Folia faunistica Slovaca 22 (2017) 13–17 www.ffs.sk

FIRST RECORDS OF MITES (ACARI: MESOSTIGMATA: PARASITIDAE) FROM SLOVAKIA

Kamila Hrúzová & Peter Fenďa

Department of Zoology, Faculty of Natural Sciences, Comenius University, Ilkovičova 6, Mlynská dolina B–1, SK–842 15 Bratislava 4, Slovakia; : kamila.hruzova@gmail.com, fenda@fns.uniba.sk

KEY WORDS

Mesostigmata
Parasitidae
first record
Slovakia

ABSTRACT

Three species of parasitid mites (Acari, Mesostigmata) – *Neogamasus* (*Dyneogamasus*) *speculiger* Athias-Henriot, 1979, *Neogamasus unicornutus* (Ewing, 1909), and *Parasitus nolli* (Karg, 1965) are recorded as new to Slovak fauna. All species were found in the Botanical garden of Comenius University in Bratislava (in the heated glasshouses and also in outdoor exposition).

INTRODUCTION

The family Parasitidae is distributed worldwide with the largest number of known species in Palaearctic region. Mites of the subfamily Parasitinae are fairly well-known in Slovakia. Till now, there were found 41 species of 11 genera in Slovakia. Most of records are from soil, bird nests and compost.

The genus *Neogamasus* is known from a Holarctic and Oriental region but only four of the total number of 46 species are known in Europe, three of them, *Neogamasus speculiger*, *Neogamasus diviortus* (Athias-Henriot, 1967) and *Neogamasus cervicornis* (van Daele, 1975) were mostly found in glasshouses (Athias-Henriot 1979, 1980a; Karg 1993) or in a soil from a pot of a houseplant (Holzmann 1969). *Neogamasus unicornutus* was rarely found in a soil and a compost (Karg 1993). There was only one record of the genus *Neogamasus* in Slovakia up to now (Mašán 1994).

Distribution of the genus *Parasitus* is similar to a distribution of the family, worldwide but with the greatest number of records in a Palaearctic region. Till now, there were found 12 species of the genus *Parasitus* in Slovakia, some of them are widespread but some are very rare and only one or few records are known.

MATERIAL AND METHODS

Area description

Botanical Garden of the Comenius University (48° 8' 50.2" N, 17° 4' 22.1" E, altitude 135 m) is the only botanical garden in Bratislava. It is located in the foothill of the Malé Karpaty Mts on the Danube riverbank. Botanical Garden of the Comenius University is the oldest public botanical garden in Slovakia – it was established on 23th January 1942. After the Second World War greenhouses were built and over 3,000 plant species were planted (the garden was opened for publics on 4th July 1949).

In the 1980s, the area of the botanical garden was reduced due to the construction of the Lafranconi Bridge. In 1992, the greenhouses were considered technically unfit and they were reconstructed which caused all the greenhouse plants to be planted anew. Nowadays, the Botanical Garden contains over 4,000 plant species covering an area of 6.6 hectares. Current exposition is divided between greenhouse plants (Figure 1) and outdoor plants. In the last decades no plant import with soil was realized (since 1952, the botanical garden successfully exchanged seeds with over 530 foreign botanical gardens). It is likely that the population of mites lives there for a relatively long time.

Hrúzová K, Fenďa P, 2017. First records of mites (Acari: Mesostigmata: Parasitidae) from Slovakia. Folia faunistica Slovaca 22: 13–17.
[in English]
Received 23 May 2016 ~ Accepted 13 March 2017 ~ Published 27 April 2017

e–ISSN 1336–4529 ISSN 1335–7522

Methods

Mites were collected by two methods – substrate samples and pitfall traps. Pitfall traps consisted of a plastic cup (3 cm diameter, 8.5 cm depth) burried up to its rim in soil and partly filled with 10 % formaldehyde. Mites were extracted from substrates to 70 % ethylalcohol solution by Tullgren's apparatus with a 40 W light bulb as a heat source. The material was processed to yield microslides using the chloralhydrate Swan's medium. Photographs were taken using Leica DM 2500 compound microscope with Canon EOS 70D Camera Module (EOS Utility v. 2.13.20.0). Where necessary, several photographs were combine into a single image using Zerene Stacker v. 1.04. Voucher specimens are deposited in Slovak National Museum with catalog numbers SZ 10 883 (*N. speculiger*), SZ 10 884 (*N. unicornutus*) and SZ 10 887 (*P. nolli*) and in Acarological Collection in Department of Zoology, Faculty of Natural Sciences, Comenius University.

RESULTS AND DISCUSSION

Neogamasus (*Dyneogamasus*) *speculiger* Athias-Henriot, 1979 (Figs 2A–B)

Neogamasus (*Dyneogamasus*) *speculiger*.— Athias-Henriot, 1979: 39, figs 1–14.

Figure 1. Heated glasshouse in the Botanical Garden of the Comenius University in Bratislava.

Material examined: Botanical Garden of the Comenius University in Bratislava, 9. 5. 2012, soil from spot with *Diffenbachia* spp. in heated glasshouse – 2 ♀♀, 2 ♂♂, 3 deutonymphs, leg. B. Mangová; ibid, soil from glasshouse – 1 ♂, leg. P. Fenďa.

Diagnosis: Both sexes have a protuberance in a sternal region, antiaxial to setae st1. Females have a tectum with three simple prongs, the medial prong is longer than lateral. An endogynial sac is oval, with a subquadrangular structure anteriorly. A rectangular, fibrous fimbria lies posterior to the endogynial sac. An epigynium bears two small sagittal spines in an anterodorsal region (Figure 2A). Males have an apophysis on femur II conical and acuminate, a processus axillaris narrow, pointed and bent towards the apophysis. A genual tubercle is flat, a tibial apophysis is strongly elongated,

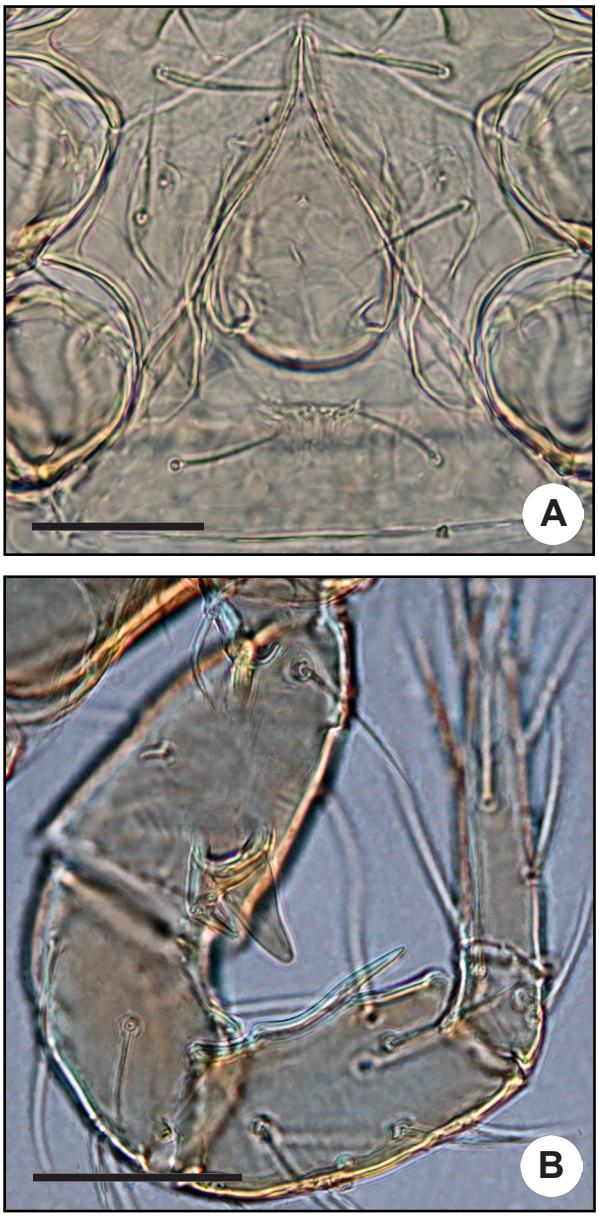

Figure 2. *Neogamasus speculiger*. A – epigynium of female, B – apophyses of leg II of male (scale = 100 µm).

proximally inserted to a tibia, free distally (Figure 2B). The males of other *Dyneogamasus* species are unknown.

Distribution: The only known record of this species is from a croton substrate in a glasshouse near Antwerp (Belgium). It was probably introduced with exotic plants from Asia and is not indigenous in Belgium (Athias-Henriot 1979). Most likely the species was introduced to Slovakia in the same way. There are three more known species in the subgenus *Dyneogamasus*, all are known only from Taiwan (Tseng 1995). *N. speculiger* is the only species of the subgenus *Dyneogamasus* known from Europe. This is the second record of *N. speculiger* worldwide and first record from Slovakia.

Neogamasus (*Neogamasus*) *unicornutus* (Ewing, 1909) (figs 3A–C)

Gamasus unicornutus.— Ewing 1909: 67, figs 26–27.

Neogamassus (*Neogamasus*) *unicornutus*.— Henessey & Farrier 1988: 9, figs 10–13; 1989: 46, figs 27–29.

Neogamasus unicornutus.— Tseng 1995: 29, figs 144–152. Ma & Ma 1998: 126. Wang et al. 2003: 115, figs 1–13.

Parasitus islandicus.— Sellnick 1940: 54, figs 25–33. Leitner 1946: 136. Micherdziński 1969: 463, fig. 332 (syn. Henessey & Farrier 1988)

Pergamasus (*Paragamasus*) *islandicus*.— Athias-Henriot 1967: 11, 25, figs 126, 128–130, 146, 148–152, 161, 162, 164, photos: 5–6.

Eugamasus islandicus.— Karg 1965: 210, 238, fig. 10b. Holzmann 1969: 10, 12, 17, pl. 9, fig. 25.

Parasitus (*Neogamasus*) *islandicus*.— Tikhomirov 1969: 1467, figs 1, 4–6; 1971: 804, 815, pl. 4, figs 7, 9; 1977: 75 (141), figs 6, 9.

Neogamasus islandicus.— Athias-Henriot 1971: 172; 1977a: 27; 1977b: 313. Karg 1993: 455, 457, figs 393e, 414c, 416c, 417c, 418i. Kazemi et al. 2013: 165.

Material examined: Botanical Garden of the Comenius University in Bratislava, 9. 5. 2012, soil in heated glasshouse – 3 ♀♀, 2 ♂♂, 2 deutonymphs, leg. P. Fenďa; ibid, 9. 5. 2012, soil in outdoor fern growth – 3 ♀♀, 3 ♂♂, 2 deutonymphs, 1 protonymph, leg. B. Mangová; ibid, 9. 5. 2012, outdoor compost heap – 30 ♀♀, 19 ♂♂, 2 deutonymphs, leg. P. Fenďa and B. Mangová; ibid, 7. 6. 2012, outdoor old hay heap – 4 ♀♀, 2 ♂♂, 6 deutonymphs, leg. P. Fenďa; ibid, 25. 8. 2014, pitfall trap in heated glasshouse – 2 ♀♀, leg. M. Holecová; ibid., 30. 9. 2014, pitfall trap in heated glasshouse – 2 ♀♀, leg. M. Holecová; ibid, 30. 9. 2014, pitfall trap in park – 1 ♂, leg. M. Holecová; ibid, 12. 12. 2012, soil in heated glasshouse – 2 ♀♀, 2 ♂♂, leg. M. Holecová and J. Frisová.

Diagnosis: Females differ in the presence of one pair of long, curved spines inside of an endogynium (Figure 3A), males in the shape of very long spurs on femora II (Figure 3B) and in having a characteristic U-shaped sculpture on a sternogenital shield, slightly posterior to level of coxae IV (Figure 3C).

Figure 3. *Neogamasus unicornutus*. A – endogynium of female, B – apophyses of leg II of male, C – specific U-shaped sculpture of male (scale = 100 µm).

Distribution: This species is known from a compost, decayed organic material and rarely from a soil, it is distributed in Palaearctic region, in Middle and North Europe (Karg 1993), in Russian Far East (Marchenko 1998) and in North America (Hennessey & Farrier 1989). The genus *Neogamasus* is widespread mainly in Asia, only several species are known from Europe (Athias-Henriot 1977b, 1979; Mašán 1994) and North America (Henessey & Farrier 1988, 1989). Together with *N. speculiger* mentioned above, four species of *Neogamasus* were found in Slovakia. *N. unicornutus* was probably introduced to Slovakia, its occurrence is restricted to the Botanical garden in Bratislava. It was found both in heated glasshouses (in May, August, September, and December) and in outdoor park (abundant species in various compost materials, infrequently in soil; occurrence in May, June, and September). First record from Slovakia.

Parasitus nolli (Karg, 1965) (figs 4A–B)

Eugamasus nolli.— Karg, 1965: 302, figs 32b, 33a–b, 45b, 58e, 59a, 80b, 81e, 82a.

Parasitus nolli.— Micherdziński 1969: 492, fig. 349. Karg 1971: 447. Hyatt, 1988: 399, figs 5–8. Karg 1993: 469, 473, figs 393l, 396c, 397a, 418s, 422c, 425b. Karg 2006: 165, figs 20e–f. Kazemi et al. 2013: 167.

Parasitus (*Coleogamasus*) *nolli*.— Tikhomirov 1977: 86, 90, figs 36 (5), 37 (12).

Phorytocarpais nolli.— Athias-Henriot 1980b: 25.

Material examined: Botanical Garden of the Comenius University in Bratislava, 9. 5. 2012, outdoor compost heap – 1 ♀, 1 deutonymph, leg. P. Fenďa and B. Mangová; ibid, 7. 6. 2012, outdoor compost heap – 3 ♀♀, leg. P. Fenďa.

Diagnosis: *P. nolli* is similar to *P. beta* Oudemans & Voigts, 1904 (Figure 4B) but it is considerably smaller and podonotal setae s5 are not as stout as z5 (Figure 4A). For detail description see Hyatt (1988).

Distribution: Till now, there were known only two records of this species from Europe. Karg (1965) described the species from compost in a cucumber bed under a glass in Germany and Hyatt (1988) found it in a compost in British Isles. Kazemi et al. (2013) mention records of this species from manure, compost, birds' nests, pine and soil in Iran. First record from Slovakia.

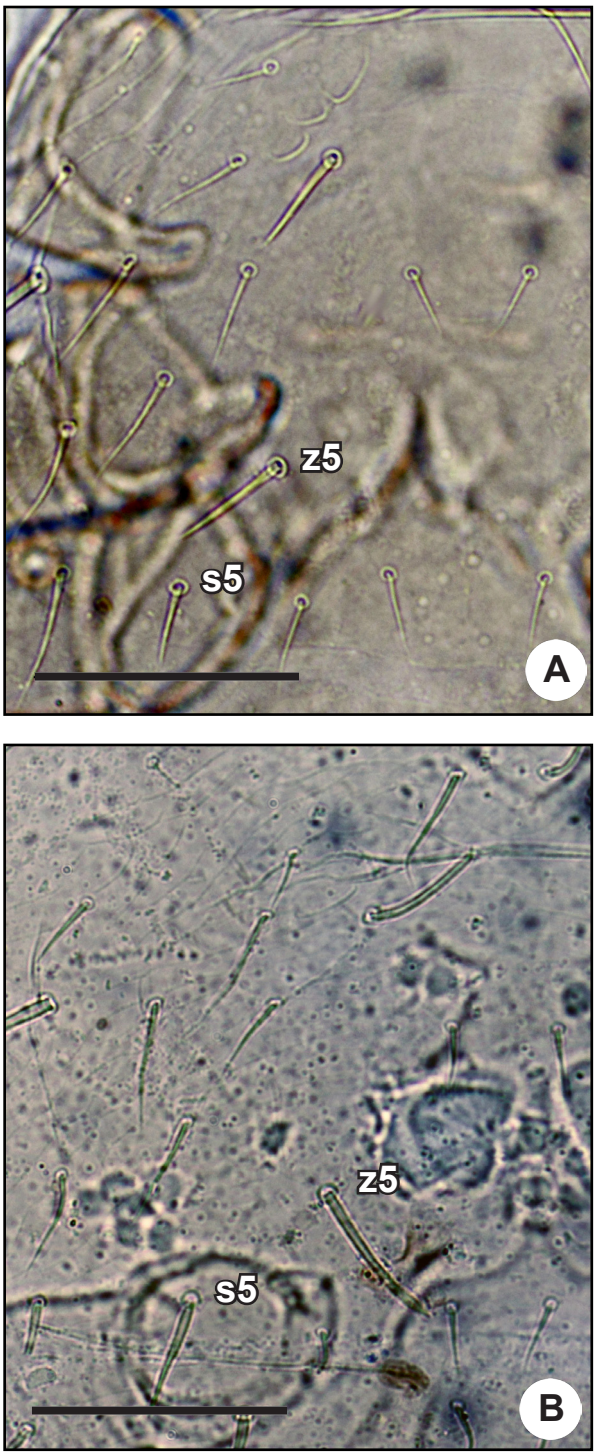

Figure 4. Part of podonotum in female: A – *Parasitus nolli*, B – *Parasitus beta* (scale = 100 μm).

ACKNOWLEDGEMENT

The work was supported by a Slovak Grant Agency KEGA, grant No. 059UK-4/2014. We express our thanks to Barbara Mangová, Milada Holecová and Jana Frisová for providing their samples. Also, the authors would like to thank the director of the Botanical Garden, Dr. Jaroslav Bella, and his staff for permission to collect the mites.

REFERENCES

Athias-Henriot C, 1967. Observations sur les Pergamasus. I. Sous-genre Paragamasus Hull, 1918 (Acariens anactinotriches, Parasitidae). Mémoires du Muséum National d'Histoire Naturelle Série A (Zoologie) 49 (1): 1–198.

Athias-Henriot C, 1971. Paragamasus (Tanygamasus) probsti (Oudemans) (Systématique, géographie), avec quelques mises au point synonymiques (Arachnides, Gamasides tocospermiques, Parasitidae). Zoologische Mededelingen (Leiden) 45 (16): 167–179.

Athias-Henriot C, 1977a. Les sept lignées du genre Neogamasus Tikhomirov d'après les données de la dynamique évolutive (Parasitiformes, Parasitidae). Acarologia (Paris) 19 (1): 26–29.

Athias-Henriot C, 1977b. Untersuchungen über die Gattung Neogamasus Tikhomirov mit zwölf neuen Arten aus Korea (Acari, Parasitiformes, Gamasida). Annales Historico-naturales Musei Nationalis Hungarici 69: 311–341.

Athias-Henriot C, 1979. Neogamasus speculiger n. sp. (Parasitiformes, Parasitidae) from horticultural substrate near Antwerp, with definition of Dyneogamasus n. subg. Biologisch Jaarboek (Dodonaea) 47: 38–43.

Athias-Henriot, C. 1980a. Parasitidae nord-coréens (Parasitiformes): apparentés au genre Neogamasus Tikh., avec création de trois nouvaux genres. Annales Historico-naturales Musei Nationalis Hungarici 72: 285–294.

Athias-Henriot C, 1980b. Sur le genre Phorytocarpais Athias-Henriot, 1979 (Parasitiformes, Parasitidae), avec description de six espèces nouvelles. Revue suisse de Zoologie 87 (1): 21–36.

Ewing HE, 1909. New North American Acarina. Transactions of the Academy of Science of St. Louis 18 (5): 53–77.

Hennessey MK, Farrier MH, 1988. Systematic revision of thirty species of free-living, soil-inhabiting gamasine mites (Acari: Mesostigmata) of North America. North Carolina Agricultural Research Service Technical Bulletin (Raleigh, North Carolina) 285: 1–123.

Hennessey MK, Farrier MH, 1989. Mites of the Family Parasitidae (Acari: Mesostigmata) Inhabiting Forest Soils of North and South Carolina. Technical Bulletin 291, The North Carolina Agricultural Research Service, North Carolina State University, 78 pp.

Holzmann C, 1969. Die Familie Parasitidae Oudemans, 1901 (Eine systematische Studie aus dem Jahre 1955). Acarologie, Schriftenreihe für vergleichende Milbenkunde, Hirschmann-Verlag Nürnberg, 13: 3–24, 25–55.

Hyatt KH, 1988. Two species of Parasitus (Acari: Mesostigmata) new to the British Isles. Irish Naturalists' Journal 22 (9): 393–403.

Karg W, 1965. Larvalsystematische und phylogenetische Untersuchung sowie Revision des Systems der Gamasina Leach, 1915 (Acarina, Parasitiformes). Mitteilungen aus dem Museum für Naturkunde in Berlin, Zoologische Reihe 41 (2): 193–340.

Karg W, 1971. Acari (Acarina), Milben, Unterordnung Anactinochaeta (Parasitiformes). Die freilebenden Gamasina (Gamasides), Raubmilben. Die Tierwelt Deutschlands und der angrenzenden Meeresteile nach ihren Merkmalen und nach ihre Lebensweise. (Die Tierwelt Deutschlands 59). Gustav Fischer Verlag, Jena, 475 pp.

Karg W, 1993. Acari (Acarina), Milben. Parasitiformes (Anactinochaeta) Cohors Gamasina, Leach, Raubmilben. (Die Tierwelt Deutschlands 59). Gustav Fischer Verlag, Jena-Stuttgart-New York, 523 pp.

Karg W, 2006. The systematics of Parasitiformes, especially of Gamasina Leach (Acarina), with new species from Ecuador. Mitteilungen aus dem Museum für Naturkunde in Berlin, Zoologische Reihe 82 (1): 140–169.

Kazemi S, Arjomandi E, Ahangaran Y, 2013. A review of the Iranian Parasitidae (Acari: Mesostigmata). Persian Journal of Acarology 2 (1): 159–180.

Leitner E, 1946. Zur Kenntnis der Milbenfauna auf Düngerstätten. Zentralblatt für das Gesamtgebiet der Entomologie 1 (5–6): 129–156.

Ma L-M, Ma D-M, 1998. Collection of gamasid mites in Dandong City 1 with descriptions of protonymph and larva of Neogamasus unicornutus (Acari). Entomological Journal of East China 1998 (2): 125–126.

Marchenko II, 1998. Gamasina, collection of Siberian Zoological Museum. http://szmn.sbras.ru/old/Inverteb/Gamasina.htm (visited 29.11.2010).

Mašán P, 1994. The mesostigmatic mites (Acarina, Mesostigmata) associated with the dung beetles (Coleoptera, Scarabaeidae) in South Slovakia. Biologia (Bratislava) 49 (2): 201–205.

Micherdziński W, 1969. Die Familie Parasitidae Oudemans 1901 (Acarina, Mesostigmata). Państwowe Wydawnictwo Naukowe, Kraków, 690 pp.

Sellnick M, 1940. Die Milbenfauna Islands. Meddelanden Från Göteborgs Musei Zoologiska Avdelning 83 (14): 1–129.

Tikhomirov SI, 1969. Morfologicheskaya i ekologicheskaya struktura roda Parasitus sensu Micherdzinski 1966 (Gamasoidea, Parasitidae). Soobshchenie I. Podrody Eugamasus Berl., Parasitus Latr., Vulgarogamasus subgen.s. Zoologicheskii Zhurnal 48 (9): 1325–1477.

Tikhomirov SI, 1971. K poznaniyu roda Parasitus (Gamasoidea, Parasitidae). Soobshchenie I. Podrod Neogamasus. Zoologicheskii Zhurnal 50 (3): 803–816.

Tikhomirov SI, 1977. Sem. Parasitidae Oudemans, 1901. In: Bregetova NG, Wainstein BA, Kadite BA, Koroleva EV, Petrova AD, Tikhomirov SI, Shcherbak GI: Opredelitel obitayushchikh v pochve kleshchei – Mesostigmata. Izdavatelstvo Nauka, Leningrad, pp. 55–107.

Tseng Y-H, 1995. A taxonomical study of free-living gamasine mite family Parasitidae Oudemans (Acari, Mesostigmata) from Taiwan. Journal of Taiwan Museum 48 (2): 11–81.

Wang B-L, Gui S-Q, Ma L-M, 2003. Descriptions on female and male of mite Neogamasus unicornutus (Ewing,1909) (Acari: Gamasina: Parasitidae). Entomological Journal of East China 2003 (1): 115–118.