

FIRST RECORD OF *JUGATALA CRIBELLIGER* = *MYCOBATES* (*CALYPTOZETES*) *CRIBELLIGER* (BERLESE, 1904) (ACARI: ORIBATIDA) IN THE ROMANIAN FAUNA

IOANA NAE*, MARK MARAUN**

Abstract. The authors present one oribatid mite species new for the Romanian fauna, found in Piatra Craiului Mountains. *Jugatala cribelliger* = *Mycobates (Calypozetes) cribelliger* (BERLESE, 1904) is described using scanning electronic microscope images, with notes on its morphology, taxonomic status and distribution.

Keywords: oribatid mites, *Jugatala cribelliger*, *Mycobates (Calypozetes) cribelliger*, Romania, Piatra Craiului, MSS, first record.

1. INTRODUCTION

The oribatid mite fauna from Romania's caves and subterranean environments such as the Mesovoid Shallow Substratum (MSS) has rarely been studied (COOREMAN, 1951; DUMITRESCU *ET AL.*, 1967, 1969; SKUBAŁA *ET AL.*, 2013; JIMÉNEZ-VALVERDE *ET AL.* 2015; IVAN & VASILIU, 2010; VASILIU & IVAN, 2011; NAE & IVAN, 2015; NAE & BĂNCILĂ, 2017; NAE *ET AL.*, 2021); most investigations were carried out in litter and soil (MARAUN & SCHEU, 2000). The Mesovoid Shallow Substratum (MSS) was found to harbour oribatid mites, and recent studies showed the importance of this type of subterranean habitat for conservation issues (ARILLO & SUBIAS, 1994; PIPAN *ET AL.*, 2000; NAE & BĂNCILĂ, 2017).

The Mesovoid Shallow Substratum (MSS) was described by JUBERTHIE *ET AL.* (1980) as an intermediate habitat between the base of the soil and the bedrock, representing a system of fissures and voids with similar abiotic characteristics as the deep subterranean environment, i.e. caves. This environment was studied in Romania, and data regarding the invertebrate animal communities (Araneae, Coleoptera, Isopoda, Diplopoda, Colembolla, Opilionidae, Oribatidae) have been published by DECU *ET AL.*, (2004), NITZU & ILIE (2002), NITZU *ET AL.* (2006), NITZU *ET AL.* (2010), NITZU *ET AL.* (2014), NAE & IVAN (2015), NAE & BĂNCILĂ (2017). Here we present a species of oribatid mites, sampled from MSS in Piatra Craiului Mountains, first recorded in the fauna of Romania.

2. MATERIALS AND METHODS

We sampled scree habitats from Piatra Craiului Mountains, also a National Park, situated in the Southern Carpathians, Romania. The Piatra Craiului Mountain has above 2000 metres altitude and developed one of the largest scree from Romanian Carpathians, Marele Grohotiș.

The mites were captured using pitfall traps placed between 1578 m and 1672 m altitude. To sample the invertebrate fauna in the MSS (Mesovoid Shallow Substratum) PVC tubes were placed in drillings in the scree (LÓPEZ & OROMI, 2010). Each tube was perforated in the posterior part and ended with a pitfall trap with ethylene glycol as preservative agent. The upper end was covered with a plastic lid to prevent debris falling in.

The specimen that is the subject of the article (one individual) was collected from Marele Grohotiș. There were two sampling stations where drillings were buried at two different depths. The species was identified from the drilling from the depth 0.75 m, in May, 2008, at 1578 m altitude.

The specimen was preserved in 70 % ethylic alcohol, temporally mounted in glycerine, examined and identified to genus level using an Olympus CH2 microscope. The studied oribatid mite was deposited in the collection of “Emil Racovitza” Institute of Speleology, Bucharest.

In 2018, the specimen was mounted for Scanning Electronic Microscope (SEM) photography, at the Institute of Zoology and Anthropology at the University of Göttingen, Germany. Using the SEM technology, we identified the specimen as *Jugatata cribelliger* (BERLESE, 1904) = *Mycobates (Calyptozetes) cribelliger* Subías, 2004.

For the identification we used the keys published by VAN DER HAMMEN (1952), BERNINI (1978), PÉREZ IÑIGO (1993,1997), WEIGMANN (2006).

The systematic ranking of the species is in accordance with SUBÍAS (2004), updated in 2023.

3. NEW RECORDED SPECIES

Family PUNCTORIBATIDAE Thor, 1937

***Jugatata cribelliger* = *Mycobates (Calyptozetes) cribelliger* (Berlese, 1904)**

Oribates cribelliger Berlese 1904, p. 28, fig. 46.

Oribates cribelliger: Castanogli & Pegazzano 1985, p. 96.

Ceratozetes cribelliger: Schweizer 1956, p. 313, fig. 258.

Mycobates cribelliger: Mahunka & Mahunka-Papp 1995, p. 84, figs. 155, 156.

Jugatata cribelliger: Subías 2000, p. 23.

Mycobates (Calyptozetes) cribelliger Subías 2004, 183; 2008, p. 344.

Trichoribates oxypterus: Schatz 1989, p. 120.

Material examined: 1 specimen – Piatra Craiului, in MSS, in drillings placed in MSS on calcareous scree, 1578 m. Leg. Augustin Nae.

The combination of following characters of adults is considered as diagnostic for *Jugatata* (Fig. 1; Fig. 2): rostrum rounded; lamella narrow to wide, with cuspides and translamella; lamellar cuspides without lateral and median dens or with minute lateral dens; bothridium cup shaped; sensillus with capitate or clavate head, rounded distally (Fig. 10; Fig. 11; Fig. 12); tutorium narrow, with cusp pointed distally; notogaster with pteromorphs curved ventrally (Fig. 3; Fig. 4), line of desclerotization absent; lenticulus present or absent; 10 or 11 pairs of notogastral setae (Fig. 15), *dp* present or absent; four to seven pairs of notogastral porose areas; six pairs of genital setae (Fig. 13); all legs heterotridactylous (Fig. 5); tibia I with dorsodistal apophysis bearing solenidion ϕ_2 ; seta *l''* of tibiae and genua I–IV thick, heavily barbed (BAYARTOGTOKH & SCHATZ, 2008).

Species diagnosis (after BAYARTOGTOKH & SCHATZ, 2008): Rostrum broadly rounded (Fig. 5), without lateral dens, with a nose-like protuberance dorsally; all prodorsal setae finely barbed (Fig. 15); lamella relatively wide, with medium long, thin translamella (Fig. 2; Fig. 5); lamellar cusp with or without minute lateral dens; inner dens absent; sensillus short, with smooth clavate head (Fig. 10; Fig. 11; Fig. 12); tutorium medium in size, its basal part approximately same in width, cusp widened proximally, but pointed distally (Fig. 5); 10 pairs of notogastral setae of medium length, thin, smooth, *dp* absent; porose areas round to oval, outer margin poorly developed; lenticulus absent; all ventral setae thin, smooth (Fig. 6).

Remarks. The genus *Jugatata* was established by EWING (1913) with *J. tuberosa* Ewing, 1913 as type species. The genus has only seven described species: *J. angulata* (C. L. KOCH, 1840), *J. armata* (HAMMER, 1958), *J. chavinensis* Hammer, 1961, *J. cribelliger* (BERLESE, 1904), *J. montana* Hammer, 1961, *J. rotunda* Willmann, 1953 and *J. tuberosa* Ewing, 1913. Most of these species (*J. armata*, *J. chavinensis*, *J. montana*, *J. tuberosa*) are known from South and North America (EWING 1913; HAMMER 1958, 1961; MARSHALL ET AL. 1987; BEHAN-PELLETIER 2000). Only three species have been found in Europe, namely *J. angulata*, *J. cribelliger* and *J. rotunda*. The first two of them, *Jugatata angulata* and *J. cribelliger* are known only from Central and Southern Europe (SCHWEIZER 1956; SCHATZ 1983; BERNINI ET AL. 1995; MAHUNKA & MAHUNKA PAPP 1995; NIEDBAŁA & OLSZANOWSKI 1997; SUBÍAS & GIL-MARTÍN 1997; STARÝ 2000A, 2000B, 2006; WEIGMANN 2006). The third species, *J. rotunda*, is known only by its original description from the type locality (WILLMANN 1953), but was reported, later, from the Czech Republic and Slovakia (STARÝ 2000B, 2006). The taxonomic status of *J. rotunda* is problematic (BAYARTOGTOKH & SCHATZ, 2008).

Until recently, the placement of the genus *Jugatata* at family level was unclear. GRANDJEAN (1963) included it in the family Ceratozetidae, but BALOGH (1972) moved it to the family Mycobatidae. In 2000, SUBÍAS accepted the genus as a member of Ceratozetidae, and he placed most of the “*Jugatata*” species in different genera of that family (*J. cribelliger* was combined with *Mycobates*). BEHAN-PELLETIER (2000) provided strong evidence for *Jugatata* as a member of Ceratozetidae, based on the studies of immature stages of the type species (BAYARTOGTOKH & SCHATZ, 2008).

The main characters of the present material agree with those of the type specimen, examined by MAHUNKA AND MAHUNKA-PAPP (1995) the material from Switzerland studied by SCHWEIZER (1956) and the species description of BAYARTOGTOKH & SCHATZ (2008).

Following BAYARTOGTOKH & SCHATZ (2008), we consider this species a member of *Jugatala* (family Ceratozetidae).

Distribution. *Jugatala cribelliger* (BERLESE, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 was found for the first time in the Romanian fauna. The species was identified using Scanning Electronic Microscope images. The species has an unknown habitat (FISCHER & SCHATZ, 2013) and is distributed in Northern Italy—Prov. Bolzano, Trento; Austria, Switzerland—Grisons; Iberian Peninsula.

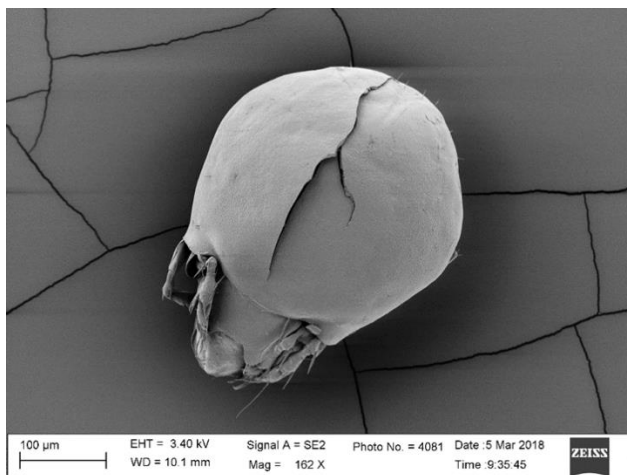


Fig. 1 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 – Dorsal view.

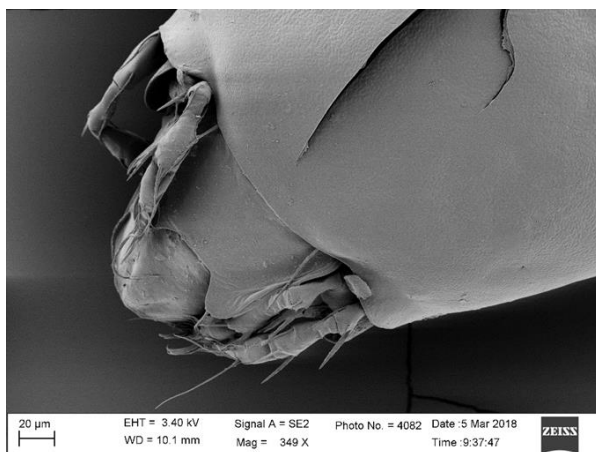


Fig. 2 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 – Dorsal view, detail of the prodorsum.

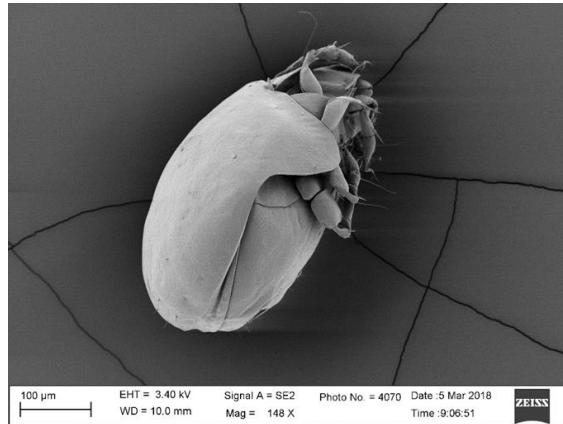


Fig. 3 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypozetes) cribelliger* Subias, 2004 – Lateral view.

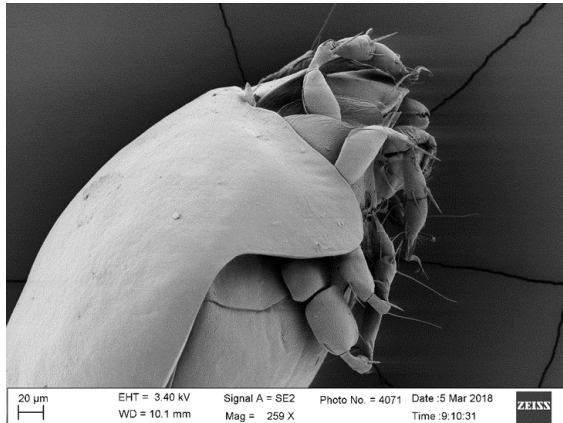


Fig. 4 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypozetes) cribelliger* Subias, 2004 – Lateral view, detail.

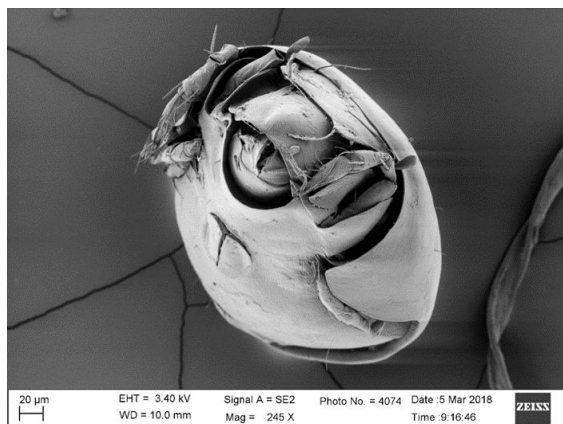


Fig. 5 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypozetes) cribelliger* Subias, 2004 – Anterior view from above.

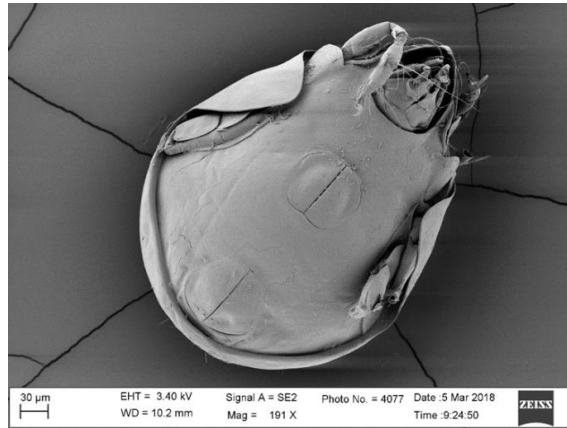


Fig. 6 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypnozetes) cribelliger* Subias, 2004 – Ventral view.

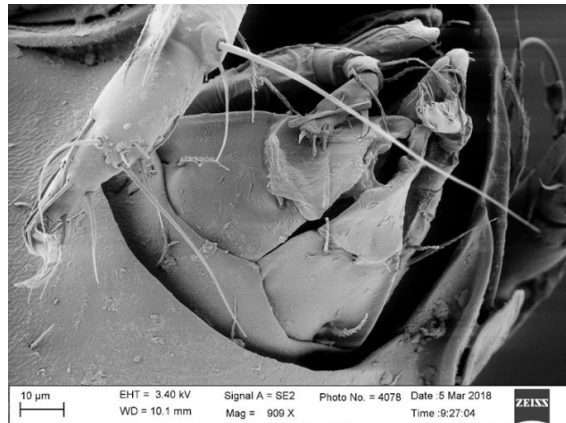


Fig. 7 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypnozetes) cribelliger* Subias, 2004 – Details of proterosoma.

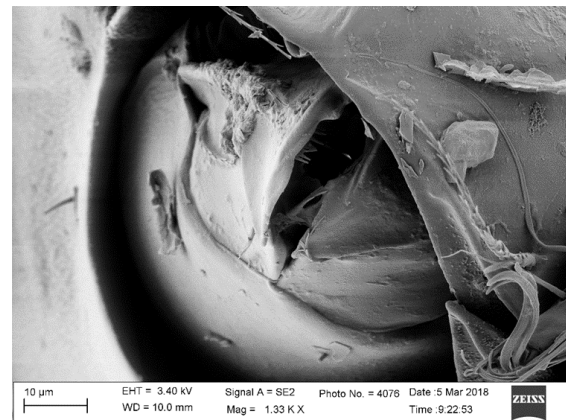


Fig. 8 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypnozetes) cribelliger* Subias, 2004 – View of gnathosoma.

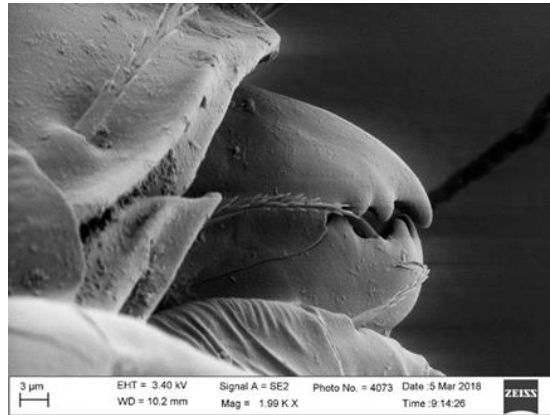


Fig. 9 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 – Chelicera.

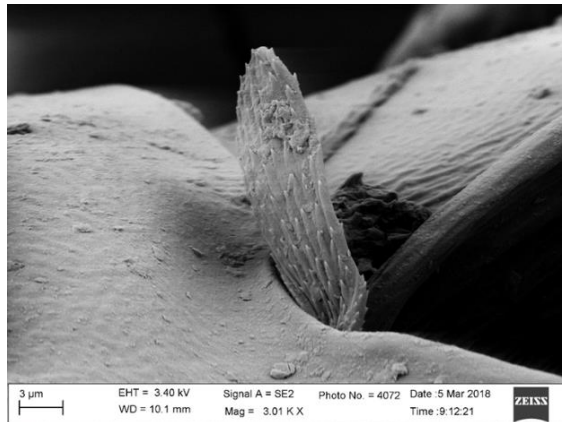


Fig. 10 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 – Sensillus.

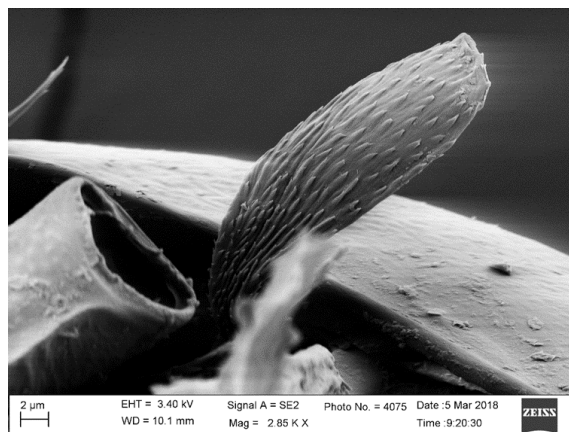


Fig. 11 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 – Sensillus.

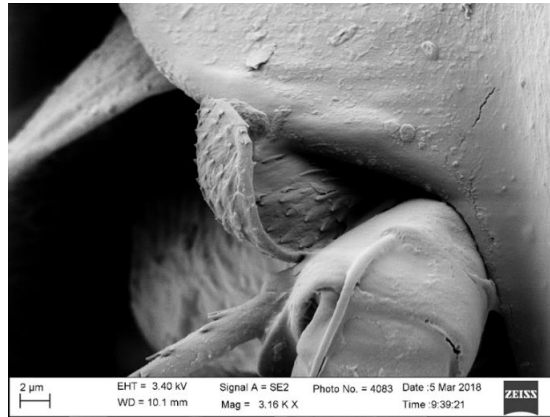


Fig. 12 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypozetes) cribelliger* Subias, 2004 – Sensillus.

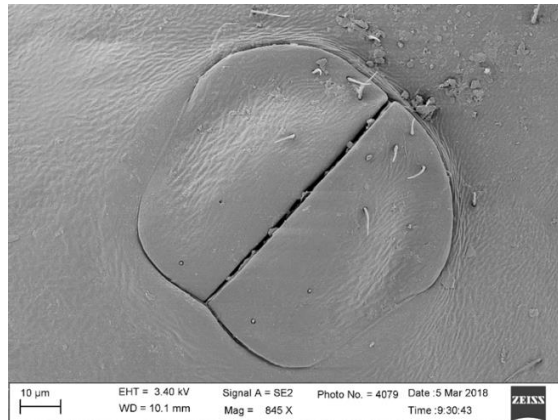


Fig. 13 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypozetes) cribelliger* Subias, 2004 – Genital plate.

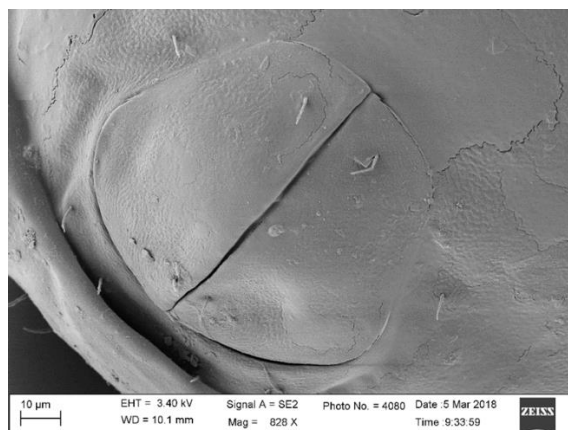


Fig. 14 – *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calypozetes) cribelliger* Subias, 2004 – Anal plate.

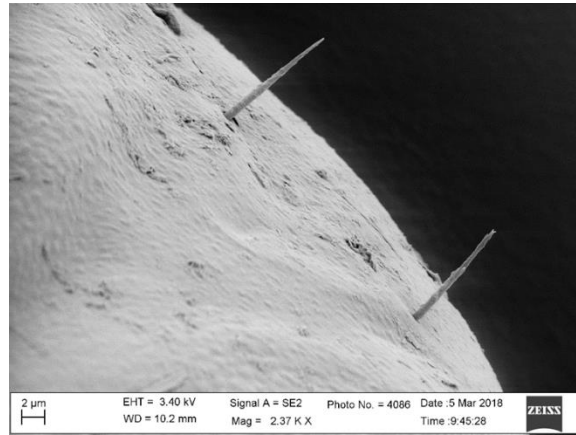


Fig. 15– *Jugatala cribelliger* (Berlese, 1904) = *Mycobates (Calyptozetes) cribelliger* Subias, 2004 – Notogastral setae.

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*“Emile Racovitza” Institute of Speleology, of the Romanian Academy, Bucharest, Romania.
E-mail: ioana.nae@iser.com

** University of Göttingen, Institute of Zoology and Anthropology, Department of Animal Ecology, Untere Karspüle 2, 37073 Göttingen