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***Geophilus oligopus* (Attems, 1895) a species new to the fauna of Romania and to the whole of the Carpathian Mountains**

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Abstract

Geophilus oligopus is a species considered until now as having an Alpine-Dinarian distribution area. The first Carpathian record of the species from the county of Maramureş in Romania is presented here, which is particularly interesting from a zoogeographical point of view. A redescription of the species is given, based on its syntypes deposited in the Museum of Natural History Vienna, further specimens from Austria and the Romanian specimen. Some special characters of the Romanian specimen are discussed in detail. An overview of the known distribution of the species is presented as well.

Keywords: Chilopoda, Myriapoda, first record, faunistic

Zusammenfassung

***Geophilus oligopus* (Attems, 1895), eine für die rumänische Fauna und die ganzen Karpaten neue Art.**

Geophilus oligopus ist eine Art, die bisher mit einem alpin-dinarischem Verbreitungsgebiet charakterisiert wurde. Hier wird nun das erste Vorkommen dieser Art aus den Karpaten vorgestellt, aus dem Komitat Maramureş in Rumänien. Dieser Fund ist aus zoogeographischer Sicht von besonderem Interesse. Es wird eine Beschreibung der Art anhand der Syntypen, die im Naturhistorisches Museum Wien aufbewahrt werden, weiteren Exemplare aus Österreich und des rumänischen Exemplares gegeben. Einige besondere Merkmale des rumänischen Exemplars werden genauer diskutiert. Auch erfolgt eine Übersicht des bisher bekannten Vorkommens.

Rezumat

Geophilus oligopus este o specie considerată până în prezent a avea un areal Alpino-Dinaric. Prima citare din Munţii Carpaţi a acestei specii, din judeţul Maramureş, este prezentată în lucrare ceea ce interesează în mod special din punct de vedere zoogeographic. Este redată o descriere a speciei pe baza sintipilor depozitaţi în colecţia Muzeului de Istorie Naturală din Viena, atât specimene din Austria cât şi cel colectat din România. Unele caractere speciale ale individului colectat în România sunt discutate în detaliu. O privire de ansamblu a distribuţiei cunoscute a acestei specii este de asemenea prezentată.

Introduction

Even in Europe, the real distribution of many taxa of centipedes is not known to a satisfactory degree (ZAPPAROLI, 2003). This statement is supported by several new faunistic records published in the latest literature (e.g. DÁNYI & KORSÓS 2002; LINDNER 2005; SPELDA 2005; VOIGTLÄNDER 1988). This is probably even true for the geophilomorphs, which is proved by some still unpublished records, too. Such an example is the case of *Dicellyphilus carniolensis* (C.L. Koch, 1847) which has been indicated for the first time in some European countries only in the present days (DÁNYI, in prep.), in spite of its relative huge size and conspicuousness. We can rightly expect that of some geophilomorph species with very small body size even more

interesting records will be revealed, like the occurrence of *Strigamia pusilla* (Sseliwanoff, 1884) in Romania (DÁNYI 2006) or *Schendyla tyrolensis* (Meinert, 1870) in Germany (SPELDA et al. 2005).

Till now, *Geophilus oligopus* (Attems, 1895) has been recorded from Austria (ATTEMS 1895, 1927, 1929a; CHRISTIAN 1996; KOREN 1986; VOIGTLÄNDER et al. 1994; WÜRMLI 1972), the Czech Republic (TAJOVSKÝ 2001b, 2002), Italy (FODDAI et al. 1995; MINELLI 1988; MINELLI & IOVANE 1987; VERHOEFF 1928), Croatia (ATTEMS 1927, 1929b, 1959; KOS 1996), Slovenia (KOS 1992, 1995; STOEVIČ 1997) and Bosnia and Herzegovina (KOS 1992, without closer locality data) and thus it was concluded that the species is of Alpine-Dinarian distribution (CHRISTIAN 1996). The new record presented here is the first one from the chain of the Carpathians, upon which we have to reassess the chorotype of this species.

Belonging to the *Geophilus insculptus* (Attems, 1895) group, the taxonomical status of *Geophilus oligopus* was rather confused for a long time. The history of the species, starting from the original description (ATTEMS 1895) was overviewed by Dr. Erhard Christian, who at last cleared the status of the species (CHRISTIAN 1996). He pointed out the inconsistencies in Attems' papers (ATTEMS 1895, 1929a) and the resulting confusion in some subsequent papers (see synonym list below). CHRISTIAN's (1996) review seems to be ignored by JEEKEL (1999), whereas to BARBER (1999) it gave a basis to clarify the identity of animals registered as *G. oligopus* in English faunistic records.

In spite of the long list of papers discussing the species, we still cannot claim to have a complete picture of the traits of *G. oligopus*; morphology, indeed, can be highly variable in geophilomorph species (MISIOCH 1978). For this reason, I feel the necessity to give an illustrated overview on the morphology of the species with remarks on the differences registered in some features on the Romanian specimen.

Materials and methods

Material examined:

- 1♂ Romania, county of Maramureş, Munţii Piatra (Piatra Mts.), Săpânţa (Szaplónca), near Cabana Colibi, 31.08.2004 N47°52.457' E23°43.397', 832 m a.s.l., leg Murányi D. & Orci K. M. (**figs. 2-10, 12, 16-19, 21**)
- 2 ♂♂? Austria, Mount Hochschwab: parts of the syntypes (NHMW: slides No. 6098 (**figs. 11, 15**), No. 6099)
- 1♀ Vienna 23, Wittgensteinstraße 29.3.1993 leg. A. Zahner (E. Christian's coll.: „F021”) (**fig. 14**)
- 1♀ Vienna 14, Steinhof resort 2.5.1993 leg. A. Zahner (E. Christian's coll.: „2510”) (**fig. 1, 13, 20**)

The new specimen was collected in the framework of a cooperation between the Hungarian Natural History Museum and the University of Arad, by taking a leaf litter sample which was extracted using Berlese-Tullgren funnel.

It was dissected with the method described by PEREIRA (2000) and cleared with a mixture of lactic acid and gelatin. The drawings were made with camera lucida on biological microscopes.

The Romanian specimen is mounted on two microscopic slides and deposited in the Myriapoda Collection of the Hungarian Natural History Museum.

Geophilus oligopus (Attems, 1895)

Orinomus oligopus ATTEMS, 1895 p. 167.

Orinophilus oligopus (Attems, 1895) – ATTEMS 1929a p. 188, fig. 175.

Geophilus minimus VERHOEFF, 1928 p. 245, fig. 10. – ATTEMS 1929a p. 355 (syn. by CHRISTIAN 1996 p. 126)

Geophilus noricus VERHOEFF, 1928 p. 242, fig. 12. – ATTEMS 1929a p. 356; ATTEMS 1947 p. 114; ATTEMS 1949 p. 107; WÜRMLI 1972 p. 3; KOREN 1986 p. 25 (syn. by MINELLI 1988 p. 439).

Geophilus paupopus ATTEMS, 1927 p. 291. – ATTEMS 1929a p. 165; ATTEMS 1929b p. 287; ATTEMS 1959 p. 293; KOREN 1986 p. 22, figs. 9a-g; KOS 1992 p. 355; KOS 1996 p. 147; STOEV 1997 p. 103; (syn. by CHRISTIAN 1996 p. 126)

Geophilus oligopus (Attems, 1895) – ATTEMS 1929a p. 356; ATTEMS 1947 p. 114; ATTEMS 1949 p. 108; WÜRMLI 1972 p. 3; MINELLI & IOVANE 1987 p. 11; MINELLI 1988 p. 436; KOS 1992 p. 355; MINELLI 1992 p. 169; VOIGTLÄNDER et al. 1994 p. 17.; FODDAI et al. 1995 p. 10, KOS 1995 p. 112; STOEV 1997 p. 103; CHRISTIAN 1996 p. 124, figs. 5e-h.; BARBER 1999 p. 2.; FODDAI & MINELLI 1999 p. 278, tab. 3.; TAJOVSKÝ 2001b p. 174., TAJOVSKÝ 2002 p. 158.; LAŠKA 2004 p. 19. (part.); TUF & LAŠKA 2005 p. 149. (part.).

non *Geophilus oligopus* (Attems, 1895) – KOREN 1986 p. 27; EASON 1990 p. 3; BARBER & KEAY 1995 p. 31; KEAY 1995 p. 29; WYTWER 1997 p. 266. (truly *G. insculptus* (WYTWER, in litt.)); TUF & OŽANOVÁ 1999 p. 359. (truly *G. insculptus* as in TUF 2003 (TUF, pers. comm.)); TAJOVSKÝ 2001a p. 40.

non *Geophilus paupopus* ATTEMS, 1927 – ATTEMS 1929a p. 352.

Size: 8-18 mm long (8-8 mm in the two specimens from Vienna, 9 mm in the Carpathian specimen, 14-18 mm in VERHOEFF, 1928 as *G. noricus*).

Number of legpairs: 37 or 39

Colour: Pale yellow, the head and the forcipula are a little darker.

Shape: Only slightly attenuated.

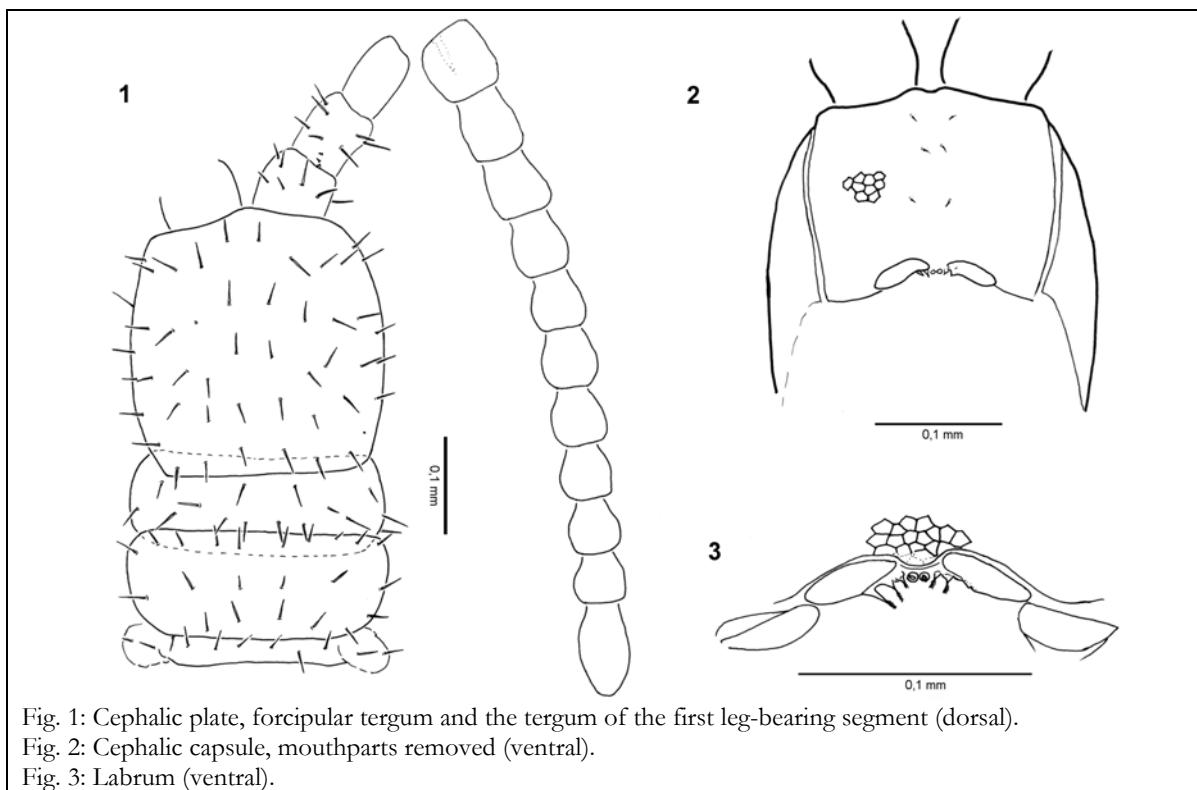


Fig. 1: Cephalic plate, forcipular tergum and the tergum of the first leg-bearing segment (dorsal).

Fig. 2: Cephalic capsule, mouthparts removed (ventral).

Fig. 3: Labrum (ventral).

Head: Longer than broad (width/length ratio: 0,78-0,92). The lateral and the proximal sides are hardly rounded, rather straight. No visible frontal sulcus. Chaetotaxy of the head as in figure 1.

Clypeus: With post-antennary, intermediate and posterior pairs of setae only (2/2/2) (fig. 2). Clearly reticulated, without clypeal area (fig. 2).

Labrum: Mid- and lateral pieces of labrum distinct. Mid-piece with 2-7 teeth, side-pieces each with 3-5 rather short fimbriae, proximally serrated (figs. 2-3).

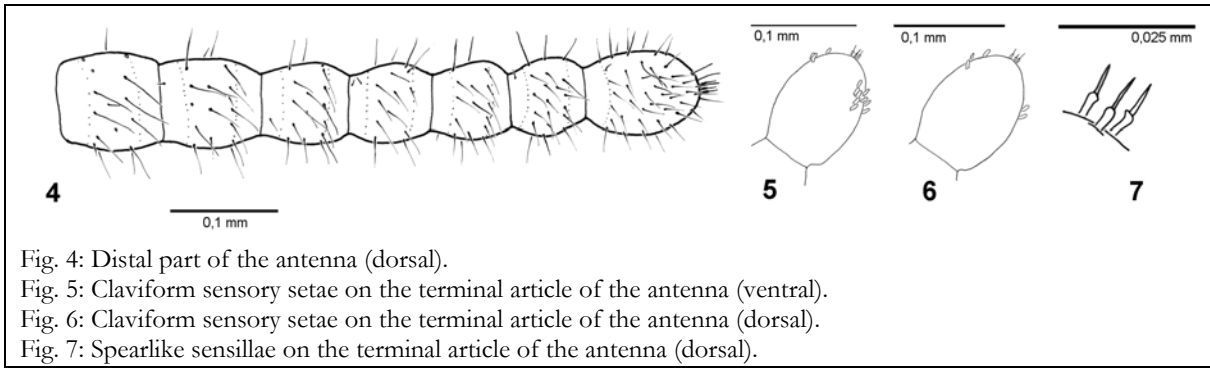


Fig. 4: Distal part of the antenna (dorsal).

Fig. 5: Claviform sensory setae on the terminal article of the antenna (ventral).

Fig. 6: Claviform sensory setae on the terminal article of the antenna (dorsal).

Fig. 7: Spearlike sensillae on the terminal article of the antenna (dorsal).

Antennae: About 3,4-4,2 times as long as the head (fig. 1). Articles rather short (fig. 4), the terminal one has claviform sensory setae (sensilla basiconica - according to the terminology of FODDAI & MINELLI 1999) in two groups (figs. 5-6) and one to three spearlike sensillae (sensilla brachyconica - according to the terminology used by BONATO et al. 2003) on the tip (fig. 7).

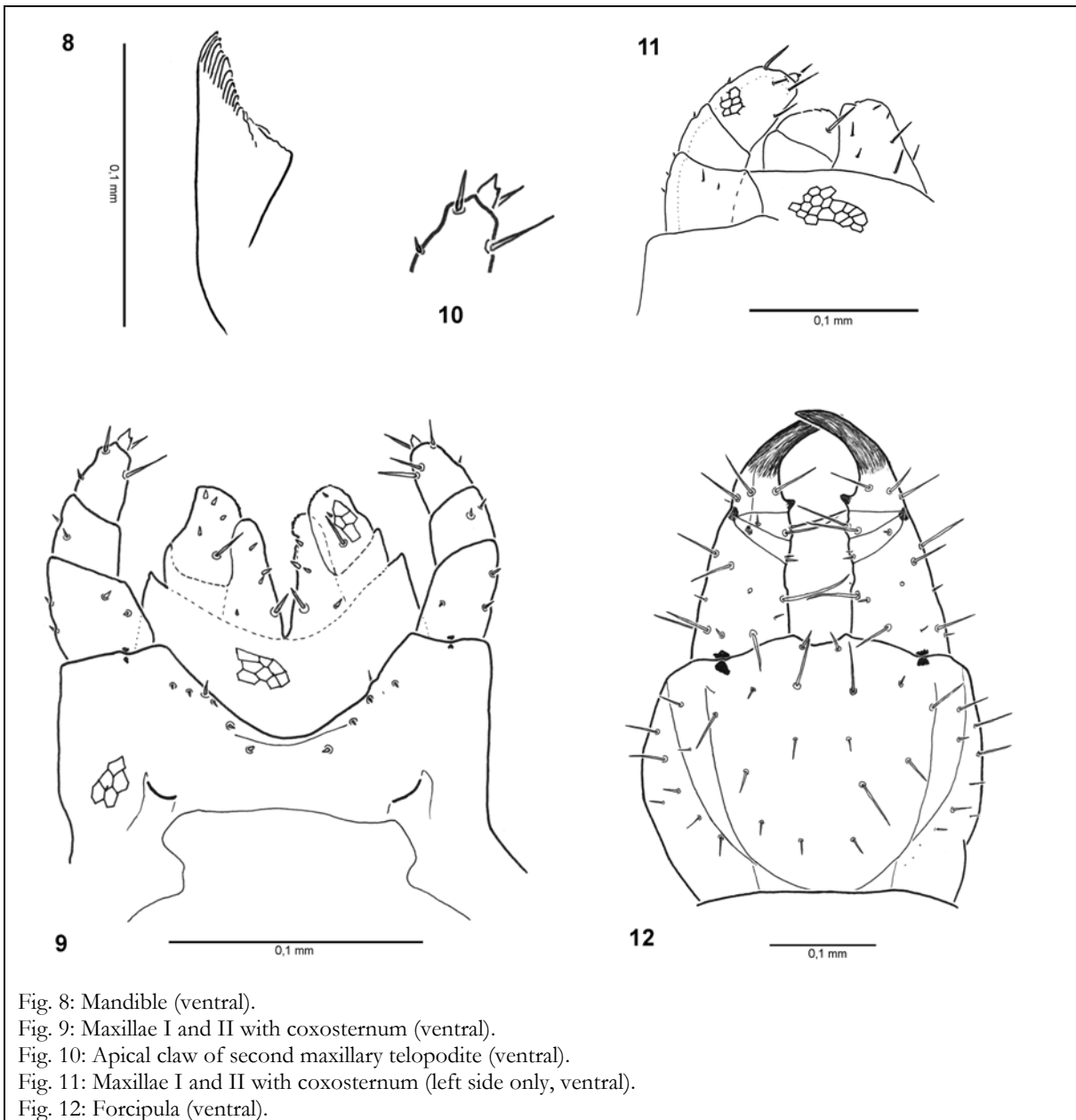


Fig. 8: Mandible (ventral).

Fig. 9: Maxillae I and II with coxosternum (ventral).

Fig. 10: Apical claw of second maxillary telopodite (ventral).

Fig. 11: Maxillae I and II with coxosternum (left side only, ventral).

Fig. 12: Forcipula (ventral).

Mandible: As in figure 8.

Maxillae: First maxillae: without palpi or with very slightly protruding laterodistal edges on the coxosternum (figs. 9, 11). The first maxillary telopodites have a special rough reticulation of large cells (CHRISTIAN 1996) (not always easily visible). First maxillary telopodites consist of two feebly articulated articles (mentioned already by ATTEMS (1895) and supported by the syntypes) which are however often hardly recognizable. Each of the telopodites and of the coxosternal projections has one large and some small setae (figs. 9, 11).

Second maxillae: coxosternum without median suture, its anterior border concave. Second maxillary telopodites have only a few setae, mostly on the proximal end (figs. 9, 11). Apical claw of second maxillary telopodite is small and peg-like with one or two tips (fig. 10).

Epipharynx: With 6-7 pores.

Forcipular segment: Forcipular tergum about as wide as the next one and a little wider than the cephalic plate. It is about 2,7-3 times wider than long, lateral edges concave, the anterior and the posterior margins are straight (fig. 1).

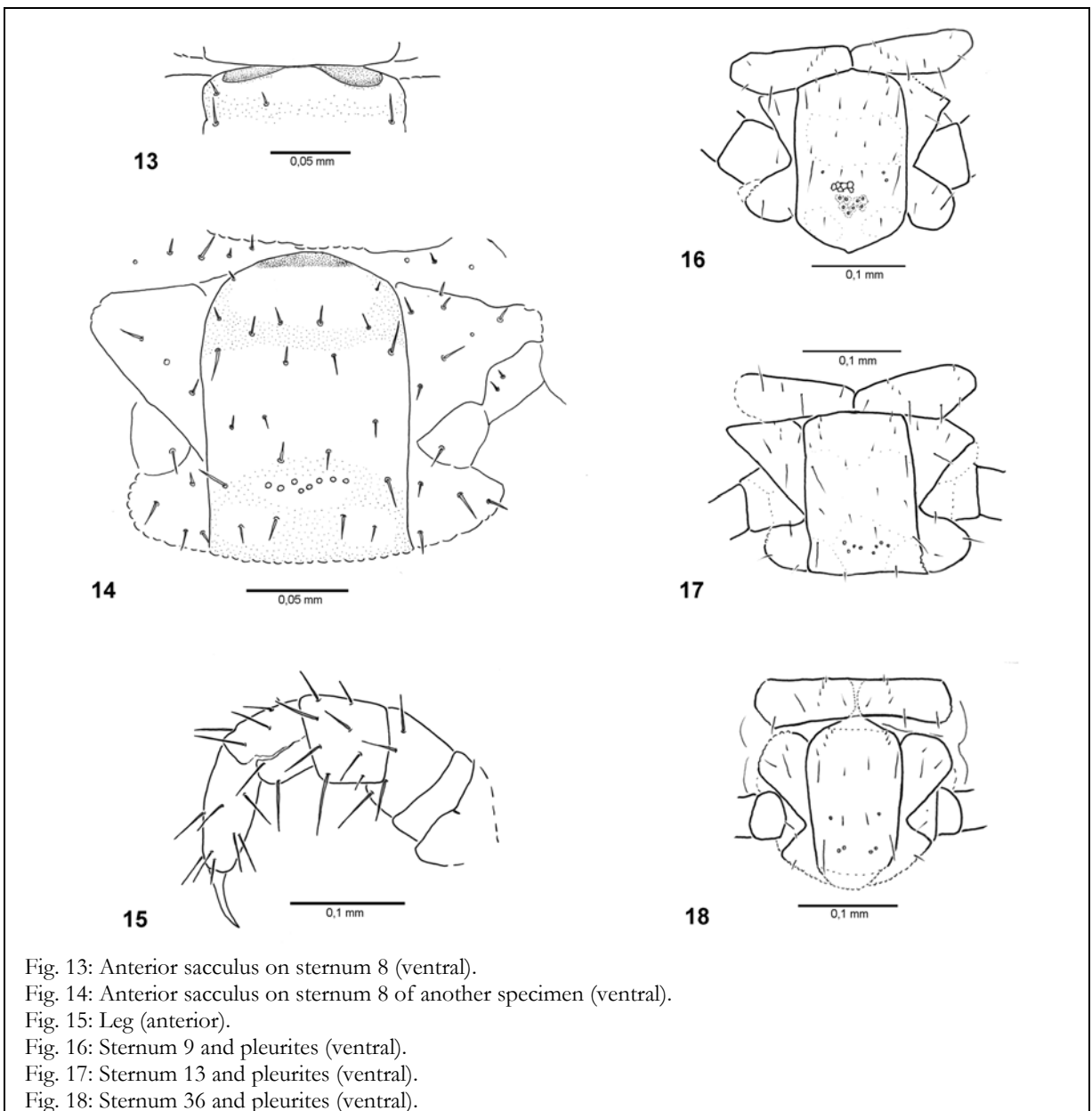


Fig. 13: Anterior sacculus on sternum 8 (ventral).

Fig. 14: Anterior sacculus on sternum 8 of another specimen (ventral).

Fig. 15: Leg (anterior).

Fig. 16: Sternum 9 and pleurites (ventral).

Fig. 17: Sternum 13 and pleurites (ventral).

Fig. 18: Sternum 36 and pleurites (ventral).

Forcipular telopodits reach till about the anterior margin of the cephalic plate or are a little shorter. Coxosternum with well-developed but incomplete chitinous lines directed more laterally than the condyles (fig. 12). Tarsungulum of the forcipular telopodites are gently curved, their internal margin can be either smooth or finely crenulate (CHRISTIAN 1996). Tarsungulum with a quite small but distinct and sclerotised basal tooth (fig. 12). Poison calyx is small („bush-shaped” according to the terminology of FODDAI & MINELLI 1999), placed into the femoroid or both in the femoroid and the tibia.

Trunk: The first 10-12 sternits have a slight carpophagus structure, that is lightly expressed in the Carpathian specimen (fig. 16). The anterior sacculus can be wide (fig. 13) or tight (fig. 14) either. The posterior peg is small or hardly expressed (figs. 13-14, 16).

Ventral pores: There are some special features in the pattern of the ventral pores of the Romanian specimen differing from that of the specimens from Vienna and from the data given in the literature. BARBER (1999) and FODDAI & MINELLI (1999) mention that *G. oligopus* has no pores at all on the first sternum and after the mid-body (13th-16th sterna). VERHOEFF (1928) states the same in the original description of both *G. noricus* and *G. minimus*. Furthermore, this information was confirmed by the re-examination of four specimens from the Alpine region (BONATO, after MINELLI, in litt., 2006). The specimens from Vienna support this finding, too (fig. 14), and the only sternum, left in a poor stage of preservation from one of the syntypes has no pores either. Another interesting feature found in the Carpathian specimen is the presence of some further pores outside of the sternal pore areas (figs. 16, 18) which are described by FODDAI & MINELLI (1999) as lacking in *G. oligopus*.

Terga with two very slight longitudinal sutures.

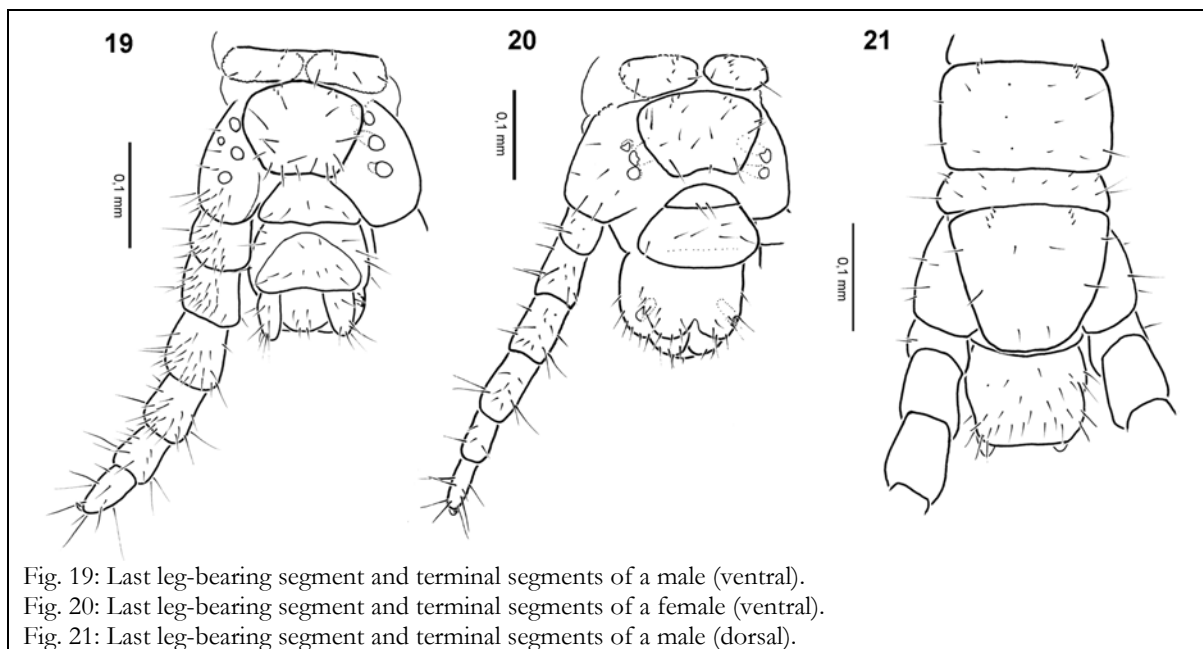


Fig. 19: Last leg-bearing segment and terminal segments of a male (ventral).
 Fig. 20: Last leg-bearing segment and terminal segments of a female (ventral).
 Fig. 21: Last leg-bearing segment and terminal segments of a male (dorsal).

Last trunk-segment: Coxopleura slightly swollen, each with 3-7 coxal pores on their ventral surfaces (figs. 19-21). Terminal legs of seven podomeres, slightly swollen in the males with more setae on the ventral side (fig. 19). Apical claws distinct.

Male gonopodes biarticulated, shape and chaetotaxy as in figure 19.

Anal pores 1+1 (figs. 19-20) (there are some reports of their lacking, such as the original description of *G. minimus* and in ATTEMS (1947), but these probably need confirmation).

Distribution: See figure 22.

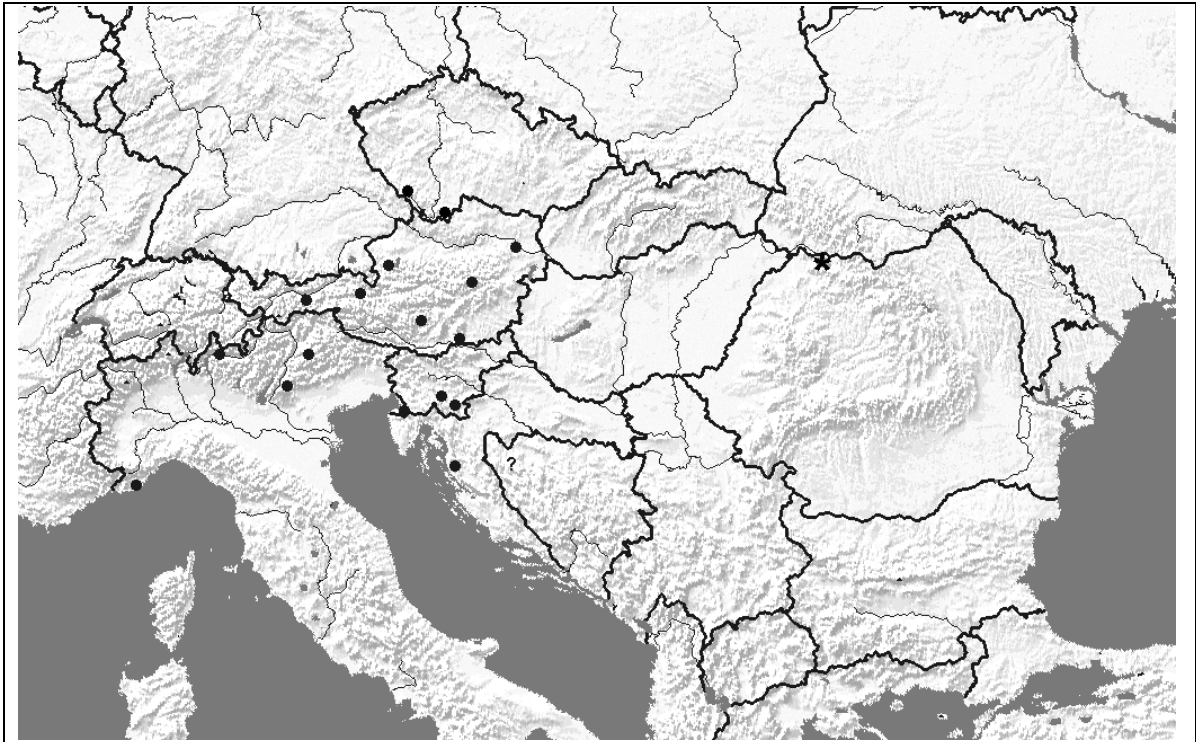


Fig. 22: Distribution of *G. oligopus* (records marked with black dots, the new record marked with a black star).

Habitat: There are only few data in the literature on the habitats in which the species was found: MINELLI & IOVANE (1987) give two records on 1000 m and 1900 m above sea level, under *Fagus* and in a *Piceetum subalpinum sphagnetosum* (the second records repeated by MINELLI 1988) and VOIGTLÄNDER et al. (1994) reported of some specimens collected in a subalpine spruce forest. KOS (1995) mentions specimens from an *Abieti-Fagetum dinaricum*, while the specimens from Vienna were collected in a grove (of *Pinus*, *Larix*, *Cornus*; 40 x 30 m) on a meadow and in a small mixed forest between a street and a vineyard, at the fringe of the settlement (CHRISTIAN, in litt., 2006). The Carpathian specimen was found in a spruce forest, at 832 m a.s.l.

Discussion

The distribution of *G. oligopus* has been considered as Alpine-Dinarian till now. In the light of the new record from the Carpathians it seems possible that the species has a much wider distribution, e.g. Alpine-Carpathian or even more Central European Mountainous. A similar pattern of distribution can be found for some other soil dwelling animals, for example for the earthworm *Eisenia spelaea* (Rosa, 1901) (CSUZDI & ZICSI 2003) or another centipede species, *Dicellobilus carniolensis* (DÁNYI, in prep). Because of the small size of *G. oligopus*, it is possible that the lack of records east of Austria is caused by the difficulties of its collecting and identifying. Thus it could be expected that the species will be found in the Carpathian parts of Slovakia, Poland and the Ukraine and even from the area of Hungary adjacent to Austria as well as from South-East Germany. An introduction of the species to its Romanian locality is hardly likely, because of the low level of anthropogenic impact in that region and the great distance to any village.

The special characters of the sternal pores shown by the Carpathian specimen are very similar to the ones upon which Verhoeff described *Geophilus promontorii* Verhoeff, 1928 as a distinct species from *G. insculptus* Attems, 1895. Unfortunately, our knowledge on the actual variability of the distribution of sternal pore areas in geophilomorphs in general, but even so within single species (TURCATO et al. 1995) is very poor. This is a general question which should be investigated further, along with the more specific investigation of further specimens in order to clarify the possibility of a new subspecies or species.

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