

## *Plagiolepis pygmaea* (Latreille, 1798) (Hymenoptera: Formicidae), an introduced ant species new to Poland

Gema TRIGOS-PERAL<sup>1</sup>  AND Wojciech CZECHOWSKI<sup>2</sup> 

<sup>1,2</sup> Laboratory of Social and Myrmecophilous Insects, Museum and Institute of Zoology, Polish Academy of Sciences, Towarda St. 51/55, 01-818 Warsaw, Poland

<sup>1</sup>e-mail: [gtrigos@miiz.waw.pl](mailto:gtrigos@miiz.waw.pl), ORCID: 0000-0002-8713-5703

<sup>2</sup>e-mail: [wczechowski@miiz.waw.pl](mailto:wczechowski@miiz.waw.pl), ORCID: 0000-0001-9422-2453

**Abstract:** *Plagiolepis* Mayr, 1861 is a diverse ant genus that includes nine species native to Europe. While most of them are primarily distributed across southern regions, *P. pygmaea* (Latreille) is increasingly expanding its range into more northern areas. Here we report the first record of this species in Warsaw, Poland, which currently is its northernmost locality known to date. Several workers were observed foraging on a lawn in an urban park. Although colony establishment by the ants remains uncertain, the mere appearance of *P. pygmaea* in Warsaw, a non-native species, most likely being the result of accidental human-mediated introduction, indicates the need to implement effective monitoring and control procedures. Such measures are essential to minimize the influx of exotic species and mitigate potential threats to native biodiversity.

**Key words:** ants, fauna of Poland, ant trade, exotic species, urban fauna, biological invasions

### INTRODUCTION

The Polish myrmecofauna, according to the recent monograph, based on records up to 2010 (Czechowski et al. 2012) with subsequent supplements (Salata & Borowiec 2011, 2013, Borowiec & Salata 2018, Salata et al. 2018, Trigos-Peral et al. 2020, Michlewicz 2022, Pawluk et al. 2022a, b), numbers 111 reliably reported species of 30 genera (according to taxonomic system and nomenclature of Myrmicinae used by Seifert 2018). This number includes 10 non-native imported tramp species, which in the temperate zone occur exclusively indoors in heated premises, mainly in greenhouses of botanical gardens and theme pavilions in zoological gardens, where they can form shorter or longer-lasting colonies. These include, among others, recently reported two Afrotropical (now pantropical) species *Nylanderia jaegerskioeldi* (Mayr) (Salata et al. 2018) and *Plagiolepis alluaudi* Emery (Pawluk et al. 2022a), an Oriental species *Technomyrmex vitiensis* Mann (Pawluk et al. 2022b), and originally Australasian, now pantropical *Strumigenys emmae* (Emery) (Michlewicz 2022). There are also species well adapted to human habitation (apartments, gastronomic plants, canteens, laundries, etc.), such as highly invasive *Monomorium pharaonis* (L.) (see e.g. Czajkowska 1979). So far, 101 outdoor ant species of 23 genera have been reported from Poland (Czechowski et al. 2012 with later additions). The vast majority of these are native to this area or originate from relatively not too distant regions, which may have appeared in Poland spontaneously through natural expansion of their ranges or those that are capable to adapt to local conditions being accidentally introduced there. Such species include *Lasius neglectus* Van Loon, Boomsma et Andrasfalvy, a highly invasive and for a long-time common ant species in Warsaw (see e.g. Trigos-Peral et al. 2024) as well as potentially invasive in Poland species *Tetramorium immigrans* Santschi already common in Wrocław (Borowiec & Salata 2018). In this report, we

inform about the outdoor finding of *Plagiolepis pygmaea* (Latreille) in Warsaw, another non-native ant species, new to the Polish fauna.

*Plagiolepis* Mayr, 1861 is a genus of small ants (average size of workers 1.5 mm approx.) that includes 67 valid extant species, 10 valid subspecies and 10 valid fossil species (Fisher & Fong 2025). This genus is naturally distributed across Africa, Australia and the temperate and tropical zones of Eurasia (Seifert 2018). The study species, *P. pygmaea* is a widespread southern and partly central European species, whose latitudinal range extends from Portugal and Spain through southern France, Italy, the Balkans, to Romania, Moldova, and Transcarpathia in Ukraine. In Central Europe, it encompasses Austria, Switzerland, Hungary, southern Czechia (50.6°N) and southern Germany (Baden-Württemberg; 48.2°N) (Seifert 2018; see also Radchenko 2016, Borowiec & Salata 2022, Fisher & Fong 2025). Further north in Germany, only isolated localities were found, apparently resulting from accidental passive, non-permanent introductions, most probably with gardening materials (Seifert 2018).

In the light of the literature data, *P. pygmaea* appears to be a xerothermophilic oligotope, occurring in various warm and dry habitats, preferentially open steppe-like ones with a sparse grass and herb vegetation, including roadsides, ruderal and urban areas, but also bushes, olive plantations, and light pine and deciduous woodlands. It nests in the soil, often under stones, in rock crevices under moss, among the rock rubble, etc. (Radchenko 2016, Seifert 2018, Borowiec & Salata 2021, 2022).

Colonies of *P. pygmaea* are usually polygynous and polydomous (multi-nest), with a tendency toward supercoloniality (at least in urban areas; Charrier et al. 2020, Seifert 2025). A single nest is typically inhabited by several hundred workers (Radchenko 2016) and from several to a few dozen queens – in extreme cases, over 20,000 workers and over 200 queens (Seifert 2018).

On a scale of invasiveness, the species is classified as ‘limited invasive’ (AntWiki 2025).

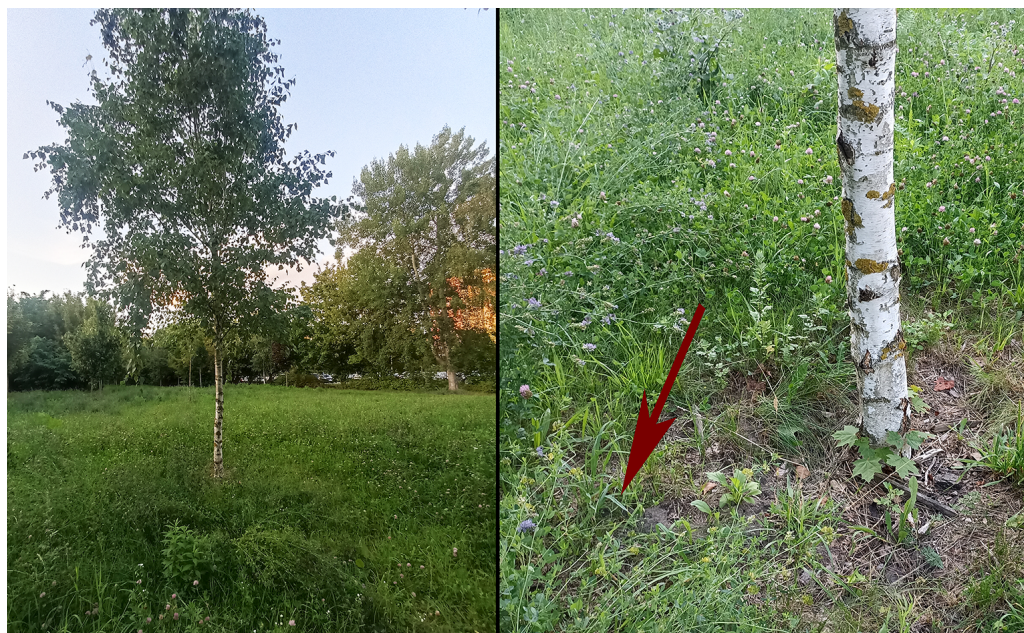


Figure 1. Site of occurrence of *P. pygmaea* in Park Szcześliwicki in Warsaw (on the left, a general view of the park lawn where the species was found. On the right, the exact location (marked with an arrow) where the ants were collected). Photo: G. Trigós-Peral.

## MATERIAL AND METHODS

The species was accidentally found in Park Szcześliwicki in Warsaw (Mazovian Lowland, UTM: DC98; 52°12'17.7"N, 20°57'47.3"E) on July 27, 2025, while searching for a *Tetramorium caespitum* (L.) nests. During the search, a few workers of *P. pygmaea* were observed foraging on blades of grass at the edge of the sparsely overgrown area around the trunk of a young birch tree (Fig. 1).

On the first day, three workers were collected. The next time, after more than a month, on September 2, 2025, five more individuals were collected in the same place. Although workers were seen emerging from a small ground-level entrance shared with *Lasius flavus* (F.), the nest itself remains undiscovered despite careful searches. When disturbing the ground surface during the search, workers of both species were observed coming out from the grassy area approximately 10 cm away from the edge of the mentioned plantless patch. The collected workers were photographed in the laboratory (Fig. 2a,b) and identified following the key in the paper by Espadaler et al. 2013 and Seifert 2020 using a stereomicroscope Leica MZ16. This species is characterised by the similar lengths of the second and third funicular segments, both of which are slightly shorter than the fourth segment (Fig. 2b). This trait serves as the primary taxonomical feature separating *Plagiolepis pygmaea* from the other four species of the *Plagiolepis schmitzii* group. Part of the material was sent to B. Seifert with a request to check the correctness of the species identification. The collected workers are deposited in the MIZ entomological collection (2w), GT-P's personal collection (2w) and B. Seifert's collection (5w).

## DISCUSSION

Currently, the Polish myrmecofauna includes 112 species whose presence in Poland (excluding laboratory and amateur breeding) has been documented. This means that based on the species list reported by Czechowski et al. 2012, nine species have been added over the last 15 years. As many as seven of them are accidentally introduced tramp species of foreign origin, of which four (listed in the Introduction) were found exclusively in greenhouses (in different cities; see Salata et al. 2018, Pawluk et al. 2022a, b, Michlewicz 2022), while three, *Tetramorium immigrans* (Borowiec & Salata 2018), *Pheidole megacephala* (Trigos-Peral et al. 2020), and *Plagiolepis pygmaea* (reported here), were found outdoors. Both *Ph. megacephala* and *P. pygmaea* were reported from Warsaw based on workers. However, while a single worker of *Ph. megacephala* was found in one occasion in the Botanical Garden (near a greenhouse), the repeated presence of numerous workers of *P. pygmaea* at one fix location on a lawn in a city park strongly indicates the (even temporary) functioning of a colony, i.e. the possibility of the founding queen successfully establishing a nest in a given place. On the other hand, a well-established population of the previously mentioned potentially invasive *T. immigrans* in the urban areas of Wrocław (Borowiec & Salata 2018) suggests an analogy with really invasive *Lasius neglectus* in Warsaw (see Trigos-Peral et al. 2024).

Compared to the above, over the last 15 years, only two native ant species have been detected in Poland: *Lasius carniolicus* Mayr (Salata & Borowiec 2011, 2014) and *Temnothorax albipennis* (Curtis) (Salata & Borowiec 2013). The former is a generally rare and locally occurring species; moreover, it is a social parasite with a cryptic (underground) lifestyle (Collingwood 1979, Seifert 2018), which makes it even more difficult to find. The second one, also occurring locally, was previously reported twice from Poland (Czechowska & Czechowski 1999, Borowiec 2009; see also Czechowski et al. 2002), but, as it turned out (thanks to B. Seifert), it was owing to misidentifications, among others of hybrids *T. albipennis* × *T. tuberum* (F.).



Figure 2. A worker of *P. pygmaea* from Warsaw (on the left, lateral view, on the right, frontal view of the head). Photo: G. Trigos-Peral.

In light of the above, the native Polish myrmecofauna can be considered well-studied, and the list of so far reported species which currently occur in the country, if not yet complete, is very close to be complete. Further faunistic research will primarily supplement the faunas of individual geographical regions of the country. However, on a nationwide scale, we can expect to find at most a few new, previously overlooked, inherently very rare, or local ant species with a cryptic mode of life (as was the case with *Lasius carnolicus*; Salata & Borowiec 2011). This is, of course, unless some taxonomic changes occur, causing the division of some species-level taxa earlier considered good, as was the case with the former Linnean *Lasius niger* (L.), divided into two sibling species (Seifert 1991), as well as the former foersterian *L. alienus* (Förster), divided into several species (Seifert 1992), of which three occur in Poland (see Czechowski et al. 2012). Of course, the spontaneous influx of new thermophilic species can always be expected over time – either through spontaneous northern range expansion of southern forms as the climate warms, or through possible acclimatisation to central European outdoor conditions of accidentally introduced alien species (even from afar). An example of the former is *Colobopsis truncata* (Spinola) [= *Camponotus truncatus* (Spinola)], detected in southwestern Poland at the beginning of the 21st century (Borowiec 2007, Suchocka et al. 2008; see also Salata et al. 2018), and examples of the latter are the highly invasive *Lasius neglectus* and the potentially invasive *Tetramorium immigrans* – both with well-established outdoor populations in Polish cities, Warsaw (e.g. Trigos-Peral et al. 2024) and Wrocław (Borowiec & Salata 2018), respectively. It cannot be ruled out that *P. pygmaea* reported here is at the beginning of this path.

*Plagiolepis pygmaea* is considered a generalist and opportunist species widely distributed from Spain to Balkans (Seifert 2018); its presence in anthropogenic habitats is common, both in urban and non-urban environments (e.g. Groc et al. 2007, Thurin and Aron 2008, Vidal-Cordero et al. 2024, Trigos-Peral & Reyes-López 2025). Permanent establishment of *P. pygmaea* outdoors in Warsaw, and thus in Poland, seems unlikely but not impossible. Its Warsaw occurrence (52°13'N) is the northernmost findings of this species caused by passive introduction, and located 400 km north of the nearest natural site and 500 km east from the closest introduction (Berlin-Köpenick, Germany; Seifert 2020). In less northern artificial sites in Switzerland, Germany, and France, *P. pygmaea* is increasingly found in cities, where it tends to be supercolonial (B. Seifert, pers. comm. to GT-P). Incidentally, in the case of *Ph. megacephala* previously found in Warsaw (Trigos-Peral et al. 2020) the possibility of creating an established outdoor population or even a permanent colony seems even more unlikely. For the worldwide spread of this extremely invasive ant species, see Wetterer 2012.

A comparison of the numbers of newly detected native ant species and foreign tramp ones in Poland in recent years (2 vs. 7; see above) clearly shows that the possible future extending the list of ant species known from Poland will also be mainly due to the latter. It should be emphasized that the recording of such newcomers (often as a result of luck) does not and will not mean a permanent enrichment of the national myrmecofauna. Such exotic species are typically found in botanical garden greenhouses (or nearby, as in the case of the aforementioned *Ph. megacephala*) or close to allotment gardens, which strongly suggests their accidental importation with plants (and soil). Artificially maintained favourable climatic conditions allow them to survive there, but they are vulnerable to the frequent use of insecticides in such locations. Therefore, the ants' presence there is often (though not always and not everywhere) more or less ephemeral.

It is crucial to document newly recorded species and to implement regular monitoring programs aimed at detecting potential changes in ant communities, particularly for conservation purposes, because of the possibility of threats to native biodiversity. Shifts in environmental conditions – driven by climate change and the global commercial trade of species – significantly increase the risk of introduction and establishment of exotic ants, some of which possess invasive potential (see Bertelsmeier et al. 2014, Gippet & Bertelsmeier 2021, Mwebaze et al. 2023, Czechowski et al. in preparation).

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## REFERENCES

- AntWiki. 2025. *Plagiolepis pygmaea*. Available from: [https://www.antwiki.org/wiki/Plagiolepis\\_pygmaea](https://www.antwiki.org/wiki/Plagiolepis_pygmaea); accessed on: 8.08.2025.
- Bertelsmeier C., Luque G.M., Hoffmann B.D., Courchamp F. 2014. Worldwide ant invasions under climate change. *Biodiversity and Conservation*, 24: 117–128.
- Borowiec M.L. 2007. *Camponotus truncatus* (Spinola, 1808) (Hymenoptera: Formicidae) – ant species new to Poland. *Polish Journal of Entomology*, 76: 41–45.
- Borowiec M.L. 2009. Nowe dane o rozmieszczeniu mrówek (Hymenoptera: Formicidae) z plemienia Formicoxenini w Polsce. *Wiadomości Entomologiczne*, 28: 200.
- Borowiec M.L., Salata S. 2018. *Tetramorium immigrans* Santschi, 1927 (Hymenoptera: Formicidae) nowy gatunek potencjalnie inwazyjnej mrówki w Polsce. *Acta Entomologica Silesiana*, 26 (online 002): 1–5.
- Borowiec M.L., Salata S. 2021. Notes on ants (Hymenoptera: Formicidae) from Western Greece. *Annals of the Upper Silesian Museum in Bytom, Entomology*, 30 (online 005): 1–23.
- Borowiec M.L., Salata S. 2022. A monographic review of ants of Greece (Hymenoptera: Formicidae). Vol. 1. Introduction and review of all subfamilies except the subfamily Myrmicinae. Part 1: text. *Natural History Monographs of the Upper Silesian Museum*, 297 pp.
- Collingwood C.A. 1979. The Formicidae (Hymenoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* 8. Scandinavian Science Press Ltd., Klampenborg, 174 pp.
- Charrier N.P., Bonsergent C., Charrier M., Malandrin L., Kaufmann B., Gippet J.M.W. 2020. Invasive in the North: new latitudinal record for Argentine ants in Europe. *Insectes Sociaux*, 67: 331–335.
- Czajkowska M. 1979. Występowanie i rozprzestrzenianie się *Monomorium pharaonis* (L.) (Hymenoptera, Formicidae) na terenie Warszawy. *Fragmenta Faunistica*, 23: 343–361.
- Czechowska W., Czechowski W. 1999. *Leptothorax albipennis* Curtis, 1854 (Hymenoptera, Formicidae), nowy dla Polski gatunek mrówki. *Przegląd Zoologiczny*, 43: 103–104.
- Czechowski W., Radchenko A., Czechowska W. 2002. The ants (Hymenoptera, Formicidae) of Poland. *Museum and Institute of Zoology PAS, Warszawa*, 200 pp.

- Czechowski W., Radchenko A., Czechowska W., Vepsäläinen K. 2012. The ants of Poland with reference to the myrmecofauna of Europe. Fauna Poloniae new series, vol. 4. Natura optima dux Foundation, Warszawa, 496 pp.
- Czechowski W., Wiśniewski M., Trigoss-Peral G. 2025. A colony of *Camponotus nicobarensis* Mayr (Hymenoptera: Formicidae) nesting in teapots: just an anecdotal 'nature curiosity' or also a warning against possible ant invasiveness?. Annals of the Upper Silesian Museum in Bytom, Entomology, 34 (online 011): 1–11.
- Espadaler X., García F., Roig X., Vila R. 2013. Hormigas (Hymenoptera, Formicidae) del Parc del Castell de Montesquiu (Osona, Noreste de la Península Ibérica). Boletín de la Sociedad Entomológica Aragonesa, 53: 223–227.
- Fisher B., Fong J. 2025. AntWeb. California Academy of Sciences – Available from: <https://doi.org/10.15468/wqmjtt>; accessed via GBIF.org; accessed on: 17.10.2025.
- Gippet J.M.W., Bertelsmeier C. 2021. Invasiveness is linked to greater commercial success in the global pet trade. Proceedings of the National Academy of Sciences of USA, 118: e2016337118.
- Groc S., Delabie J.H.C., Céréghino R., Orivel J., Jaladeau F., Grangier J., Mariano C.S.F., Dejean A. 2007. Ant species diversity in the 'Grands Causses' (Aveyron, France): In search of sampling methods adapted to temperate climates. Comptes Rendus Biologies, 330(12): 913–922.
- Mwebaze P., Liebhold A.M., Bertelsmeier C., Kellenberg D., Bates O.K., Springborn M.R. 2023. The role of climatic similarity and bridgehead effects in two centuries of trade-driven global ant invasions. Journal of the Agricultural and Applied Economics Association, 2: 515–530.
- Michlewicz M. 2022. *Strumigenys emmae* (Emery, 1890) (Hymenoptera: Formicidae) in Poland – first record of this pantropic ant species from Europe with remarks on its biology. Annals of the Upper Silesian Museum in Bytom, Entomology, 31 (online 007): 1–5.
- Pawluk F., Borowiec M.L., Salata S. 2022a. First record of *Plagiolepis alluaudi* Emery, 1894 (Hymenoptera: Formicidae) from Poland. Annals of the Upper Silesian Museum in Bytom, Entomology, 31 (online 006): 1–5.
- Pawluk F., Borowiec M.L., Salata S. 2022b. *Technomyrmex vitiensis* Mann, 1921 (Hymenoptera: Formicidae) – a new exotic ant species in Poland. Annals of the Upper Silesian Museum in Bytom, Entomology, 31 (online 011): 1–5.
- Radchenko A.G. 2016. Murav'i (Hymenoptera, Formicidae) Ukrainy. Nacional'naya akademiya nauk Ukrainy, Kiev, 495 pp.
- Salata S., Borowiec M.L. 2011. *Lasius (Austrolasius) carnolicus* Mayr, 1861, species new to the Polish fauna (Hymenoptera: Formicidae). Genus, 22: 639–644.
- Salata S., Borowiec M.L. 2013. *Temnothorax albipennis* (Curtis, 1854) in Poland and identification of the *T. tuborum* species complex (Hymenoptera: Formicidae). Genus, 24: 403–413.
- Salata S., Borowiec M.L. 2014. Nowe stanowiska kilku rzadkich gatunków mrówek (Hymenoptera: Formicidae). Wiadomości Entomologiczne, 33: 77–79.
- Salata S., Rutkowski T., Borowiec M.L. 2018. First record of *Nylanderia jaegerskioeldi* (Mayr, 1904) (Hymenoptera: Formicidae) from Central Europe – Rocznik Muzeum Górnośląskiego w Bytomiu, Przyroda, 24 (online 001): 1–5.
- Salata S., Żurawlew P. and Kowalczyk J.K. 2018. Nowe dane o rozmieszczeniu wybranych gatunków mrówek (Hymenoptera: Formicidae) w Polsce. Wiadomości Entomologiczne, 37: 46–53.
- Seifert B. 1991. *Lasius platythorax* n. sp., a widespread sibling species of *Lasius niger* (Hymenoptera: Formicidae). Entomologia Generalis, 16: 69–81.
- Seifert B. 1992. A taxonomic revision of the Palaearctic members of the ant subgenus *Lasius* s.str. (Hymenoptera: Formicidae). Abhandlungen und Berichte des Naturkundemuseums Görlitz, 66: 1–67.
- Seifert B. 2018. The ants of Central and North Europe – Lutra Verlags- und Vertriebsgesellschaft, Tauer, 408 pp.
- Seifert B. 2020. Revision of the *Plagiolepis schmitzii* group with description of *Pl. invadens* sp. nov. – a new invasive supercolonial species (Hymenoptera: Formicidae). Deutsche Entomologische Zeitschrift, 67(2): 183–196.
- Seifert B. 2025. The *Monomorium carbonarium* species group in the Nearctic and Europe (Hymenoptera: Formicidae). Soil Organisms, 97: 55–84.
- Suchocka H., Czechowski W., Radchenko A. 2008. Second report on the occurrence of *Camponotus truncatus* (Spinola) (Hymenoptera: Formicidae) in Poland, with a key to the Polish species of the genus *Camponotus* Mayr. Fragmenta Faunistica, 51: 9–13.
- Thurin N., Aron, S. 2008. Seasonal nestmate recognition in the polydomous ant *Plagiolepis pygmaea*. Animal Behaviour, 75(3): 1023–1030.
- Trigos-Peral G., Rutkowski T., Witek M., Ślipiński P., Babik H., Czechowski W. 2020. Three categories of urban green areas and the effect of their different management on the communities of ants, spiders and harvestmen. Urban Ecosystems, 23: 803–818.
- Trigos-Peral G., Szpalek A., Mika F., Czechowski W. 2024. Raised from decline: reassessment of the occurrence of *Lasius neglectus* (Hymenoptera: Formicidae), an invasive ant species, in Warsaw, Poland. Polish Journal of Ecology, 72: 85–95.
- Trigos-Peral G., Reyes-López J.L. 2025. The aging of urban gardens can enhance their role as refuges for local ant species. Diversity, 17(1), 64.
- Vidal-Cordero J.M., de la Rubia-Ibáñez B., Tinaut A. 2024. Las hormigas de la Alhambra, un enclave histórico y biodiverso (Hymenoptera, Formicidae) (Granada, España). Boletín de la Asociación Española de Entomología, 48(1–2): 21–34.
- Wetterer J.K. 2012. Worldwide spread of the African big-headed ant, *Pheidole megacephala* (Hymenoptera: Formicidae). Myrmecological News, 17: 51–62.

## STRESZCZENIE

### **Plagiolepis pygmaea (Latreille, 1798) (Hymenoptera: Formicidae) – nowy zawleczony gatunek mrówki w Polsce**

*Plagiolepis* Mayr, 1861 to rodzaj mrówek obejmujący dziewięć znanych gatunków, rodzimych dla Europy. Podczas gdy większość z nich występuje (i utrzymuje się) głównie w regionach południowych, *Plagiolepis pygmaea* rozszerza swój zasięg na północ – po części samoistnie, po części drogą przypadkowych zawleczeń. W niniejszym opracowaniu przedstawiamy pierwsze stwierdzenie tego gatunku w Polsce. Mrówki (robotnice) były obserwowane na trawniku w Parku Szczęśliwickim w Warszawie. Obecnie jest to najbardziej północne znane stanowisko tego gatunku w Europie, oddalone o 400 km od granicy jego naturalnego zasięgu. Powstało niewątpliwie w wyniku przypadkowego przeniesienia. Znaleźisko to zwraca uwagę na potrzebę wypracowania efektywnych procedur monitorowania i kontroli, jakie pozwoliłyby na ograniczenie napływu gatunków obcych, potencjalnie zagrażających rodzimej faunie i różnorodności biologicznej.

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