig. 1. *Biokovoamaurops nyx* gen. n., sp. n., habitus (by M. Popović).

Distribution

Known only from the type locality, Gradska špilja cave, located on the eastern part and N slopes on Biokovo Mountain (Figs 2-4). *Biokovoamaurops nyx* gen. n., sp. n. can be defined as an endemic species for the Natura 2000 site Biokovo (HR5000030), Nature Park Biokovo, Geopark Biokovo-Imotski lakes, Biokovo Mt., Split-Dalmatia County, Croatia, EU and Dinarides.

Discussion

This new Amauropini genus, *Biokovoamaurops* gen. n., shows a high level of similarity with the genus *Seracamaurops*, especially their smaller representatives such as *S. popovici* (Pavičević et al. 2008) or *S. cadmei* (Pavičević and Ozimec 2013) (Fig. 5) with respect to the following morphological characters: general body shape (habitus), length of antenna, disposition of the vertexal fovea as well as basal pronotal fovea, diffuse external stria with tergal margin, with short internal stria and long and slender legs with club-shaped mesofemora. It differs from *Seracamaurops* because of the presence of a distinctly wider head in the region of genae, broader pronotum, without the fissures of the last abdominal tergite.

The biogeography of the three troglobitic Amauropini genera, such as *Biokovoamaurops* gen. n., *Seracamaurops* (subgenera *Cordiamaurops* and *Seracamaurops*) and *Trogla-*



Fig. 2. Entrance of Gradska špilja cave, view from the cave channel (photo by R. Ozimec).

maurops, is shown by the unique position of the genus *Biokovoamaurops* gen. n. in the Dinaric region (Fig. 6), according to the biogeography of the Dinaric cave fauna (Ozimec et al. 2009). While the other two genera are members of the South Dinaric biogeographic region, *Biokovoamaurops* gen. n. is a member of the Central Dinaric, so-called Dalmatian, biogeographic region.

With respect to the tectonics of the Dinarides, *Seracamaurops* and *Biokovoamaurops* gen. n. belong to the deeply karstified Dinaric tectonic zone, while *Troglamaurops* belongs to the Adriatic tectonic zone, which is strongly influ-

enced by the Adriatic microplate.

The genus *Seracamaurops* is distributed mainly in the mountainous part of eastern Herzegovina, in Bosnia and Herzegovina, and in the Mediterranean mountains of Montenegro, but also in Croatia, on Mount Sniježnica, part of the Konavle region (Fig. 6). The genus *Troglamaurops* is mainly distributed in the Southern Dalmatia (Dubrovnik-Neretva County) in Croatia, but also in eastern Herzegovina in Bosnia and Herzegovina, while the genus *Biokovoamaurops* gen. n. is currently known only in Croatia.



Fig. 3. Cave habitat of Gradska špilja cave, view from the entrance (photo by R. Ozimec).

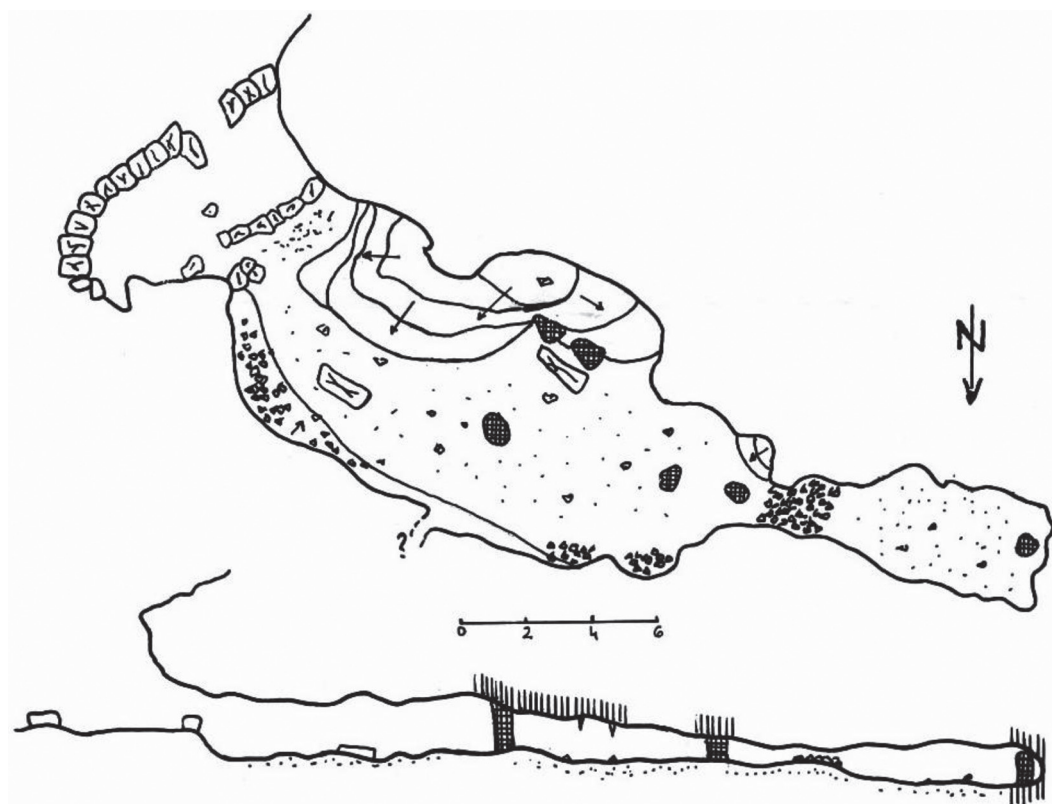


Fig. 4. Map of Gradska špilja cave (by M. Pavlek, measured by H. Cvitanović, B. Jalžić and P. Rade).

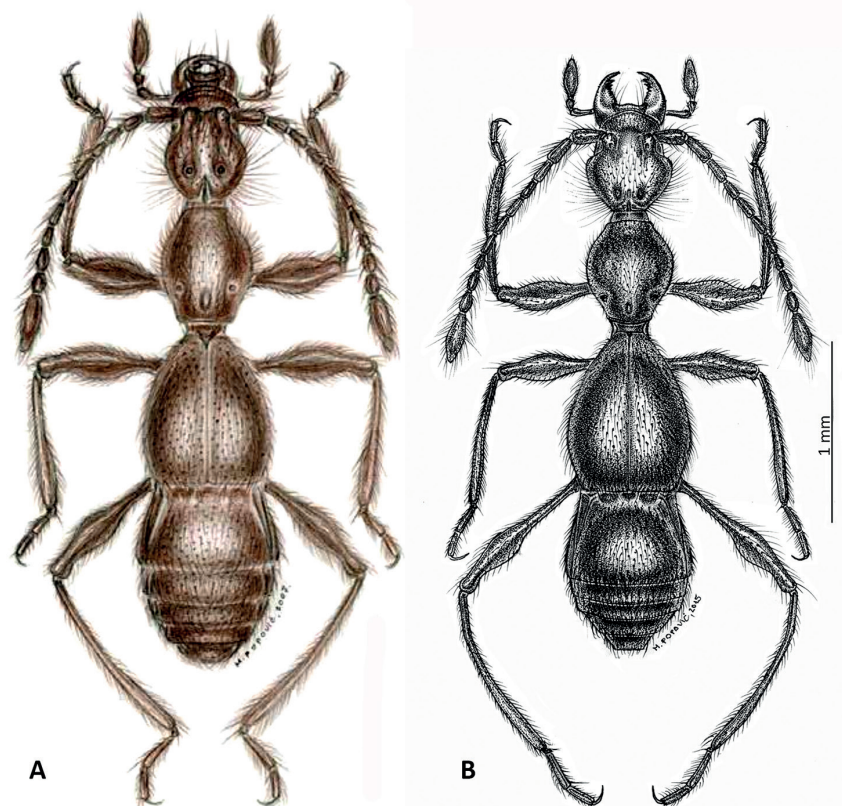


Fig. 5. Comparative drawings of *Seracamaurops cadmei* (A) and *Biokovoamaurops nyx* gen. n., sp. n. (B) (by M. Popović).

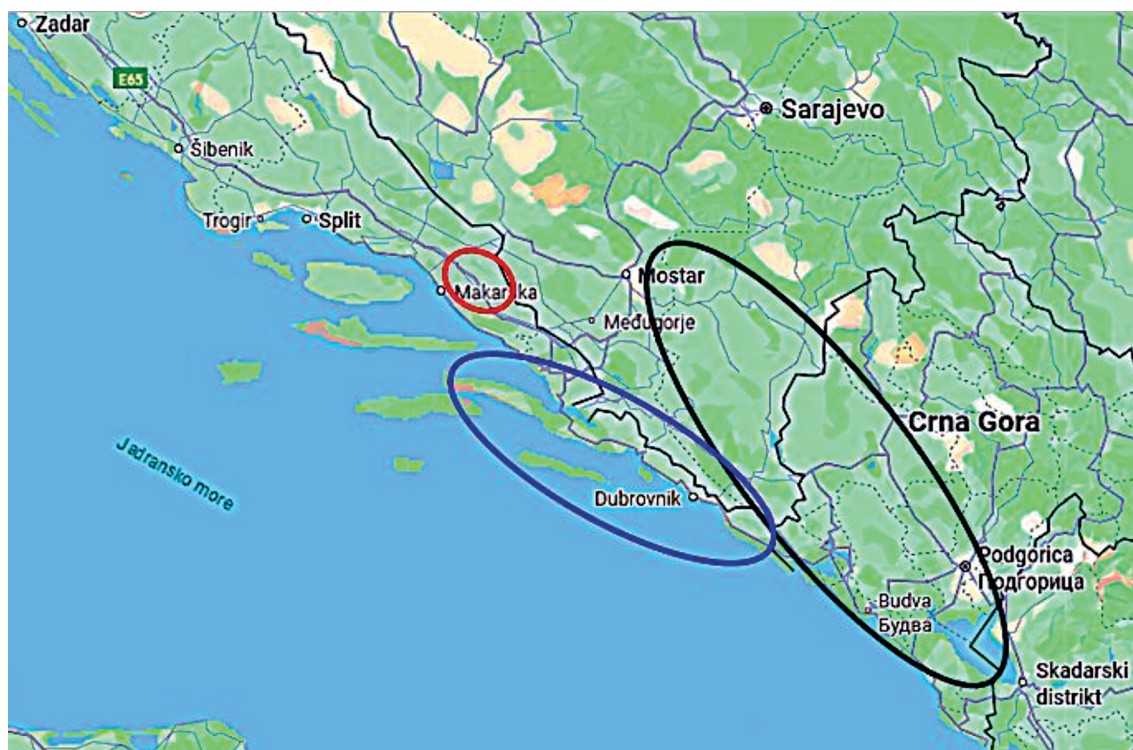


Fig. 6. Simplified distribution map of three troglitic Amauropini genera: *Biokovoamaurops* gen. n. (red line), *Seracamaurops* (black line) and *Troglamaurops* (blue line).

In close proximity to the Gradska špilja cave (*Biokovoamaurops nyx* gen. n., sp. n. type locality), two species of edaphic genus *Paramaurops* are present, both with atrophied eyes. *Paramaurops alenkirini* Hlavač, Bregović & Jalžić, 2020 was described from the entrance area of the cave, Golubinka u Gaju, on Mihovil Mt. a part of Vrgorac Mountains, approximately 15 km straight-line distance from Gradska špilja cave. Another species, *Paramaurops apfelbecki* (Ganglbauer, 1896) is widely present in the region of middle Dalmatia, also on Matokit Mt. a part of Vrgorac mountain chain rather close to Gradska špilja cave. In the same wider area, Hlavač et al. (2020) found three more new, undescribed species of this genus. The genus *Paramaurops* with numerous taxa (62 after Hlavač et al. 2020) is present in the Mediterranean. The majority of the taxa are distributed in France and Italy and 10 species are found in the Balkan Peninsula (Hlavač et al. 2020).

The distribution of the newly described genus, *Biokovoamaurops* gen. n. is currently completely unknown, but it can be predicted for caves at relatively higher altitudes, as well as cooler microclimates, in the Primorski mountain range, next to Biokovo (1762 m), including from the southeastern to the northwestern part of the Rilić massif (1155 m), Omiška Dinara (864 m), Mosor (1339 m) and Kozjak (779 m). But, perhaps also in the hilly mountainous area in the hinterland of Mount Biokovo, the so-called Vrgorac Mountains, including Matokit (1062 m), Mihovil (1247 m) and

Šibenik (1314 m), as well as on some neighbouring mountains in Herzegovina. It should be emphasized that the genus *Thaumastocephalus*, which is most likely a syntropic genus with *Biokovoamaurops* gen. n., is also widespread on both of these mountain ranges.

The type locality, Gradska špilja cave, as well as the neighbouring caves Matijaševa peć and Samogorska špilja (all three grouped above the village of Župa, on the northern slopes of Biokovo), were visited and investigated several times after 25-05-2004 (the date that the specimen of this new species was found), in order to find new specimens (25-06-2004, 19-11-2005, 04-04-2006, 21-06-2007, 15-11-2010, 15-11-2011, 08-05-2012, 05-11-2015, and 23-06-2017). The most recent attempt to investigate these caves was conducted in the spring of 2024, when it was discovered that the path to the caves was heavily overgrown with vegetation and that it was impossible to reach the caves without prior cutting, cleaning, and clearly marking the path to the cave entrance.

Unfortunately, even after many visits to the type locality, we have not been able to find any other specimens. Identification of a male specimen would be especially informative, because the study of its aedeagus could lead us to the correct position of this new genus and species among the Amauropini. We hope that future systematic research will lead us to the discovery of male individuals, and perhaps even further species of the newly described genus.

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