

**ON TYPE SPECIMENS OF CAVERNICULOUS ISOPODS DESCRIBED
BY THE FAMOUS ROMANIAN SCIENTIST EMIL RACOVITZA
IN THE COLLECTIONS OF THE “GRIGORE ANTIPA” NATIONAL MUSEUM
OF NATURAL HISTORY FROM BUCHAREST**

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Abstract. In 1948, the Museum from Bucharest received an important donation from Andrei Racoviță, the son of the great founding father of Biospeleology, Emil Racovitza. We provide details for three type (syntype) specimens identified in the Crustacean collection from the “Grigore Antipa” National Museum of Natural History. Three jars harbouring three species of isopods were identified, one cirrolanid and two spheromatid isopods, marked with a “cotype” label. *Typhlocirolana gurneyi* was described by Emil Racovitza in 1912 based on material collected from a cave in Algeria, Missergin. The other two are: *Caecosphaeroma (Vireia) burgundum burgundum* Dollfus, 1898 and *Monolistra (Typhlosphaeroma) bericum bericum* (Fabiani, 1901) from France and the Italian Alps. We therefore underline the necessity to designate the “syntype” of the three species rediscovered in the collection. This paper is dedicated as an homage to the colossal work and great scientific personality who was Emil Racovitza and to his immense contribution to the history of biospeleology.

Keywords: type specimens, isopods, Racovitza, “Grigore Antipa” Museum.

Rezumat. Despre exemplarele tip de izopode cavernicole descrise de faimosul cercetător român Emil Racoviță din colecțiile Muzeului Național de Istorie Naturală „Grigore Antipa” din București. În 1948 Muzeul din București a primit o donație importantă de la Andrei Racoviță, fiul marelui părinte fondator al biospeologiei, Emil Racoviță. Oferim mai multe detalii despre trei exemplare tip (sintipi) identificate în colecția de crustacee din Muzeul Național de Istorie Naturală ”Grigore Antipa”. Au fost identificate trei recipiente adăpostind trei specii de izopode, un cirrolanid și două specii de izopode sferomatide, cu eticheta “cotip”. *Typhlocirolana gurneyi* a fost descrisă de Emil Racoviță în 1912 pe baza unui material colectat dintr-o peșteră din Algeria, Missergin. Celelalte două sunt: *Caecosphaeroma (Vireia) burgundum burgundum* Dollfus, 1898 și *Monolistra (Typhlosphaeroma) bericum bericum* (Fabiani, 1901) din Franța și din Alpii italieni. Astfel că subliniem necesitatea desemnării sintipilor celor trei specii redescoperite în colecție. Această lucrare este dedicată ca un omagiu lucrării colosale și marii personalități științifice care a fost Emil Racoviță, precum și contribuției sale imense la istoria speologiei.

Cuvinte cheie: exemplare tip, izopode, Racoviță, Muzeul „Grigore Antipa”.

INTRODUCTION

The world-renowned scientist Emil G. Racovitza has remained to posterity as an illustrious participant in the Belgian Antarctic expedition “Belgica”, the first to winter at the South Pole and through the discovery and description of the small fauna found inside the caves that formed the basis of the establishment of a new branch of biological sciences, biospeleology. The Archive of the “Grigore Antipa” Museum is one of the repositories in the country which holds some of the great scholar’s documents, photographs and objects (PETRESCU & PETRESCU, 2018 b).

Emil Racovitza (1868 -1947) was, alongside Grigore Antipa, one of the founders of Romanian sciences, the founder and pioneer of Biospeleology in Romania. After obtaining his doctorate in 1896, Racovitza becomes the sub-director of the Arago laboratory, a famous oceanological observatory, where he stays between 1900 and 1920. Due to his tenacious and leading personality he will give an impulse to the development of biospeleology, along with his colleagues, René Jeannel and Pierre-Alfred Chappuis. The results of the speleological explorations made by Emil Racovitza together with René Jeannel, Chappuis and other collaborators were published in «*Énumération des grottes visitées*» (JEANNEL & RACOVITZA, 1908), summarizing no more than 1000 caves by the end of the First World War (MOHAN, 2018). In Cluj, he will bring a team of renowned biologists, Jules Guiart (French doctor, and professor of the History of Medicine at the Faculty of Medicine in Cluj), René Jeannel and Alfred Chappuis (GUIART & JEANNEL, 1948; MOTĂȘ, 1963).

René Jeannel (23th March 1879-20th February 1956), was a doctor in medicine from Paris, specialist in cave beetles. In 1920 he will move with his entire family in Cluj to help Racovitza to found the Speleological Institute, where he was a professor in Cluj (PUȘCARIU, 1980), and together with Chappuis and Pușcariu will develop a most representative journal “*Travaux de l’Institut de Spéologie de Cluj*” (ORGHIDAN, 1980). Together with Emil Racovitza, he will coordinate the “*Biospeologica*” association (1907-1950), whose results were published in a review with the same name in the famous “*Archives de Zoologie expérimentale et générale*”, conducted by Pruvot and Racovitza and founded by the famous Professor Henri de Lacaze-Duthiers (BĂCESCU & MARINESCU, 1981). He was a member of the Italian Entomological Society since 1922 (when he worked in Romania, in Cluj) and he published some notes on Coleoptera of the Italian and Balkan fauna in the Bulletin of the Society (TAGLIANTI, 2005).

Pierre-Alfred Chappuis (1891-1960) was a Swiss famous researcher of hydrobiology who became the deputy director of the Romanian Institute of Speleology in Cluj of for more than twenty years (MOTĂȘ, 1963), the first deputy

director of the Underground Laboratory of the National Center for Scientific Research in Moulis (JEANNEL, 1960; DELAMARE DEBOUTTEVILLE & ROUCH, 1961).

The “*Biospeologica*” collection included more than 20,000 subterranean specimens and was deposited at The Speleological Institute from Cluj (TĂBĂCARU & DANIELOPOL, 2020). Across the times, some of the specimens from this great collection had been studied and their data was restored in the form of catalogues: Diptera (BURGHELE-BALACESCO, 1966), Chiroptera (BORDA et al., 2006), Chilopoda (MATIC, 1968) – with precious holotypes of cavernicolous Lithobiids and Scolopendromorpha, Lumbricids (POP, 1968). This vast collection suffered losses during the Second World War, especially the bat collection, and its collecting data was successfully restored (BORDA et al., 2006).

The “Grigore Antipa” Museum holds one of the most important collections, the type specimen collections in the country, being one of the important pillars of taxonomical discoveries in Romania. According to the International Code of Zoological Nomenclature, the cotype is similar to the syntype, which is a specimen from the holotype series that is chosen in the absence of the holotype. Naming a holotype is an important step in establishing a new species.

The crustacean type collection (other than insects) from the “Grigore Antipa” National Museum of Natural History was founded by Professor Mihai Băcescu and his most devoted disciples, Zarui Muradian (PETRESCU, 2019), Modest Guțu, Ileana Negoescu, Iorgu Petrescu, a most precious treasure that will remain over time.

The crustacean isopod collection contains a large number of alcohol-preserved specimens (mostly terrestrial species, in sealed jars with glass plates), that had been acquired at the beginning of the 20th century from Vaclav Frič (PETRESCU & PETRESCU, 2018a). The Anthuridea isopod collection was organized and established by Dr. Ileana Negoescu (NEGOESCU, 1998), an esteemed carcinologist from the museum and comprises more than 271 type specimens: 20 holotypes, 8 allotypes, and 243 paratypes. Across the times, fellow colleagues, admirers and scientists who followed into his path had dedicated new isopod species to the memory of the most famous specialist. Two type specimens dedicated to the memory of the scientist are harboured in the collections of the museum: *Eurydice racovitzae* Băcescu, 1949 and *Kupellonura racovitzae* George & Negoescu, 1985.

We discuss here about some specimens that arrived with the donation made by Andrei Racoviță, the son of Emil Racovitza, on 27th of January 1948 (PETRESCU & PETRESCU, 2018b). Also, we bring to attention that when describing the new species, Racovitza did not designate any type specimens, like it was the particular case of *Typhlocirolana gurneyi* (RACOVITZA, 1912).

The entire paper is dedicated as an homage to the colossal work and great scientific personality who was Emil Racovitza and to his immense contribution to the history of biospeleology.

MATERIAL AND METHOD

We have analysed the Isopoda type collection and the scientific collection and tried to identify specimens received from the donation made by Andrei Racoviță, on January 27th 1948. In this process, hard-copy registers and the hand-written registers made by the custodian of the collections had been verified. Hand-written interior labels had been analysed and compared to other writings of previous curators or scientists.

The specimens are fixed in formalin cylinder jars, sealed with pig bladder and painted black.

For each species, we provide references to the original description and figure, the original localities, a list of the type material, current taxonomy and nomenclature (BOYKO et al., 2024).

RESULTS AND DISCUSSIONS

We provide details for three type (syntype) specimens identified in the Crustacean collection (non-type). Three jars hosting three species of isopods were identified, with an external label marked as “syntype”. One cirolanid and two spheromatid isopods have been identified. The specimens were collected from Algeria, France and Italy, in 1909, 1910 and 1925. The material was described and collected by Emil Racovitza and his collaborators, Rene Jeannel and Chappuis. From “*Énumération de grottes*” published by JEANNEL & RACOVITZA in “*Archives de zoologie expérimentale et générale, Biospeologica*” (1908, 1910, 1912, 1914, 1918, 1929) it was possible to resurface some of the lost details of the orphan syntypes of Racovitza most beloved research group, the crustacean cavernicolous isopods.

Type specimens described by Emil Racovitza

Suborder Cymothoidea Leach, 1814

Family Cirolanidae Dana, 1852

Typhlocirolana Racovitza, 1905

Typhlocirolana gurneyi Racovitza, 1912: 261–266, figs. 54–63

COTYPE: ISP 350 (old. no.9490/53), 2 specs, Algeria, Département d'Oran, Grotte Misserghin, 17.11.1909, Col. Prof. Racovitza, 1912 (Fig. 1A) .

Remarks: exterior label in ink (handwritten): *Typhlocirolana Gurneyi* Racovitza (Cotyp.) Algeria, Col. Pr. (Profesor) Racovitza (Fig. 1B); interior label in pencil handwritten “*Typhlocirolana Gurneyi*”; fixed on a glass plate (one dorsal, the second one ventral) (Fig. 1C).



Figure 1 **A.** *Typhlocirolana gurneyi* Racovitza, 1910 (syntype, ISP 350 (old. no.9490/53)); **B.** External ink-label; **C.** Internal handwritten label; **Figure 2.** **A.** *Caecosphaeroma (Vireia) burgundum burgundum* Dollfus, 1898 (syntype, ISP 393 (old. no. 9490/99)), **B.** Internal handwritten label; **Figure 3.** **A.** *Monolistra (Typhlosphaeroma) bericum* (Fabiani, 1901) ((syntype, ISP 406 (old. no. 9490/112)), **B.** External ink-label; **C.** Internal handwritten label. (M.N.I.N.G.A. collection, original photos by Ana-Maria Petrescu)

Suborder Sphaeromatidea Wägele, 1989

Family Sphaeromatidae Latreille, 1825

Genus *Caecosphaeroma* Dollfus, 1896

***Caecosphaeroma (Vireia) burgundum burgundum* Dollfus, 1898**

Caecosphaeroma (Vireia) burgundum Dollfus.

Racovitza, 1910- Pl. XXIX-XXXi, Fig. 140-169

COTYPE: ISP 393 (old. no. 9490/99) *Cercosphaeroma burgundum* Dollfus, Col. E Racovitza, Grotte de Baume les Messieurs, Franța, 4 specs, 28.09.1907 (Fig. 2A).

Remarks: External label in ink: *Cercosphaeroma* (correct *Caecosphaeroma*) *burgundum* Dollfus, Cotyp Col. E Racovitza, ISP 393/9490/99, 4 specs; internal labels (2) in handwritten pencil, fixed on a glass plate: 1. *Caecosphaeroma burgundum* Gr. (Grotte) d. (de) Baume les Messieurs, Franța, leg. Prof. Racovitza don. P. Chappuis (probably the writing of Mihai Băcescu) (Fig. 2B).

***Monolistra (Typhlosphaeroma) bericum bericum* (Fabiani, 1901)**

Monolistra (Typhlosphaeroma) Racovitza, 1910

Syn. *Caecosphaeroma bericum* Fabiani, 1901

Fabiani, 1901: 169-176, pl. 3.

Racovitza, E. G. 1910: 726-737, pl. 23-25, fig. 65-94.

COTYPE: ISP 406 (old. no. 9490/112), 8 specs, Cuvolo della Guerra, Vicenza, 09.09.1925, Jeannel and Chappuis leg. (Fig. 3A).

Remarks: external label in ink ("*Monolistra (Typhlosphaeroma) berica* (Fab.)") (Fig. 3B), internal label in pencil ("*Monolistra berica* Fab. Cuvolo della Guerra, Vicenza, Jeannel et Chappuis leg.") (Fig. 3C).

DISCUSSIONS

In the Crustacean collection of the museum, the world fauna, we have discovered three jars with specimens marked as "syntype", collected by Racovitza and his collaborators, Pierre Alfred Chappuis and René Jeannel (Figures 1-3). We assume that it arrived together with the donation made on 27.01.1948 by the descendants of the illustrious scientist, namely the scientist's son, Andrei Racoviță, a donation consisting of objects that belonged to Emil Racovitza (PETRESCU & PETRESCU, 2018 b). On that date, the director of the museum was the illustrious and late scientist Constantin Motaș, and the crustacean specialist was the scientist Mihai Băcescu (MARINESCU, 2000), whom we presume to have also written part of the interior labels that are now fixed on the inside of the jar.

***Typhlocirolana gurneyi* Racovitza, 1912.** In 1904, on 16th July, Racovitza, together with Pruvot and guided by Fernando Moragues, had researched the Balearic Islands where he discovered the *Typhlocirolana* genus and the species

Typhlocirolana moraguesi Racovitza, 1905 in the freshwater lakes from Cuevo del Drach, Lac de Délices, in the Balearic Archipelago (RACOVITZA, 1905; RACOVITZA, 2005a). The *Typhlocirolana* genus has a large distribution around the Mediterranean, Sicily, N-W Africa, Balearic Islands (DE GRAVE & HERRANDO-PÉREZ 2003; MAHI et al., 2017).

In 1909, René Jeannel had started one of his first explorations, with Emil Racovitza, in the Algerian caves, where they stayed two and a half months and explored 18 Algerian caves (9 from Alger and 9 from Constantine) (JEANNEL & RACOVITZA, 1910).

While exploring the caves of Misserghin (“no. 492/221, “Grotte de la quatrième source du Ravin de Misserghin”, as described by JEANNEL & RACOVITZA, 1912, 1914) and Bou Iacor (Bou-Tlélis) from the Oran Province, Racovitza will describe the new species, *Typhlocirolana gurneyi* (RACOVITZA, 1912). The very slender and small cirolanids were caught in a trap, during one hour. He will describe collecting 47 specimens from Misserghin ravine on 17.11.1909 and three specimens in 16.12.1910 from Bou Iacor, Bou-Tlélis commune, but without designating the type specimen. From the works of Jeannel & Racovitza, 1912 we have found that the specimen was collected from a calcareous cave, at 275 m, approximately 150 m from the entrance of the cave, a temperature of the water of 20.2°C and 30-50 m depth (allotted no. 329). Cave Misserghin, Dept. Oran, Algeria, is the fourth source of the ravine de Misserghin and is situated at 275 m altitude, in limestone rock (JEANNEL & RACOVITZA, 1910, 1914). In 1914, Jeannel notes (JEANNEL & RACOVITZA, 1914) that the cave, which they have visited for the third time, on March 2nd in 1913 (previously in 17 November 1909 and 17 December 1910) presents a stagnant pond and very abundant *Typhlocirolana gurneyi* burrowed in the mud.

From Algeria, Racovitza discovered three species out of four of the genus *Typhlocirolana*: *T. buxtoni* Racovitza, 1912, *T. fontis* Gurney, 1908, and *T. gurneyi* Racovitza (DECU et al., 2001). BOTOSANEANU et al. (1986) and other specialists (MONOD, 1930; NOURRISSON, 1956) consider the synonymy of *T. gurneyi* with *T. fontis*, while MARGALEF (1958) and BRUCE (1986) are more inclined to note that *T. gurneyi* is not a valid species, but a combination between others, like *T. fontis* Gurney (1902) and *T. buxtoni* Racovitza (1912). MAHI et al. (2017) describe a new species of *Typhlocirolana* from Algeria, *T. longimera* and *T. cf. gurneyi* from Ain Temouchent, while considering *T. gurneyi* as a good species, but with further more details in the near future.

The specimen from the collections of “Grigore Antipa” Museum presents an interior label that may have been handwritten by Acad. Mihai Băcescu himself. It is the only known specimen, since RACOVITZA (1912) had not designated a type specimen.

***Caecosphaeroma (Vireia) burgundum burgundum* Dollfus, 1898.** The species was described by Galimard (1898) from the Grotta della Douix (Costa d'Oro). The analysed material was first described from Grotte de Darcey, Cote-d'Or, France and from the cave d'Arcy-sur-Cure, south-east from Department of Yonne) (RACOVITZA, 1910).

The description of the Baume-les-Messieurs cave (no.103) from 28 September 1907 is made by JEANNEL & RACOVITZA (1908) where they note the presence of “an interesting animal”, a sphaeromian isopod which will be described in a memoir destined for the study of isopods (RACOVITZA, 1910). On the second mention from the Baume-les-Messieurs (no.733, JEANNEL & RACOVITZA, 1918), the description of the cave and the collected material is made by Edmond Sollaud, preparator at the School of Higher studies of Besançon (RACOVITZA, 2005b). In the same cave, from Baume-les-Messieurs, the new genus *Caecosphaeroma* was discovered, also with, *C. virei* Dollfus, in 1895 by Dr. Viré (DOLLFUS, 1896, 1898; SKET, 1986). Racovitza reassigned it to the subgenus *Vireia* in 1910.

The specimen from the collection of Antipa Museum was collected by Racovitza and donated by Chappuis (Fig. 2A, B) and was possibly collected in 1907, on 28 September, in the Cave of Baume-les-Messieurs close to Lons-le-Saunier (commune de Baume-les-Messieurs, cant. de Voiteu, Dep. of Basses-Pyrénées, Jura Mountains, France) (JEANNEL & RACOVITZA, 1908).

***Caecosphaeroma bericum* (accepted as *Monolistra (Typhlosphaeroma) bericum bericum* (Fabiani, 1901)**

In his revision of the Monolistrini RACOVITZA (1910) assigned *Typhlosphaeroma* as subgenus of *Monolistra* Gerstaecker, 1856 and *T. bericum* as type species of this subgenus. This classification is still valid (Sket, 1964). *Monolistra* is a diverse group of 35 species and subspecies, which can be found along the Dinaride and Italo-Dinaride Systems, from Montenegro to the Swiss Alps (SKET, 1986). Two subspecies have been differentiated: *M. (T.) bericum bericum* Fabiani, 1901 and *M. (T.) bericum hatzii* Sket, 1959. The species was found in the North of Italy (SE of Lago di Garda), Po system and in Istria (SKET, 1964).

The stygobitic isopod species is endemic to the Berici Hills (Colli Berici, S of Vicenza Province) and in Verona — Vicenza — Monti Lessini (SKET, 1964; SKET, 1986; LATELLA, 2023). The troglobitic sphaeromatids belonging to the group Monolistrini Hansen, 1905 are considered “marine relics in cave waters” (SKET, 1986).

The type material studied by Racovitza (1910) was based on donations made by Ernst Vanhöffen (Zoology Museum from Berlin), by H. J. Hansen (Copenhagen Museum) and by Mario Bezzi (a famous Italian entomologist and professor from Regional Museum of Natural Sciences, Torino), collected from Covolo della Guerra, Colli Berici, Vicenza Province, Italy. Recent faunistic studies in the region have mentioned that this species is still present in the cave (BOSCOLO, 1968; BOLDORI, 1977; LATELLA, 2023).

In his chronologic remembrance, CHAPPUIS (1948) notes all the campaigns they have made under the coordination of the Speleological Institute in Cluj (TĂBĂCARU & DANIELOPOL, 2020), and after 1925, because of an illness Racovitza suffered, Jeannel and Chappuis had to continue collecting fauna, but from a lesser number of caves. In the autumn of 1925, early September, they had explored 15 caves in Northern Italy and the karst, bringing back very

interesting material (caves no. 1005-1019) (JEANNEL & RACOVITZA, 1929). The trip was made in an automobile in the Southern Alps, from Lake Lugano and up to the Brenta valley, then in Vicentin, Colli Berici and the small Montello massif. The collected material would allow to highlight a number of affinities between the cavernicolous fauna of the Southern Alps and those of Carniola. In their trips in the Italian Alps, they were helped by the great Italian scientist Leonida Boldori (1897-1980), speleologist and entomologist from Cremona, and a close friend of Jeannel (BUCCIARELLI, 1996), also the first president of the Italian Speleological Society. They have passed through several provinces and visited 15 caves: Brescia (1 cave - Buco del Frate), Como (3), Istria (1), Treviso (2), Trieste (1), Vicenza (6); 15 in total.

The specimen from our collection was collected by Jeannel & Chappuis from Covolo della Guerra, Vicenza Province, on September 9th 1925 (JEANNEL & RACOVITZA, 1929).

Covolo della Guerra, Buso de la Guerra or "War Cave", N. 127 V-VI, is located in N-E Italy, on Mount Castellaro, on the Berici Hills, in Vicenza Province, municipality of Longare, Costozza; 45° 27' 20" N, 0° 52' 27" W. The cave was discovered in 1887 during a drought and the internal areas were reached by C. Baldini, Don G. Bologna, V. Castellani. Caneva (1891) discussed in his paper about the "Covolo della Guerra" in the Berici Hills, but he did not have the time to describe the specimen. Ramiro Fabiani, in 1901, Italian Academician described the albino specimen for the first time, also offering a small description of the cave. The specimen was found in a puddle on the left side of the stream (FABIANI, 1901). Later on, Covolo della Guerra was visited by Chappuis and Jeannel, in 1925, on September 9th, who gave a little description of the cave (JEANNEL & RACOVITZA, 1929). The two French explorers have succeeded in going downstream the siphon, a pond about one meter deep and 150 m from the entrance.

It is grace to the most conspicuous works of Racovitza, Jeannel, Chappuis and their collaborators from all over the world in the nine series of the «*Énumération des grottes visitées*» that we could find and complete the data on the syntypes from our collection.

CONCLUSIONS

On this year we mark 120 years since the first discovery of the famous isopod, *Typhlocirolana moraguesi* (Racovitza, 1905), one of the milestone moments transforming the curious young scientist from Banyuls-sur-Mer into the worldwidely recognized speleologist.

We underline the continuity of the work of Emil Racovitza by allotting the "syntype" name to the three rediscovered specimens and their restored historical place: *Typhlocirolana gurneyi* Racovitza, 1912, *Caecosphaeroma (Vireia) burgundum burgundum* Dollfus, 1898 and *Monolistra (Typhlosphaeroma) bericum bericum* (Fabiani, 1901), from three caves from Algeria, France and Italian Alps, a collective image of the sustained team effort of his illustrious collaborators, Jeannel and Chappuis.

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