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New records of three species of the genus *Micarea* (lichenized *Ascomycota*) in Poland

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The article presents new data on distribution of *Micarea botryoides*, *M. misella* and *M. nitschkeana* in Poland. The localities, maps, and ecological remarks are given. *M. botryoides* is reported from several localities, which have been noted recently, *M. misella* and *M. nitschkeana* are known from some earlier published records and from several recent ones.

Key words: *Micarea botryoides*, *M. misella*, *M. nitschkeana*, rare species, distribution, ecology, Poland.

INTRODUCTION

Three interesting species of *Micarea* were found during the recent field-work in Poland. *M. botryoides* (Nyl.) Coppins is reported from several recently recorded localities. *M. misella* (Nyl.) Hedl. and *M. nitschkeana* (Lahm ex Rabenh.) Harm. are known from some earlier records and from several localities reported recently by the authors of the paper.

All of these species have been reported from other countries in Europe: *M. botryoides* – as a rather rare species, *M. misella* and *M. nitschkeana* – as more common ones. The aim of the work is to present new distributional data about these three taxa and to widen the knowledge of their ecological preferences.

METHODS

The distributional data of the species are given in the 10×10 km ATPOL grid square-system (acc. to Cieśliński and Fałtynowicz 1993). The names of the physico-geographic units (mesoregions) follow Kondracki (1994). Most of the collected specimens are housed in the herbaria in which the authors are working: Martin Kukwa – UGDA, Anna Zalewska – OLS, Paweł Czarnota – GPN, and in hb. Kuk. Agnieszka Kowalewska – UGDA and Dariusz Kubiak – OLTC (in press) also made some distributional data available. The nomenclature of *Micarea* follows Coppins (1983). Names of other lichen species were accepted following Santesson (1993).

Abbrevations: g.s – grid square – system; GMts – Gorce Mts.; hb. Kuk. – private lichen herbarium of M. Kukwa; PI – Pojezierze Iławskie lakeland; PK – Pojezierze Kaszubskie lakeland; PM – Pojezierze Mazurskie lakeland; PoK – Pobrzeże Kaszubskie coast; PW – Pojezierze Wschodniosuwalskie lakeland; RB – Równina Bielska plain; WS – Wybrzeże Słowińskie coast; WW – Wyżyna Wieluńska upland.

THE SPECIES

Micarea botryoides (Nyl.) Coppins

Micarea botryoides usually occurs as an anamorph; the lichens in Polish collections are anamorphic as well. Specimens in pycnidial state growing on lignum can be confused with rare *M. nigella* Coppins and *M. melaeniza* Hedl. *M. nigella* has slightly bigger conidia and its stalk and pycnidial wall tissues are dark purplish brown, K+ dark green. *M. melaeniza* can have similar pycnidia, but its conidia are shorter and the thallus is different. On rocks *Micarea botryoides* can resemble *M. lutulata* (Nyl.) Coppins, but the latter one has simple spores, non-micareoid photobiont and immersed pycnidia (Coppins 1983).

Micarea botryoides grows most frequently in *Micareetum sylvicole* communities, occurring in dry underhangs (on rocks, loose stones, consolidated soil, tree roots, decaying bryophytes). Records from lignum and bark are rare (Coppins 1983). In Poland the species was found on decaying wood, less frequently on bark of conifers (*Picea abies*, *Pinus sylvestris*) or birch *Betula pendula* and on stones. Associated species in Polish collections include *Lecanora conizaeoides* Nyl. in Crombie, *Lepraria* spp., *Hypogymnia physodes* (L.) Nyl., *Micarea prasina*, *Placynthiella dasaea* (Stirton) Tonsberg and mosses.

Micarea botryoides is probably widespread in Europe. It is known from the British Isles, France (Coppins 1983), Fennoscandia (Santesson 1993; Vitikainen et al. 1997), Czech Republic (Kocourková-Horáková 1998), Austria (Berger and Türk 1993) and also Ukraine (Motiejūnaitė et al. in press).

Micarea botryoides has been reported recently from Poland by K u k w a (1998) and Z a l e w s k a (1998), however, in these short notes the location of stands was not given.

Specimens examined (Fig 1.): **PK:** between Kloc and Słupinko-Dąbrówka villages, 54°02'N/17°50'E; bark of *Betula pendula* on the lower part of the trunk, pine forest; leg. A. Kowalewska 1997, UGDA-L (g.s Ac 96); **PI:** 1.5 km E of Ryjewo village, Lisewo forestry, forest section 221, 53°50'N/18°58'E; decaying wood, pine forest; leg. M. Kukwa 1996, hb. Kuk 111 (g.s Bd 43); Smolniki near Iława, 'Żurawinowe Bagno' Reserve, 53°32'N/19°37'E; bark of *Pinus sylvestris*, on the lower part of the trunk, peat-bog, *Sphagnetum magellanici pinetosum*; leg. A. Zalewska 1997, OLS-L-1262 (g.s Bd 77); **PM:** Borecka Forest, 'Borki' Reserve, Lipowo forestry, forest section No 22, 54°07'N/22°'06'E; bark at the base of the trunk of *Picea abies* and decaying wood of *Picea abies*, old oak-linden-hornbeam forest with spruce *Tilio-Carpinetum*; leg. A. Zalewska 1996, OLS-L-1285, OLS-L-1286 (g.s Bf 13); **GMts:** Kamienica stream valley, Lubomierz Rzeki colony, alt. 700 m, 49°35'N/20°14'E; on shaded sandstone by the stream; leg. P. Czarnota 1999, GPN; Gorce National Park, 'Żydowski Lasek' range, Gorcowy Potok valley, below Jaworzynka glade, alt. 890 m, exp. S, 49°36'N/20°13'E; hard wood of stump, beech forest *Dentario glandulosae-Fagetum*; leg. P. Czarnota 1997, GPN – 1906/94 (g.s Ge 11); Gorce National Park, Kamienica stream valley, 'Pod Jaworzyną' range alt. 1060 m, exp. N, 49°34'N/20°10'E; on shaded sandstone; leg. P. Czarnota 1999, GPN-2023/94 and 2024/94 (g.s Ge 21); Kamienica stream valley, below Bieniowe glade, alt. 820 m, 49°34'N/20°13'E; on shaded sandstone; leg P. Czarnota 1999, GPN – 1964/94 (g.s Ge 21).

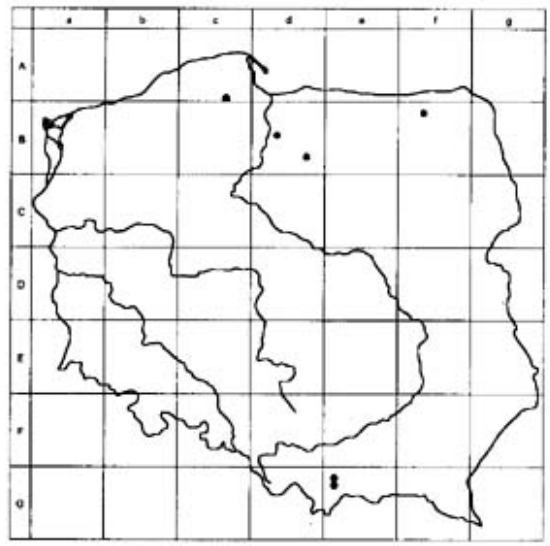

Fig. 1. Distribution of *Micarea botryoides* (Nyl.) Coppins in Poland

Micarea misella (Nyl.) Hedl.

Micarea misella is a very distinctive species, easily recognised by the usually endoxylic thallus, numerous apothecia and stalked pycnidia. However, when it has a well-developed superficial thallus and no stalked pycnidia it can be difficult to separate from *M. denigrata* (Fr.) Hedl. – for differences see C o p p i n s (1983).

Micarea misella is mainly lignicolous, but it was also found on bark, old basidiomes of polypores, moribund *Polytrichum* spp. and thalli of *Cladonia furcata* (Huds.) Schrader (Migula 1931; Coppins 1983; Christensen et al. 1995). Nearly all (13) Polish specimens were found on wood, but two epiphytic ones were also collected from *Picea abies* and *Pinus sylvestris*. The species was recorded in well-lit or semi-exposed sites, in many cases with the particularly high air humidity (mountain valleys, peat-bog, coastal dune, by forest tracks in the extensive deciduous woodlands). *M. prasina*, *Placynthiella dasaea*, *P. icmalea* (Ach.) Coppins et P. James, *Scolicosporum chlorococcum* (Graeve ex Stenham.) Vlzda and rarely *Absconditella lignicola* Vězda et Pišut accompanied *M. misella* in more shaded locality. Associated lichens in open places included: *Cladonia coniocraea* (Flk.) Vainio, *C. macilenta* Hoffm., *C. pyxidata* (L.) Hoffm., *Hypocenomyce scalaris* (Ach.) Choisy, *Hypogymnia physodes*, *Lecanora conizaeoides*, *Micarea denigrata*, *Platismatia glauca* (L.) W. Culb. et C. Culb., *Trapeliopsis flexuosa* (Fr.) Coppins et P. James and *Vulpicida pinastri* (Scop.) J. E. Mattsson et Lai.

Micarea misella is widely distributed in Europe (especially in areas with natural coniferous forests), though not very common. The species is known from Denmark (Alstrup et al. 1990), Germany (Wirth 1995), Estonia (Ekman et al. 1991), Great Britain, Italy (Coppins 1983) and Sweden (Santesson 1993). It was also found in areas neighbouring Poland, e.g. Germany (Litterski 1995), Lithuania (Motiejūnaitė 1996; Motiejūnaitė et al. 1998), Slovakia (Pišút et al. 1996), and Ukraine (Kondratyuk et al. 1998). Besides, it was noted in Canada and Brazil (Coppins 1983), and also in the Azores (Coppins 1992).

Micarea misella in Poland is known from few records (Migula 1931; Czyżewska 1998, Śliwa 1998, Kubiak in press). Its distribution shows that *M. misella* may appear to be much more common in Poland.

Specimens examined (Fig. 2): **PoK:** vicinity of Białogóra village, 54°57′N/17°58′E; soft wood of pine, grey dune with *Calluna vulgaris* and young *Pinus sylvestris*; leg. P. Czarnota 1998, OLS-L-1378 (g.s Ac 37); **PI:** 1.5 km to E of Ryjewo village, Lisewo forestry, forest section 221, 53°49′N/18°58′E; hard pine wood in well-lit situation, the edge of mixed forest; leg. M. Kukwa 1996, hb. Kuk. (g.s Bd 43); Smolniki near Iława, 'Żurawinowe Bagno' Reserve, 53°32′N/19°37′E; hard wood of pine stumps (c.ap.) and on the bark of *Pinus sylvestris* on the lower part of the trunk (anamorph), well-lit places in the peat-bog *Sphagnetum magellanici pinetosum*; leg. A. Zalewska 1996, 1997, OLS-L-1261, 1265 et 1260 (g.s Bd 77); **PM:** Borecka Forest, Diabla Góra forestry, forest section 87, 54°08′N/22°03′E; wood of the decaying log, oak-linden-hornbeam forest with spruce *Tilio-Carpinetum*; leg. A. Zalewska 1997, OLS-L-1379 (g.s Bf 03); Borecka Forest, 'Lipowy Jar' Reserve, Lipowo forestry, forestry section 225, 54°09′N/22°08′E; firm wood of spruce stump, at the edge of oak-linden-hornbeam forest *Tilio-Carpinetum*; leg. A. Zalewska 1996,

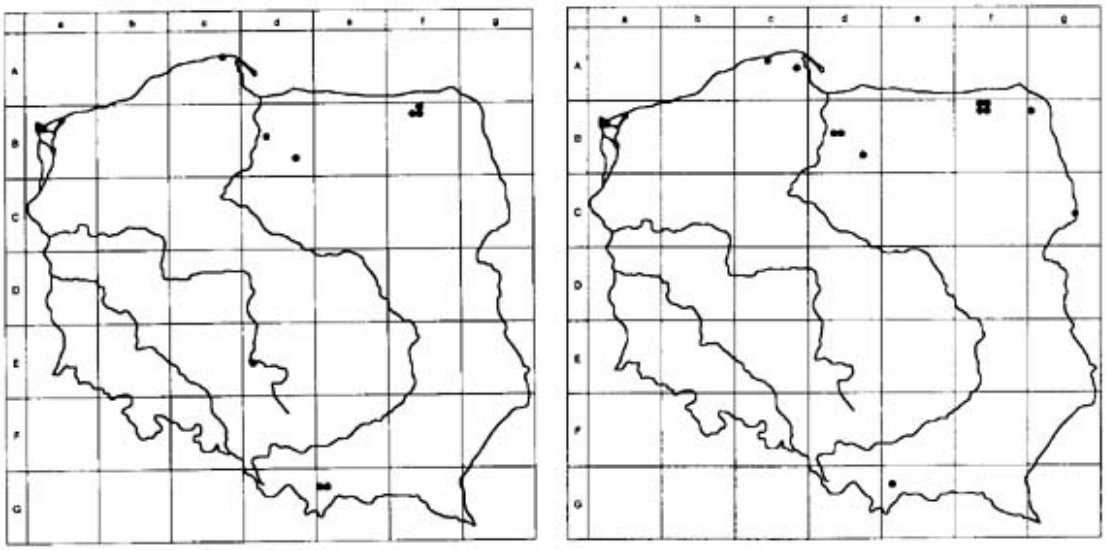

Fig. 2. New localities of *Micarea misella* (Nyl.) Hedl. (I) and of *Micarea nitschkeana* (Lahm ex Rabenh.) Harm. (II) in Poland

OLS-L-1360 (g.s Bf 13); Borecka Forest, Zielonki forestry, forest section 233; 54°04'N/22°13'E; wood of roots of felled *Alnus glutinosa*, ash-alder streamside forest *Circaeo-Alnetum*; leg. A. Zalewska 1995, OLS-L-1380 (g.s Bf 14). **WW:** Załęczański Landscape Park, 1 km to S of Zelce Mt., 51°05'N/18°48'E; on coniferous stump on the glade in pine forest; leg. P. Czarnota 1997, UGDA-L (g.s Ed 51). **GMts:** Gorce National Park: 'Turbacz' Reserve, by Olszowy stream, alt. 780 m, exp. NW, 49°34'N/20°06'E; decaying stump, leg. P. Czarnota 1997, GPN-1737/94 (g.s Ge 20); Jaworzyna Kamienicka Mt., alt. 1220 m, exp. S, 49°34'N/20°08'E; decaying wood; leg. P. Czarnota 1997, GPN–1710/94 (g.s Ge 21); Kamienica stream valley, alt. 810 m, exp. SE, 49°34'N/20°10'E; decaying stump; leg. P. Czarnota 1996, GPN-1454/94 (g.s Ge 21); Kamienica stream valley, 'Pod Jaworzyną' range alt 1100 m, exp. N, 49°34'N/20°10'E; decaying coniferous stump; leg. P. Czarnota 1995, GPN-1846/94 (g.s Ge 21); 'Łopuszanka' stream valley; at the edge of Młyńska glade; alt. 1260 m, exp. S, 49°33'N, 20°10'E; decaying spruce wood; leg. P. Czarnota 1997, GPN-1813/94(g.s Ge 21); Turbacz Mt., 'Hala Długa', vicinity of a shelter-house, alt. 1220 m, exp. S, 49°34'N/20°14'E; decaying stump; leg. P. Czarnota 1995, GPN-1874/94 (g.s Ge 21); Ustępny Potok valley, alt. 880 m, exp. SW, 49°34'N/20°15'E; on mouldy stump; leg. P. Czarnota 1995, GPN-297/94 all in (g.s Ge 21).

Micarea nitschkeana (Lahm ex Rabenh.) Harm.

Micarea nitschkeana is most closely related to *M. denigrata*. Both species have similar thalli and apothecial structures, three types of pycnidia, pigmentation and chemistry, but differ in spore septation and ecology. *M. nitschkeana*

can be mistaken also for *M. globulosella* (Nyl.) Coppins, *M. cinerea* (Schaerer) Hedl., *M. lignaria* (Ach.) Hedl. and *M. peliocarpa* (Anzi) Coppins et R. Sant., but these lichens differ in the dimensions of apothecia, reactions of hymenium as well as in shape and septation of spore (Coppins 1983).

Micarea nitschkeana grows on twigs or branches of many coniferous and deciduous trees and shrubs. Rarely it was observed on wood and rocks (Coppins 1983). In Poland the species occurred most often on branches of spruce as well as on wood in humid sites. It was also found on the bark of deciduous trees (e.g. *Betula pendula*, *Fagus sylvatica*, *Quercus* sp. and other). On branches it was commonly associated with small thalli of *Hypogymnia physodes*, *Lecanora conizaeoides*, *Micarea prasina*, *Placynthiella icmalea* and *Scoliciosporum chlorococcum*. Lignicolous specimens occurred together with *Hypocenomyce scalaris*, *Trapeliopsis granulosa* (Hoffm.) Lumbsch and with some taxa mentioned above. On the bark associated species included *Melanelia fuliginosa* (Fr. ex Duby) Essl., *Micarea prasina*, *Lecanora pulicaris* (Pers.) Ach., *Placynthiella dasaea*, *Lepraria* spp. and *Bacidia arnoldiana* Körber.

In Europe *Micarea nitschkeana* is a frequent, widely distributed lichen species. It has been found in Great Britain, France (Coppins 1983), Denmark (Alstrup and Sochting 1989), Fennoscandia (Santesson 1993; Vitikainen et al. 1997), Germany (John 1987; Wirth 1995) and Austria (Türk and Wunder 1991). It was also found in areas close to Poland: e.g. in Estonia (Sömermaa 1972), Germany (Litterski 1995), Lithuania (Motiejūnaitė 1995; Motiejūnaitė et al. 1998), Slovakia (Pišút et al. 1996) and Ukraine (Kondratyuk et al. 1998). Moreover it is known to occur in the USA (Coppins 1983).

In Poland the species is known from several old (Stein 1879; Eitner 1895, 1910) and several modern records (Nowak 1967; Miądlikowska 1991, 1997; Czyżewska 1981, 1999), but it might appear to be much more common in the country.

Specimens examined (Fig. 2): **PoK:** Darżlubska Forest, ca. 3 km to N of Wejherowo, by Lake Stoborowe (Sztobor), 54°29′N/18°13′E; twigs of young spruce, pine forest; leg. M. Kukwa 1998, hb. Kuk 277 (g.s Ac 58); **WS:** Słowiński National Park, 1 km to north of Rąbka village, 54°46′N/17°32′E; dead branch of *Pinus sylvestris*, *Empetro nigri-Pinetum*; leg. M. Kukwa and A. Zalewska 1999, OLS-L (g.s Ac 44); **PI:** vicinity of Ryjewo village, Biały Dwór forestry, forest sections No. 229, 53°49′N/18°58′E; twigs of young spruce, pine forest, leg. M. Kukwa 1996, hb. Kuk. 116 (g.s Bd 43); vicinity of Ryjewo village, Biały Dwór forestry, boundary between forest sections nos. 232 et 239, 53°49′N/18°57′E; hard wood in mixed forest and twigs of young spruce in pine forest; leg. M. Kukwa 1996, hb. Kuk. 117 et 118 (g.s Bd 43); vicinity of Brachlewo village, Biały Dwór forestry, forest sections No. 250, 53°48′N/18°57′E; twigs of young spruce, pine forest; leg. M. Kukwa 1997, hb. Kuk. 113 (g.s Bd 43); vicinity of Ryjewo village, Biały Dwór forestry, forest

sections No. 227, 53°49′N/18°59′E; twigs of young spruce in pine forest; leg. M. Kukwa 1996, hb. Kuk. 106 (g.s Bd 43); vicinity of Nowa Wieś village, Lisewo forestry, forest section No. 211, by Lake Mątki, 53°51′N/19°00′E; wood of the decaying coniferous log, partly dry peat bog with *Pinus sylvestris*; leg. M. Kukwa 1996, hb. Kuk. 119 (g.s Bd 43); vicinity of Nowa Wieś village, Lisewo forestry, forest section No. 212, 53°51′N/19°00′E; wood of decorticate branch of (?) oak in rather well-lit place; leg. M. Kukwa 1996, hb. Kuk. 107 (g.s Bd 43); vicinity of Nowa Wieś village, Lisewo forestry, forest section No. 217, 53°50′N/19°00′E; twigs of young spruces in pine forest; leg. M. Kukwa 1996, hb. Kuk. 109 (g.s Bd 43); about 2 km to S of Nowa Wieś village, 53°51′N/19°01′N; firm coniferous wood, small forest by roadside; leg. M. Kukwa 1995, hb. Kuk. 114 (g.s Bd 44); Smolniki near Iława, 'Żurawinowe Bagno' Reserve, 53°32′N/19°37′E; bark of *Pinus sylvestris* (from the lower part of the trunk) and young twigs of *Picea abies*, in well-lit place on the peat-bog *Sphagnetum magellanici pinetosum*; leg. A. Zalewska 1996, 1997, OLS-L-1259 et 1278 (g.s Bd 77): **PM:** Borecka Forest, Olszówka forestry, forest section No. 184, 54°08′N/22°08′E; bark of young *Fraxinus excelsior*, ash-alder forest *Circaeo-Alnetum*; leg. A. Zalewska 1996, OLS-L-1344 (g.s Bf 03); Borecka Forest, Olszanka forestry, forest section No. 125, 54°09′N/22°14′E; bark of *Fraxinus excelsior*, ash-alder forest *Circaeo-Alnetum*; leg. A. Zalewska 1997, OLS-L-1279 (g.s Bf 03); Borecka Forest, Zielonki forestry, forest section No. 197, 54°04′N/22°09′E; bark of young *Alnus glutinosa*, ash-alder forest *Circaeo-Alnetum*; leg. A. Zalewska 1995, OLS-L-1383 (g.s Bf 13); Borecka Forest, Knieja forestry, forest section No. 70, 54°06′N/22°03′E; wood of spruce stump, at the edge of oak-linden-hornbeam forest with spruce *Tilio-Carpinetum*; leg. A. Zalewska 1995, OLS-L-1382 (g.s Bf 13); Borecka Forest, Zielonki forestry, forest section No. 223, 54°04′N/22°11′E; bark of *Populus tremula*, oak-linden-hornbeam forest with spruce *Tilio-Carpinetum* near the boggy holow; leg. A. Zalewska 1995, OLS-L (g.s Bf 14); Borecka Forest, Jelonek forestry, forest section No. 222, 54°04′N/22°12′E; bark of young *Quercus robur*, at the edge of young spruce plantation; leg. A. Zalewska 1995, OLS-L (g.s Bf 14); Borecka Forest, Jelonek forestry, forest section No. 229, 54°02′N/22°13′E; bark of *Sorbus aucuparia*, oak-linden-hornbeam forest with spruce *Tilio-Carpinetum*; leg. A. Zalewska 1995, OLS-L-1384 (g.s Bf 14). **PW:** Wigierski National Park, 'Jezioro Białe' Wigierskie Reserve, forest section No. 237, 54°03′N/23°05′E; bark of birch in humid mixed forest by a lake; leg. M. Kukwa 1995, hb. Kuk. 93 (g.s Bg 10); **RB:** Białowieża National Park, forest section No. 371, 52°45′N/23°55′E; wood of dead branches of old spruce in well-lit place, oak-linden-hornbeam forest with spruce *Tilio-Carpinetum*; leg. A. Zalewska 1998, OLS-L-1385 (g.s Cg 56); **GMts:** Gorce National Park, Przysłop Górny glade, at the edge, alt. 1120 m, 49°34′N/20°13′E, exp. S; bark of beech, Carpathian beech forest *Dentario glandulosae-Fagetum*; leg. P. Czarnota 1997, GPN-345/94 et 1562/94 (g.s Ge 21); Kamienica

stream valley, 'Znaki' range, below Bieniowe glade, alt. 1020 m, exp. N, 49°34'N/20°13'E; bark of beech, Carpathian beech forest *Dentario glandulosae-Fagetum*; leg. P. Czarnota 1997, GPN-1654/94 (g.s Ge 21).

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Nowe notowania trzech gatunków z rodzaju *Micarea* (lichenized *Ascomycota*) w Polsce

Streszczenie

Przedstawiono nowe stanowiska trzech gatunków z rodzaju *Micarea*: *M. botryoides*, *M. misella* oraz *M. nitschkeana* w Polsce. Przy każdym z nich wymieniono podobnych przedstawicieli rodzaju, wymagania siedliskowe oraz uwagi o ich ogólnym rozmieszczeniu geograficznym. Załączono listy zbadanych okazów oraz ich rozmieszczenie na mapach.

Omówione porosty należą do grupy słabo wyróżnianych, dość trudnych do zaobserwowania podczas badań terenowych głównie ze względu na niewielkie rozmiary. Rezultaty wskazują, że gatunki te są prawdopodobnie bardziej rozpowszechnione w Polsce, a poznanie ich rzeczywistego rozmieszczenia wymaga dalszych badań.