Haploglomeris multistriata (C. L. Koch, 1844) and *Brachyiulus pusillus* (Leach, 1814) (Diplopoda: Glomerida, Julida) new for the Czech Republic

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Abstract. The first records of two millipede species, *Haploglomeris multistriata* (C. L. Koch, 1844) and *Brachyiulus pusillus* (Leach, 1814) from the Czech Republic, are presented. The male genitalia are illustrated for both species. The number of millipede species known from the Czech Republic is thus increased to 80.

Abstrakt. ***Haploglomeris multistriata*** **a** ***Brachyiulus pusillus*** **(Diplopoda: Glomerida, Julida) nové pro Česko.** Svinule mnohopásá (*Haploglomeris multistriata* (C. L. Koch, 1844)) a prouženka příbřežní (*Brachyiulus pusillus* (Leach, 1814)) jsou druhy nově zjištěnými v Česku. Oba druhy jsou doloženy kresbami samčích gonopodů. Počet druhů mnohonožek známých z Česka tak vzrostl na 80.

Keywords. Pill millipedes, snake millipedes, Southwest Bohemia, new records, faunistics.

1 Introduction

The millipede fauna of the Czech Republic is relatively well studied, but through the activities of the last decades, progress has been made on the occurrence and distribution of millipedes. DOLEJŠ et al. reported in 2019 78 millipede (Diplopoda) species in six orders to occur in the Czech Republic, eight of them being pill millipedes (order Glomerida) and 37 snake millipedes (order Julida) (KOCOUREK et al. 2017a). Beforehand, KOCOUREK (2003) listed six new records of julid species for the Czech Republic in the period until 2002: *Brachyiulus lusitanus* Verhoeff, 1898 found in 1935 according to DOLEJŠ & KOCOUREK (2018), not in 2001 as stated by KOCOUREK (2003), but according to (TAJOVSKÝ 2001) probably found earlier by LATZEL (1884). *Rossiulus vilnensis* (Jawłowski, 1925) was recorded in 1990 (KOCOUREK 2001b) and *C. parisiorum* (Brölemann & Verhoeff, 1896) in 1998 (KOCOUREK 2001b). *Cylindroiulus vulnerarius* (Berlese, 1888), *C. truncorum* (Silvestri, 1896), and *Allajulus nitidus* (Verhoeff, 1891) were found for the first time in 2000 (KOCOUREK 2001a). For the latter species there was already a historic record by LANG (1952), whose voucher material had been lost, which was questioned as improbable by GULIČKA (1985).

For pill millipedes, KOCOUREK et al. (2017b) added one species that was recorded as new for the Czech Republic in the period 2003–2017: *Geoglomeris subterranea* Verhoeff, 1908 found in 2006 (MIKULA 2006).

The current paper reports one more pill millipede and one snake millipede species found as new for the Czech millipede fauna.

2 Material and Methods

Millipedes were collected by hand sampling and sieving, and identified by the authors (unless otherwise stated) using the literature given below. All millipedes are maintained in 80% ethanol, selected gonopods were mounted on permanent slides. The material is deposited in the zoological collection of the National Museum of the Czech Republic, Prague (NMP). The number of the mapping grid square in which the species were found follows BUCHAR (1982) and PRUNER & MÍKA (1996). Images of specimens were made using an Olympus SZX16 stereomicroscope equipped with an Infinity 2 camera, and that of gonopods (mounted on permanent slides) using by an Olympus BX50 light microscope (LM) equipped with an Olympus DP74 camera. For scanning electron microscope (SEM) examination, selected gonopods were transferred from ethanol into acetone, air-dried, coated with gold, and inspected using a SEM (HITACHI S-3700N). Illustrations were made by the first author.

This paper is one of three manuscripts completed after the sudden death of Pavel Kocourek (DOLEJŠ & KOVAŘÍKOVÁ 2023).

3 Results

Order GLOMERIDA Leach, 1814

Family Glomeridae Leach, 1815

Haploglomeris multistriata (C. L. Koch, 1844) (Fig. 1)

Glomeris multistriata C. L. Koch, 1844
Haploglomeris multistriata dorsalis Verhoeff, 1928
Haploglomeris multistriata multistriata (C. L. Koch, 1844)
Haploglomeris multistriata notolucida Verhoeff, 1928

Material: Jihočeský Region, Český Krumlov District, Přední Výtoň – Pasečná (48.6073°N, 14.0982°E, grid square 7350, 829 m a.s.l., Fig. 1C), 24.VI.2021: 1 ♂ (Figs 1A, 1F), 1 ♀ (NMP: P6E 5333), leg. P. Kocourek, hand sampling; 03.VII.2021: 2 ♂♂ (Figs 1D-E), 1 ♀, 2 juv. (NMP: P6E 5334), leg. P. Kocourek, hand sampling. Location of the former village Lhota in the municipality of Loučovice (48.6001°N, 14.1776°E, grid square 7351, 780 m a.s.l.), 09.X.2021: 1 juv. (NMP: P6d-19/2021), leg. P. Dolejš, sieving.

Identification: after SCHUBART (1934).

Description: Small, 9-13 mm (♂) or 10-15 mm (♀). Dark brown, with seven yellow or orange stripes on tergites (3 + 1 + 3), having either a paler or a darker form (Fig. 1 A-B). Tergal surface opaque. Bisyntergal margin with 7-11 striae, 8-9 ocelli. Male telopod (Fig. 1D-F): Syncoxital horns narrow (sh), overreached by syncoxital lobe (sl).

Distribution: Balkans (Montenegro, Serbia, Bosnia and Herzegovina, Croatia, Slovenia), southern Europe (Italy) (KIME & ENGHOFF 2011), reaching north to central Europe (Hungary and Austria) (JERMY 1942; GRUBER 2012). New to the Czech Republic.

Co-occurring species at the locality Pasečná (Fig. 1C): Millipedes – *Glomeris hexasticha* Brandt, 1833, *Haasea germanica* (Verhoeff, 1901), *Julus scandinavius* Latzel, 1884, *Mastigona mutabilis* (Latzel, 1884), *Polydesmus complanatus* (Linnaeus, 1761); centipedes (det. I. H. Tuf) – *Lithobius borealis* Meinert, 1872, *Strigamia acuminata* (Leach, 1815); woodlice – *Porcellium conspersum* (Koch, 1841); spiders – *Centromerus sellarius* (Simon, 1884), *Cryphoeca silvicola* (C. L. Koch, 1834), *Diplostyla concolor* (Wider, 1834), *Palliduphantes pallidus* (O. Pickard-Cambridge, 1871); harvestmen – *Nemastoma lugubre* (Müller, 1776); mites (det. J. Mourek) – *Damaeus onustus* (C. L. Koch, 1841).

Co-occuring species at the locality Lhota: Millipedes – *Haasea germanica* (Verhoeff, 1901), *Julus scandinavius* Latzel, 1884, *Polydesmus complanatus* (Linnaeus, 1761).

Proposed Czech name: svinule mnohopásá. The Czech name was previously proposed by KRATOCHVÍL & BARTOŠ (1954); the generic name "svinule" means the millipede able to volvate, the adjective "mnohopásá" means "many striae", reflecting both scientific name and morphological character.

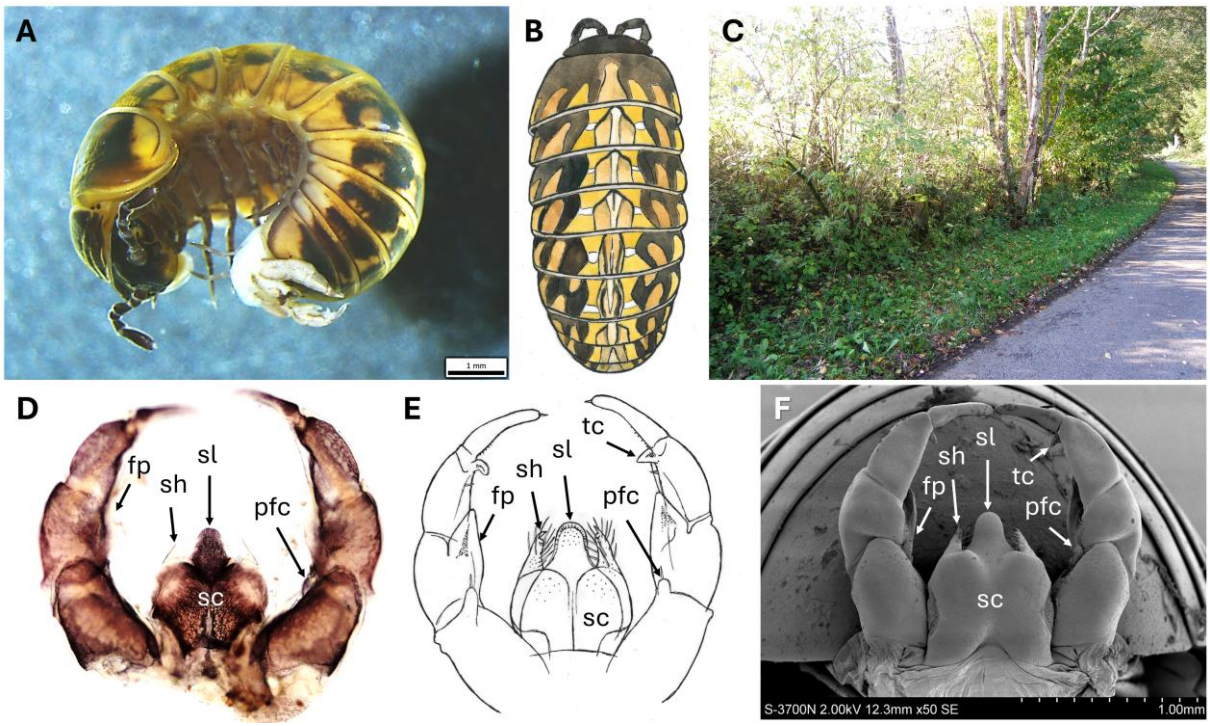

Figure 1: *Haploglomeris multistriata* (C. L. Koch, 1844). **A**: Male habitus, **B**: Female habitus, **C**: Habitat (Přední Výtoň – Pasečná), **D**: LM image of gonopods, **E**: Illustration of gonopods, **F**: SEM image of gonopods. Photo P. Dolejš (**A, C, D, F**), orig. P. Kocourek (**B, E**). Abbreviations (after LIKHITRAKARN et al. 2023): fp = femoral process, pfc = prefemoral cone, sc = syncoxite, sh = syncoxital horn, sl = syncoxital lobe, tc = tibial cone.

Order JULIDA Leach, 1814

Family Julidae Leach, 1814

Brachyiulus pusillus (Leach, 1814) (Fig. 2)

Synonyms: see VAGALINSKI & LAZÁNYI (2018: 18)

Material: Plzeň Region, Plzeň-jih District, Blovice – plant nursery "Štrobl" (49.5849°N, 13.5422°E, grid square 6447, 385 m a.s.l.), 18.V.2021: 2 ♂♂ (Fig. 2F), 2 ♀♀ (NMP: P6E 5335), leg. P. Kocourek, hand sampling. Klatovy District, Nezdice – Úhlava riverbank (49.5314°N, 13.3140°E, grid square 6445, 357 m a.s.l.), 10.V.2021: 1 ♀ (NMP: P6E 5336, Fig. 2G–H). Červené Poříčí – hydropower plant (49.5008°N, 13.2959°E, grid square 6445, 366 m a.s.l., Fig. 2C), 03.VI.2021: 2 ♂♂, 11 ♀♀ (NMP: P6d-13/2021; Fig. 2D–E, I–J), leg. P. Kocourek, P. Dolejš & A. Kovaříková, hand sampling. Janovice nad Úhlavou – Úhlava riverbank (49.3484°N, 13.2112°E, grid square 6645, 407 m a.s.l.), 03.VI.2021: 1 ♂ (NMP: P6d-13/2021), leg. P. Dolejš, hand sampling. Tajanov – plant nursery "Papušková" (49.4017°N, 13.2531°E, grid square 6545, 394 m a.s.l.), 12.X.2022: 1 ♂ (NMP: P6E 5337), leg. P. Dolejš, hand sampling.

Identification: after KORSÓS & LAZÁNYI (2020).

Description: Small, 7-12 mm (♂) or 9-13 mm (♀). Dark, grey-brown, grey-purple, with two yellowish stripes (Fig. 2A-B). Eyes with 22-23 ocelli. Preanal ring with a very short blunt projection. Anal valves densely covered with setae. Male gonopod: opisthomerite narrow, lateral process vestigial (not shown on Fig. 2D–F), basoposterior process (bpp) pointed (Fig. 2D-F). Vulva as in Fig. 2G-J.

Distribution: Widespread in western and central Europe, introduced to northern and southern Africa, North America and Australia (KIME & ENGHOFF 2017). New to the Czech Republic.

Co-occurring species at the locality Červené Poříčí: Millipedes – *Blaniulus guttulatus* (Fabricius, 1798), *Choneiulus palmatus* (Němec, 1895), *Polydesmus inconstans* Latzel, 1884, *Polyxenus lagurus* (Linnaeus, 1758).

Co-occurring species at the locality Janovice nad Úhlavou: Millipedes – *Brachydesmus superus* Latzel, 1884, *Glomeris tetrasticha* Brandt, 1833, *Polydesmus inconstans*.

Co-occurring species at the locality plant nursery "Papoušková": Millipedes – *Blaniulus guttulatus*, *Choneiulus palmatus*, *Cylindroiulus britannicus* (Verhoeff, 1891), *Glomeris hexasticha*, *Nemasoma varicorne* C. L. Koch, 1847, *Ophyiulus pilosus* (Newport, 1843), *Polydesmus inconstans*, *Unciger foetidus* (C. L. Koch, 1838).

Proposed Czech name: prouženka příbřežní. The Czech generic name "prouženka" means the millipede with colour stripes, Czech adjective "příbřežní" means "by a [river] bank", reflecting a natural habitat where the species was found in the Czech Republic.

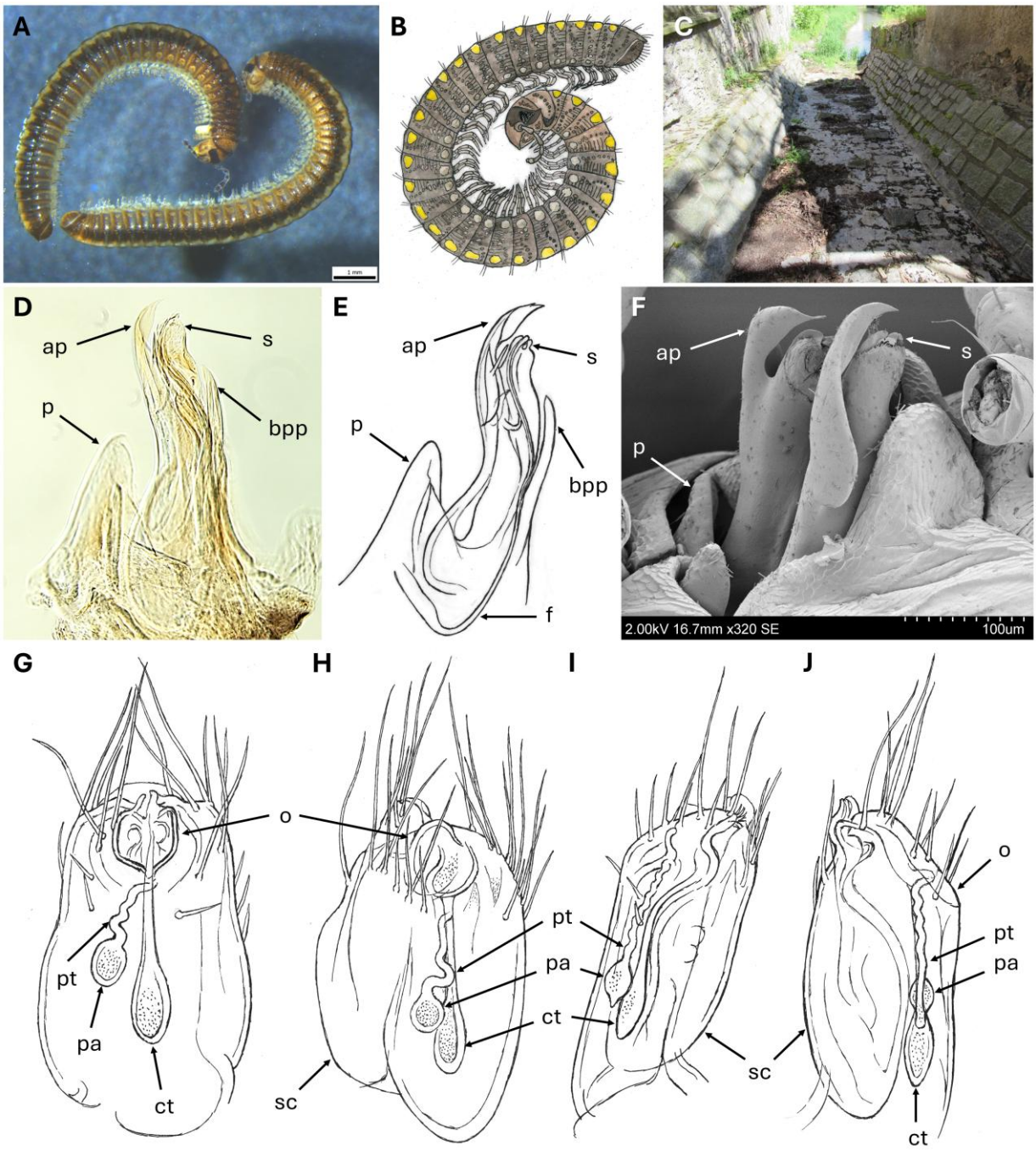

Figure 2: *Brachyiulus pusillus* (Leach, 1814). **A**: Females, **B**: Female habitus, **C**: Habitat (Červené Poříčí – hydropower plant), **D**: LM image of gonopod, **E**: Illustration of gonopod, **F**: SEM image of gonopods, **G–H**: Vulva from frontal view, **I–J**: Vulva from lateral view. Photo P. Dolejš (**A, D, F**), orig./photo P. Kocourek (**B, C, E, G–J**). Abbreviations (after KORSÓS & LAZÁNYI 2020): ap = anterior process, bpp = basoposterior process, ct = central tube, f = flagellum, o = opening, p = promere, pa = posterior ampulla, pt = posterior tube, s = solenomere, sc = side sclerite.

4 Discussion

Before publishing the "Atlas of the millipedes of the Czech Republic" (KOCOUREK et al. 2023), the authors and their collaborators visited unexplored parts of the republic. During this research, two species new to the Czech Republic were found.

Haploglomeris multistriata was recorded by LANG (1954a, 1954b, 1962, 1965) from the present Czech Republic and Slovakia, however, GULIČKA (1985) claimed that the Slovak material was misidentified. Therefore, we checked that part of Lang's collection that was not lost but is currently deposited in the NMP and located several specimens collected near Blatná and labelled by Lang as *H. multistriata*. As the Slovak specimens, they also were found to be *Glomeris hexasticha*. We are thus the first to record *H. multistriata* from the Czech Republic without any doubts. Given its occurrence in southernmost part of the Czech Republic, it is apparent that this species is at the northernmost limit of its European distribution in the Czech Republic.

For nomenclatural history of *Brachyiulus pusillus*, see VAGALINSKI & LAZÁNYI (2018). As in Hungary (KORSÓS & LAZÁNYI 2020), the name "*B. pusillus*" has been erroneously cited many times from the Czech Republic (for review, see TAJOVSKÝ 2001). Until now, only *B. bagnalli* (Brölemann, 1924) and *B. lusitanus* were known from the country (KOCOUREK et al. 2017a). The true *B. pusillus* is here reported as new to the Czech fauna which is consistent with its distribution in central Europe.

Thanks to these two new finds, the number of millipede species known from the Czech Republic has increased to 80.

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