



Distribution of *Myrmecophilus acervorum* (Panzer, 1799) (Orthoptera: Myrmecophilidae) in Poland

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Abstract: This study summarises information on the occurrence of *Myrmecophilus acervorum* in Poland in the years 1851–2022. We collected information about 143 localities: 40 from literature and 103 unpublished. *Myrmecophilus acervorum* is reported from seven new regions: the Baltic Coast, Białowieża Primeval Forest, Eastern Sudety Mts, Kraków-Wieluń Upland, Podlasie Lowland, Sandomierska Lowland and Trzebnickie Hills. While until 2010 observations were rare (35 localities), in the years 2011–2022 the species was found in 108 new localities. A total of 443 individuals of *M. acervorum* were observed in Poland, but the sex was identified only for 138, of which 135 were mature females or female nymphs. Males were recorded only historically in the Pomeranian Lakeland. At present, these records should be treated with caution, as they are uncertain.

Key words: common ant-cricket, myrmecophily, regions, new records

INTRODUCTION

The genus *Myrmecophilus* Berthold, 1887 consists of 49 species that can be found in Europe, Asia, Africa, North America, Australia and Oceania (Cigliano et al. 2022). *Myrmecophilus acervorum* (Panzer, 1799) occurs in Armenia, Austria, Belarus, Bulgaria, Czech Republic, Denmark, France, Greece, Netherlands, Spain, Kazakhstan, Lithuania, Luxembourg, North Macedonia, Germany, Poland, Russia (Kaliningrad Oblast), Romania, Slovakia, Sweden, Ukraine, Uzbekistan and Hungary (Zacher 1917, Stach 1926, Stalling 2013, Childebaev et al. 2014, Ostrovsky 2016, Bubenko 2017, Lebedeva 2017, Stalling et al. 2017, Iorgu et al. 2021). It

is a myrmecophilous species with a symphilic character, however it can also be found far from ant nests during dispersal (Franc et al. 2015).

Until recently *M. acervorum* was known in Poland from nine regions: Lower Silesia, Lublin Upland, Małopolska Upland, Masovian Lowland, Pomeranian Lakeland, Roztocze Upland, Świętokrzyskie Mts, Upper Silesia and Wielkopolska-Kujawy Lowland (Bazyluk & Liana 2000).

The aim of this study is to summarise existing data on *M. acervorum* in Poland, whether published or unpublished, discuss its habitat preferences and present its distribution in Poland according to the current state of knowledge.

MATERIAL AND METHODS

Available sources and materials as well as critically analysed domestic literature were used in this study (Bazyluk & Liana 2000). Information obtained from fellow entomologists and naturalists was used alongside data collected by the authors. The collected material refers to 40 sites from literature and 103 unpublished sites. The records are presented according to the regionalisation of Poland after the “Catalogue of the Fauna of Poland” (Bazyluk & Liana 2000). The information is given in the following order: locality (also national park or nature reserve), UTM (Universal Transverse Mercator coordinate system), date, number of individuals, sex, accompanying ant species, habitat, information source. Places where *M. acervorum* was found located at least 100 m from each other were treated as different sites. Due to taxonomic changes in species of ants from the *Lasius niger* group, all previous designations were treated as *Lasius* sp.

RESULTS

Baltic Coast

- Słowiński National Park [XA56], circuit Rąbka, by Wydma Łącka, 17 Jun 2019, 1 individual, *Formica rufa* (Linnaeus, 1761) nest, pine forest (leg. A. Chudzik);
- Darzowice [VV77], 31 Jul 2021, 1 individual, *Lasius niger* (Linnaeus, 1758) nest under a stone (leg. G. Gierlasiński, T. Rutkowski);

Białowieża Primeval Forest

- Białowiecki National Park [FD84], forest branch 394c, 6 Jun 2017, 1♀, under the loose bark of a dead tree trunk (leg. Sz. Konwerski);
- Białowiecki National Park [FD95], forest branch 192b, 16 Sep 2020, 2♀♀, under the loose bark of a dead *Quercus robur* Linnaeus, 1753 (leg. Sz. Konwerski);

Bieszczady Mts

- Lipie [FV26], 19 Sep 2019, 1♀, *Myrmica rugulosa* (Nylander, 1849) nest under a stone, road edge (Michlewicz 2020);
- Muczne [FV24], 13 May 2020, 1 ♀, *Myrmica rubra* (Linnaeus, 1758) nest under a stone, forest clearing with trees and bushes (Michlewicz 2020);

Eastern Beskid Mts

- Libusza [EA10], 15 May 2013, 1♀, *Lasius niger* nest under the cover of a well (Tszakowski et al. 2013);
- Libusza [EA10], 28 Dec 2013, 1♀, *Lasius brunneus* (Latreille, 1798) nest under the bark of a decaying tree trunk (Kaszycza et al. 2018);
- Przysieki [EA20], 15 May 2020, 1♀, *Lasius niger* nest under a stone in a home garden (Michlewicz 2020);

Eastern Sudety Mts

- Olszak Mt. ad Pokrzywna [XR77], 7 Jan 2017, 2♀♀, rocks in a mixed forest (leg. S. Salata);

- Rozumice nature reserve [YR14], 30 Apr 2020, 1♀, ant nest in a decaying *Betula pendula* Roth, 1788 (leg. R. Ruta);

Kraków-Wieluń Upland

- Pustynia Błędowska [CA97], 12 May 2018, ca. 10 individuals, under the bark of a dead *Alnus glutinosa* (Linnaeus, 1753) (leg. Ł. Mielczarek);
- Kraków-Bronowice [DA14], 16 Apr 2019, 1♀, 11 May 2020, 1 individual, ant nest under the pavement (leg. M. Syratt);
- Kraków-Mydlniki [DA14], 22 Apr 2020, 1 individual, under a fallen *Betula pendula* (leg. M. Syratt);

Lower Silesia

- Stolec [XS30], Oct 1964, 1♀ (Liana 1975);
- Skałki Stoleckie nature reserve [XS30], 1976–1979, xerothermic grassland on limestone rocks in an old quarry (Liana 1982);
- Ślęza Mt ad Sady [XS23], 277 m a.s.l., 30 Jul 2016, 1 individual, *Lasius platythorax* (Seifert, 1991) nest under the bark of a *Pinus sylvestris* (Linnaeus, 1753) stump (leg. Sz. Konwerski);
- Gęsiniec [XS42], 8 Jul 2019, 1 nymph, *Myrmica* sp. nest under a stone, old granite quarry (leg. T. Rutkowski);
- Łososiuwice [XS18], 23 Apr 2021, 1♀, ant nest under a stone, pine forest next to a train station (leg. T. Rutkowski);

Lublin Upland

- Parchatka ad Puławy [EB69], 7 Sep 1940, 1♀, 19 Jun 1951, 1♀, under a stone on a xerothermic hill (Bazyłuk 1956, 1957);
- Kazimierz Dolny [EB68], 19 Jul 1950, 2♀♀, *Lasius flavus* (Fabricius, 1782) nest (Bazyłuk 1957);
- Bochoznica [EB68], 1974–1975, slopes of the Bystra river valley (Liana 1978);
- Łańcuchów [FB38], 7 May 2021, 1 individual, *Lasius brunneus* nest in a tree hollow in *Alnus glutinosa*, riparian forest (leg. G. K. Wagner);
- Lublin – Stary Gaj [FB07], 26 May 2021, 1 individual, *Lasius platythorax* nest in a *Quercus robur* stump, oak-hornbeam forest (leg. B. Staniec);
- Durne Bagno peat bog, Poleski National Park [FC50], 6 Jul 2021, 2 individuals, *Lasius niger* nest in a dry *Betula pendula* stump, edge of a raised bog (leg. G. K. Wagner);
- Orzechów Stary [FC40], 18 Aug 2021, 9 individuals, *Lasius niger* nest in a lying *Betula pendula* trunk, pine forest (leg. B. Staniec);
- Zienki [FC40], two sites: 25 Aug 2021, 4 individuals, *Lasius niger* nest in a lying *Pinus sylvestris* trunk, pine forest; 1 Oct 2021, 10 individuals, *Lasius niger* nest in a lying *Pinus sylvestris* trunk, pine forest (leg. G. K. Wagner);
- Wola Wereszczyńska, Poleski National Park [FC40], 3 Sep 2021, 31 individuals, *Lasius niger* nest in a lying *Betula pendula* trunk, pine forest (leg. G. K. Wagner);
- Rogóżno [FB39], 23 Sep 2021, 23 individuals, *Lasius niger* nest in a lying *Betula pendula* trunk, mixed pine-oak forest (leg. B. Staniec);
- Wielkopole [FB59], 1 Oct 2021, 21 individuals, *Lasius niger* nest in a lying *Betula pendula* trunk, wet birch forest (leg. B. Staniec);

Malopolska Upland

- Busko-Zdrój [DA79] (Bazyłuk 1956);
- Włoszczowa [EB23], 30 Apr 2012, ca. 10 individuals, wood in the soil (leg. Ł. Mielczarek);
- Stawiany [DB70], 18 May 2016, 1♀, *Lasius niger* nest under a stone, xerothermic grassland (Kaszyca et al. 2018);

- Łódź [CC83], Majerowskie Błota protected area, 12 May 2019, ca. 10 individuals, *Lasius* sp. nest under a fallen *Populus* sp. (leg. R. Kaźmierczak, W. Wypych, insektarium.net);
- Dobromierz [DB25], 13 Jun 2020, ca. 10 individuals, under the dry bark of *Pinus sylvestris* (leg. Ł. Mielczarek);
- Radom-Śródmieście [EB19], Kościuszko Park, 16 Jul 2021, 5 individuals, decayed, wet wood of a lying *Acer platanoides* (Linnaeus, 1753) (Miłkowski 2022);
- Krzemionki Opatowskie nature reserve [EB34], 22 Apr 2022, 1♀, *Lasius platythorax* nest, birch forest (leg. G. K. Wagner);

Masurian Lakeland

- Olsztyn – Las Miejski [DE66], 17 Jun 2013, 1♀, sandy road, edge of a mixed forest (leg. M. Sowiński);
- Krukłanki [EE69], 29 Jun 2016, 1♀, *Lasius brunneus* nest under the bark of a decaying trunk of *Alnus glutinosa*, wood by a lake (Michlewicz 2020);
- Kowalewo Pomorskie [CD59], 26 Aug 2020, few ♀♀, *Myrmica rubra* nest (leg. P. Olszewski);

Mazovian Lowland

- Podkowa Leśna [DC87], 20 Dec 1948, 6♀♀, *Formica rufa* nest (Bazyłuk 1957);
- Dziekanów Leśny, Kampinoski National Park [DC89], 8 Aug 1960, 1♀, *Lasius* sp. nest under the bark of a *Betula pendula* trunk (Liana 1962);
- Warszawa [DC99], Las Bielański, *Lasius brunneus* nest (Burakowski & Luniak 1982);
- Warszawa [EC08], Kawęczyn nature reserve, 18 Jun 2019, 1♀, oak-hornbeam forest (leg. R. Ruta);
- Bukowiec Jabłonowski nature reserve [DD90], 20 Jun 2019, 1♀, mixed forest (leg. R. Ruta);
- Warszawa [EC08], Pole Mokotowskie, 23 Jul 2020, few individuals, *Lasius* sp. nest under a piece of sett lying by a tree (leg. A. Szpalek);
- Warszawa [EC07], Las Kabacki nature reserve, 4 Apr 2021, 3 individuals, *Lasius brunneus* nest under the bark of a lying *Pinus sylvestris*, mixed oak-hornbeam forest (Tatur-Dytkowski 2021);
- Cyganówka [EC24], two sites: 3 Aug 2020, 4 individuals, including 1♀ nymph (Fig. 1), ant nest under a *Pinus sylvestris* stump; 24 and 25 Jun 2021, few individuals, ant nest under an unearthed *Pinus sylvestris* stump, oak-pine forest (leg. J. Błądowski);
- Warszawa [DC98], Szczęśliwice Fort, 5 Aug 2020, 2 individuals, *Lasius* sp. nest in decaying wood (leg. A. Szpalek);
- Polewicz [EC24], 24 Jun 2021, 2 individuals, ant nest under the roots of an unearthed *Pinus sylvestris* stump, pine-oak forest (leg. J. Błądowski);
- Jasienica [ED20], 12 Jun 2021, 1 individual, *Lasius fuliginosus* (Latreille, 1798) nest under a big piece of styrofoam (leg. A. Szpalek);
- Wola Rębkowska [EC34], 23 Jul 2021, 3 individuals, ant nest under firewood logs in the yard (leg. J. Błądowski);
- Huta Garwolińska [EC35], five sites: 24 Jun 2021, few nymphs, ant nest in a decayed *Pinus sylvestris* stump; 24 Jun 2021, few nymphs, ant nest under a piece of a tree stump, mixed pine-oak forest; 31 Aug 2021, few individuals (also nymphs), ant nest under the bark of a *Pinus sylvestris* stump, pine-oak forest; 31 Aug 2021, few individuals (also nymphs), ant nest under the bark of a *Pinus sylvestris* stump, a pine old-growth clump; 13 Apr 2022, 1♀ nymph (Fig. 2), 30 Apr 2022, 3♀♀, 1 nymph, under the bark of a *Pinus sylvestris* stump on the edge of a few years old forest plantation (leg. J. Błądowski);



Fig. 1. *Myrmecophilus acervorum*, female nymph, Cyganówka, Mazovian Lowland, Aug 2020 (Photo by J. Błędowski).



Fig. 2. *Myrmecophilus acervorum*, female nymph, Huta Garwolińska, Mazovian Lowland, Apr 2022 (Photo by J. Błędowski).

- Siedem Móg [EC34], 24 Jun 2021, few nymphs, two ant nests under *Pinus sylvestris* stumps, potential pine-oak forest habitat, 10 Aug 2021, 3 nymphs, ant nest under a *Pinus sylvestris* stump, oak plantation (leg. J. Błędowski);
- Podzamcze [EC42], two sites: 26 Jul 2021, 1 nymph, ant nest under a cut *Salix* sp. (Linnaeus, 1753), a grazed pasture in a drained pond by the forest; 27 Jul 2021, 1 nymph, ant nest under the bark of a *Pinus sylvestris* stump, mixed pine-oak forest (leg. J. Błędowski);
- Lipniki [EC33], three sites: 10 Jul 2021, 4 individuals, ant nest under a fallen, dry *Pinus sylvestris*; 10 Aug 2021, few nymphs, ant nests under the bark of three *Pinus sylvestris* stumps, mixed pine-oak forest; 23 Apr 2022, 1 ♀, ant nest under the bark of a *Pinus sylvestris* stump, pine plantation after a clear cut, potential pine forest habitat (leg. J. Błędowski);
- Rywociny [EC44], 10 Aug 2021, few nymphs, ant nests under the bark of *Pinus sylvestris* stumps, pine-oak forest (leg. J. Błędowski);
- Samogoszcz [EC33], 10 Aug 2021, few nymphs, ant nest under the bark of an unearthened *Pinus sylvestris* stump, pine-oak forest (leg. J. Błędowski);
- Tarnów [EC23, EC33], three sites: 24 Jul 2021, 2 nymphs, ant nest under the bark of a *Pinus sylvestris* stump; 11 Aug 2021, 1 individual, ant nest under the bark of a *Picea abies* (Linnaeus, 1753) stump next to a car park in a pine forest; 3 Sep 2021, few mature individuals and nymphs, ant nests under three *Pinus sylvestris* stumps, pine-oak forest (leg. J. Błędowski);
- Skurcza [EC34], 1 Sep 2021, ca. 25–30 individuals (also nymphs), ant nest under the bark of a fallen *Pinus sylvestris*, a pine old-growth clump (leg. J. Błędowski);
- Lubice [EC36], 9 Sep 2021, 3 individuals, ant nest under the bark of a *Pinus sylvestris* stump, pine-oak forest (leg. J. Błędowski);

Podlasie Lowland

- Łuków [EC95], 12 Jun 2019, 1 individual, *Lasius* sp. nest, under a paving stone (leg. R. Szczygieł);
- Stary Brus [FC50], 25 Aug 2021, 5 individuals, *Formica fusca* (Linnaeus, 1758) nest in a lying *Betula pendula* trunk, pine forest (leg. B. Staniec);
- Pieszowola, Poleski National Park [FC50], 23 Sep 2021, 16 individuals, *Lasius niger* nest in a lying *Betula pendula* trunk, pine forest (leg. G. K. Wagner);
- Osmola [FD32], 24 Apr 2022, 1 ♀, *Lasius platythorax* nest under a stone, edge of a field dirt road and birch-pine woods (leg. B. Pacuk);
- Wygonowo [FD32], 24 Apr 2022, 2 ♀♀, *Lasius platythorax* nest under the bark of a dead *Pinus sylvestris*, pine-birch forest edge (leg. B. Pacuk);

Pomeranian Lakeland

- Mały Kack/Krykulec [CF34], 23 Apr 1916, *Lasius* sp. nest (La Baume 1920);
- Szczecin surrounding [VV72] (Splinter 1925);
- Kwidzyń [CE65], 18 Aug 1951, 2 ♂♂, *Lasius* sp. nest, under a stone on a train track, by the forest (Bazyluk 1957);
- Goleniów [VV83], 2 Jul 1953, 1 ♂, *Lasius* sp. nest (Bazyluk 1957);
- Nowy Staw [CF60], 9 Jul 1972, 1 individual, under a stone (leg. A. Dziabaszewski);
- Słupsk [XA23], western edge of the town, 10 May 2017, 1 individual, *Formica polyctena* (Foerster, 1850) nest, mixed forest (leg. A. Chudzik);
- Cisy Staropolskie nature reserve [CE03], 10 Jul 2010, 1 ♀ (leg. Sz. Konwerski), 7 Jul 2018, 1 nymph, *Lasius brunneus* nest under the bark of a *Pinus sylvestris* (leg. T. Rutkowski);
- Sulnówko [CE22], 9 Aug 2019, 1 individual, ant nest under a piece of wood, by the train tracks at the edge of a pine forest (leg. B. Pacuk);

- Daleszewo [VV60], 21 Apr 2021, 1 individual, ant nest under a stone, by a train station (leg. T. Rutkowski);
- Szczecin [VV71], Barwna str., 21 Apr 2021, few individuals, *Lasius fuliginosus* nest under a stone (leg. T. Rutkowski);

Roztocze Upland

- Zwierzyniec [FB30], Sep 1928 or 1929, *Lasius* sp. nest in a decaying tree stump (Kuntze 1930);
- Tartaczna Góra ad Zwierzyniec [FB40], 29 Jun 1948, 16♀♀, *Lasius* sp. nest under a stone (Urbański 1949, Skuratowicz & Urbański 1953), 28 Jun 1954, 1♀, under a stone (Bazyłuk 1957);
- Bukowa Góra nature reserve, Roztoczański National Park [FB30], 1956–1958, 1 individual, *Lasius* sp. nest (Pętał 1961), 1986–1990, beech forest (Liana 1994);
- Czerkies – strict protection area, Roztoczański National Park [FB40], 1986–1990, beech forest (Liana 1994);
- Józefów [FA49], 7 Aug 2021, 3 nymphs, ant nest under a fallen *Pinus sylvestris*, pine-oak forest (leg. J. Błędowski);

Sandomierska Lowland

- Wola Zarczycka [EA87], two sites: 1 Aug 2007, 1 individual, *Tetramorium caespitum* (Linnaeus, 1758) nest under a stone; 31 Aug 2008, 1 individual, 15 Nov 2009, 1 individual, *Lasius fuliginosus* nest, pine forest (leg. M. Zagaja);
- Łętownia [EA87], 14 Apr 2009, 1 individual, *Formica pratensis* (Retzius, 1783) nest, pine forest edge (leg. M. Zagaja);

Świętokrzyskie Mts

- Nowa Słupia [EB03], 30 Oct 1913, 1 individual, *Lasius* sp. nest (Demel 1922);
- Zachelmie nature reserve [DB74], 5 Jun 2021, 1 individual, *Lasius* cf. *niger* nest under a stone, quarry (leg. A. Szpalek);

Trzebnickie Hills

- Oborniki Śląskie [XS38], 16 Apr 2022, 2 individuals, *Lasius* sp. nest under the bark of a lying *Quercus robur* (leg. R. Ruta);

Upper Silesia

- Racibórz surroundings [CA05] (Kelch 1852, after: Liana 1975);
- Imielin [CA75], 8 Sep 2015, 1♀, 4 May 2018, 1♀, *Lasius flavus* nest with *Solenopsis fugax* (Latreille, 1798), old dolomite quarry, xerothermic grassland (Kaszyca et al. 2018);
- Piekary Śląskie [CA58], 17 Aug 2016, 1♀, *Lasius brunneus* nest (Kaszyca et al. 2018);
- Katowice-Brynow [CA56], 27 Sep 2017, 1♀, on a paving stone, anthropogenic habitat (Kaszyca et al. 2018);
- Katowice-Brynow [CA56], Kościuszko Park, 11 May 2018, 3♀♀, *Lasius brunneus* nest at the basis of a tree stump (Kaszyca et al. 2018);
- Katowice-Brynow [CA56], 20 May 2018, 5♀♀, *Lasius flavus* nest, anthropogenic habitat (Kaszyca et al. 2018);
- Jaworzno [CA76], 10 Oct 2021, 1♀, under a stone, old quarry (leg. G. Gierlasiński);

Western Beskid Mts

- Jaroszwicka Góra ad Jaroszwice [CA92], 540 m a.s.l., 26 Aug 2021, 1♀, *Lasius* sp. nest under a stone, fir-spruce forest (Gierlasiński 2022);

Wielkopolska-Kujawy Lowland

- Dziewicza Góra [XU31], May 1949, 1♀ (Bazyłuk 1957);
- Skwierzyna [WU32], 10 Aug 1951, 1♀, under a stone at the edge of a pine forest (Bazyłuk 1957);

- Poznań-Cytadela [XU30], 28 Mar 1973, 1 individual, *Lasius* sp. nest under a stone (Dziabaszewski 1975), Jul 1994, 1 ♀, ant nest under a stone, 18 Jan 1999, 3 individuals, ant nest in a lying, decaying *Robinia pseudoacacia* (Linnaeus, 1753) (Grobelny & Tryjanowski 2002);
- Lusowo [XU11], 3 May 1997, 1 ♀, in a decayed log, a forest at the southern shores of Lusowskie Lake (leg. Sz. Konwerski);
- Biedrusko [XU21], military area, 20 Apr 1999, 2 ♀♀, 1 ♀ nymph, in a decayed *Pinus sylvestris* trunk, oak forest (leg. Sz. Konwerski);
- Karszew [CC57], 9 Dec 1999, 1 ♀, Jul 2000, 1 ♀, *Lasius brunneus* nest in a dead *Aesculus hippocastanum* (Linnaeus, 1753) (leg. R. Matusiak);
- Byszewice [XU38], 2005, 1 ♀, oak forest (leg. R. Ruta);
- Mosina [XT28], 15 Jul 2008, 1 ♀, *Lasius platythorax* nest in a lying decayed trunk of a deciduous tree (leg. Sz. Konwerski);
- Kątnik ad Łęczycza, Wielkopolski National Park [XT39], 15 Apr 2008, 4 ♀♀, *Lasius brunneus* nest, 12 May 2009, 4 ♀♀, *Lasius platythorax* nest in punk wood (leg. Sz. Konwerski);
- Dolina Śwędni – Natura 2000 protected area [CC04], 21 Aug 2008, 1 ♀, 3 nymphes, *Lasius platythorax* nest in a standing, decayed *Betula pendula* next to a fen (leg. Sz. Konwerski);
- Grabina strict protection area, Wielkopolski National Park [XT29], 20 May 2010, 1 individual (leg. Sz. Konwerski);
- Rogalin [XT38], 25 May 2010, 5 individuals (leg. P. Jałoszyński);
- Stara Kaźmierka [XT96], 11 Sep 2011, 2 ♀♀, *Lasius platythorax* nest in a decayed stump, pine forest (Żurawlew & Grobelny 2012);
- Wieleń – former palace gardens [WU76], 19 May 2013, 1 ♀, (leg. R. Ruta);
- Trzcianka [WU97], 3 Sep 2013, 1 ♀, *Lasius umbratus* (Nylander, 1846) nest in decaying wood underground (Michlewicz 2020);
- Szklarka Przygodzicka [XT90], 2013-2018, few individuals, *Lasius* cf. *niger* nest in a tree stump of *Corylus avellana* (Linnaeus, 1753) (leg. T. Rutkowski);
- Radojewo/Biedrusko [XU32], 2015, 1 ♀, ant nest under the bark of a *Pinus sylvestris* trunk, mixed forest (leg. T. Klejdysz);
- Bór Wąkole nature reserve [CD65], 14 May 2015, 1 ♀, under a piece of wood at the edge of a pine forest (leg. B. Pacuk);
- Łażyn nature reserve [CD08], 23 May 2015, 1 individual (leg. B. Pacuk);
- Bydgoszcz [XU98], Dąbrowski Park, 23 Apr 2016, 1 individual, *Lasius umbratus* nest in a *Tilia* sp. trunk (leg. T. Rutkowski);
- Inowrocław [CD15], 1 May 2016, 1 individual, *Lasius* cf. *niger* nest, under a stone next to the train station (leg. T. Rutkowski);
- Lubski Łęg Śnieżycowy – Natura 2000 protected area [VT93], 31 May 2016, 3 ♀♀, 29 Jul 2016, 1 ♀, under the loose bark of *Quercus robur* (leg. Sz. Konwerski);
- Gryżyna [WT18], 3 Jun 2016, 1 nymph (Orzechowski & Wasielewski 2016).
- Templewko [WU20], 18 Sep 2016, 1 ♀, *Lasius* sp. nest under a stone (leg. T. Rutkowski);
- Trzcielina [XT19], 1 Apr 2017, 1 ♀, *Lasius niger* nest under a stone, next to a playground (leg. T. Rutkowski);
- Bielice Nowe [WU65], 20 May 2017, 1 ♀, *Formica polyctena* nest in a *Pinus sylvestris* trunk, next to the train station (leg. T. Rutkowski);
- Drezdenko [WU55], 21 May 2017, 1 ♀, *Myrmica* sp. nest under a stone, next to the train station (leg. T. Rutkowski);
- Bydgoszcz [CD09], Witos Park, 5 Jul 2017, 1 individual, ant nest under a stone (leg. T. Rutkowski);

- Sośnie [XT80], 9 Jul 2017, 1 individual, *Tetramorium caespitum* nest, pine forest next to the train track (leg. T. Rutkowski);
- Cegielnia [XU84], 9 Oct 2019, female nymph, *Lasius platythorax* nest under an unearthed *Pinus sylvestris* stump, clear cut at the edge of a pine forest (leg. B. Pacuk);
- Czmoń [XT48], 10 Nov 2019, 1♀, ant nest under the bark of a *Pinus sylvestris* stump (Fig. 3, T. Klejdysz);
- Stany [WT54], 15 May 2020, 1♀, under tree bark, oak-hornbeam-elm forest (leg. R. Orzechowski);
- Ciszkowo [WU96], 15 Jun–7 Jul 2020, 1 individual caught in a pitfall trap, a xerothermic grassland at the edge of the Noteć river valley (leg. T. Rutkowski);
- Poznań [XU21], 2 Oct 2020, 2♀♀, *Lasius niger* nest under a stone, woods by the Rusałka lake (leg. M. Michlewicz);
- Barcinek [XU41], 7 Oct 2020, 1♀, under a stone, beech forest (leg. W. Kroker);
- Poznań [XU20], Sołacki Park, 4 May 2021, 1♀, *Lasius niger* nest within a lawn (leg. M. Michlewicz);
- Straduń [WU97], 8 Jul 2021, 1♀, *Tetramorium caespitum* nest under some debris, loose grassland (leg. M. Michlewicz);



Fig. 3. *Myrmecophilus acervorum*, female, Czmoń, Wielkopolska-Kujawy Lowland, Nov 2019 (Photo by T. Klejdysz).

In the years 1851 to 2022, *M. acervorum* was recorded in Poland at 143 sites. Until 2010 the records were sparse (35 sites), whereas in the period 2011–2022 the species was recorded at 108 sites. Most of the records come from Wielkopolska-Kujawy Lowland (37) and Mazovian Lowland (31), since *M. acervorum* has been actively searched for in these regions (Table 1, Fig. 4).

Table 1. Number of *Myrmecophilus acervorum* records in Poland in the distinguished periods in the years 1851 – 2022. Division into regions according to the “Catalog of the Fauna of Poland” (Bazyluk & Liana 2000). Numbers of sites marked with an asterisk (*) refer to corrected cases, where one site was occupied over several periods.

Region	1851– 1900	1900– 1925	1926– 1950	1951– 1975	1976– 2000	2001– 2010	2011– 2022	Com- bined
Baltic Coast	-	-	-	-	-	-	2	2
Białowieża Primeval Forest	-	-	-	-	-	-	2	2
Bieszczady Mts	-	-	-	-	-	-	2	2
Eastern Beskid Mts	-	-	-	-	-	-	3	3
Eastern Sudety Mts	-	-	-	-	-	-	2	2
Kraków-Wieluń Upland	-	-	-	-	-	-	3	3
Lower Silesia	-	-	-	1	1	-	3	5
Lublin Upland	-	-	2	2	-	-	9	12*
Małopolska Upland	-	-	-	1	-	-	6	7
Masurian Lakeland	-	-	-	-	-	-	3	3
Mazovian Lowland	-	-	1	1	1	-	28	31
Podlasie Lowland	-	-	-	-	-	-	5	5
Pomeranian Lakeland	-	2	-	3	-	-	5	10
Roztocze Upland	-	1	1	2	2	-	1	5*
Sandomierska Lowland	-	-	-	-	-	3	-	3
Świętokrzyskie Lowland	-	1	-	-	-	-	1	2
Trzebnickie Hills	-	-	-	-	-	-	1	1
Upper Silesia	1	-	-	-	-	-	6	7
Western Beskid Mts	-	-	-	-	-	-	1	1
Wielkopolska-Kujawy Lowland	-	-	1	2	4	6	25	37*
In all	1	4	5	12	8	9	108	143

Table 2. Ant species (Formicidae) in the nests of which *Myrmecophilus acervorum* found in Poland.

Ant species (Formicidae)	N ant nests with <i>M. acervorum</i>
<i>Lasius</i> sp.	19
<i>Lasius niger</i> (Linnaeus, 1758)	15
<i>Lasius brunneus</i> (Latreille, 1798)	11
<i>Lasius platythorax</i> (Seifert, 1991)	10
<i>Lasius fuliginosus</i> (Latreille, 1798)	4
<i>Lasius flavus</i> (Fabricius, 1782)	2
<i>Lasius umbratus</i> (Nylander, 1846)	2
<i>Lasius flavus</i> + <i>Solenopsis fugax</i> (Latreille, 1798)	1
<i>Formica polyctena</i> (Foerster, 1850)	2
<i>Formica rufa</i> (Linnaeus, 1761)	2
<i>Formica fusca</i> (Linnaeus, 1758)	1
<i>Formica pratensis</i> (Retzius, 1783)	1
<i>Myrmica rubra</i> (Linnaeus, 1758)	2
<i>Myrmica</i> sp.	2
<i>Myrmica rugulosa</i> (Nylander, 1849)	1
<i>Tetramorium caespitum</i> (Linnaeus, 1758)	3

Myrmecophilus acervorum preferred dry, warm localities in forests of different types (pine, beech, oak, hornbeam, and riparian forests), edges of forest plantations, sometimes parks, quarries and their surroundings, xerothermic grasslands, and urban areas, where it occupied ant nests. Most of the records come from dead, decaying wood and its fragments (80 records). The most commonly occupied species was *Pinus sylvestris* (38 records) – *M. acervorum* occurred under the bark of tree stumps, decaying logs and under the roots of unearthed tree stumps. It was also found on the following species: *Betula pendula* (11 records), *Quercus robur* (five records), *Alnus glutinosa* (3 records), *Aesculus hippocastanum* (two records), *Acer platanoides*, *Corylus avellana*, *Picea abies*, *Populus* sp., *Robinia pseudoacacia*, *Salix* sp. and *Tilia* sp. (one record

each). *Myrmecophilus acervorum* was also found under stones (29 records), under paving stones (three records), under the cover of a well, under a sett, in chopped firewood logs, under debris, and under styrofoam. Furthermore, it was accidentally caught in a pitfall trap on a xerothermic grassland in Noteć valley in the Wielkopolska-Kujawy Lowland and photographed on a sandy forest dirt road in Olsztyn in the Masurian Lakeland (M. Sowiński, pers. obs.). The latter observations are evidence of *M. acervorum* moving between ant nests.

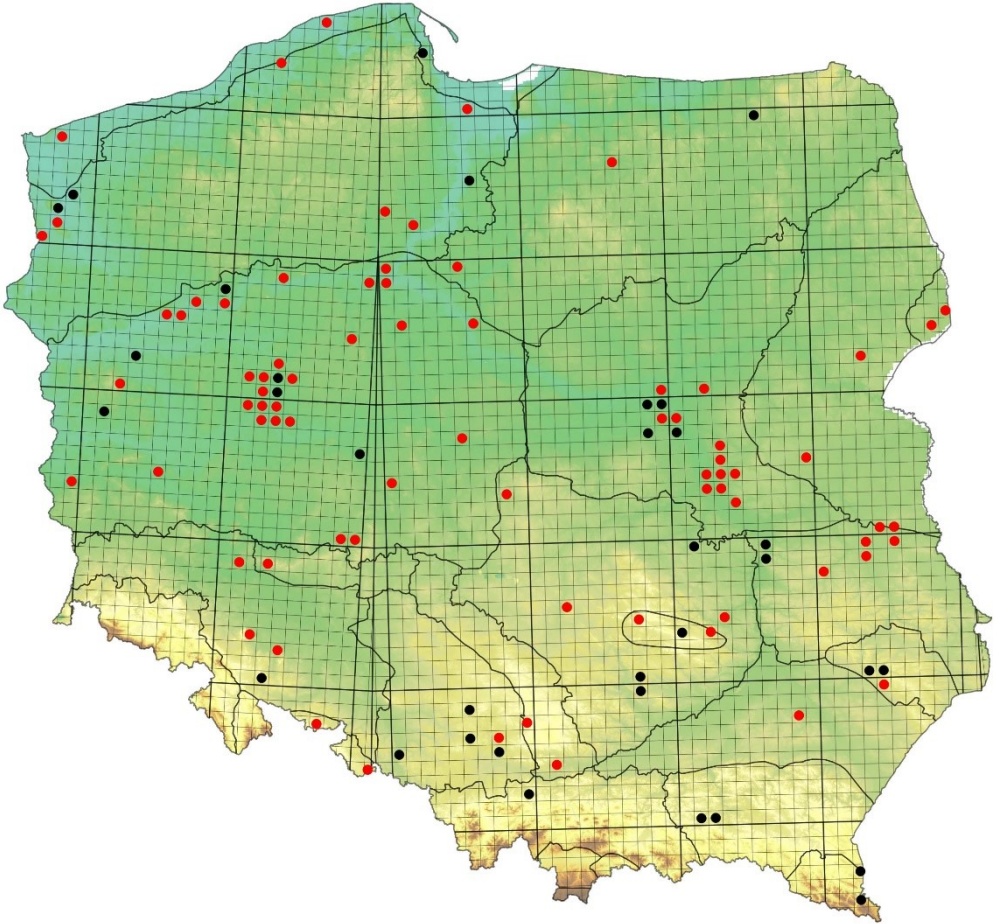


Fig. 4. Distribution of *Myrmecophilus acervorum* in Poland in the UTM (Universal Transverse Mercator coordinate system) 1851-2022. Grid: black circles – published records, red circles – new records.

Myrmecophilus acervorum was recorded at almost all times of year: Jan – twice, Feb – 0, Mar – one time, Apr – 21 times, May – 28 times, Jun – 15 times, Jul – 22 times, Aug – 24 times, Sep – 16 times, Oct – 8 times, Nov – 2 times, Dec – 3 times. The high concentration of records in the period Apr–Sep reflects the intensive surveys of ant nests and coleopterans inhabiting them performed at that time. Only one *M. acervorum* individual was found in an ant nest in most of the cases (84 records), followed by 2–5 individuals (46 records), 6–10 individuals (7 records); the biggest aggregations consisted respectively of: 16, 21, 23, 25–30 and 31 individuals. All together 443 individuals of *M. acervorum* were recorded in Poland. Sex was identified for 135,

of which all were mature females or female nymphs. Males were only historically recorded in the Pomeranian Lakeland (Bazyluk 1957), however this information has to be treated as uncertain, as there is no possibility to check specimens. Recently all males reported from Germany turned out to be female nymphs (Iorgu et al. 2021), which indicates the possibility that the supposed Polish males could in fact also be females.

In Poland *M. acervorum* occurred in nests of 13 different ant species (data from 78 nests), most commonly with *Lasius* (82.1%), followed by *Formica* (7.7%), *Myrmica* (6.4%), and *Tetramorium* (3.9%) (Table 2).

DISCUSSION

Data presented in this study shows that *M. acervorum* is a widespread species in Poland. Active searches for this species resulted in the discovery of many new occupied sites. This confirms the view that the former rarity of *M. acervorum* in Poland was only superficial. Currently it is known from 20 regions. This study presents records from seven new regions: Baltic Coast, Białowieża Primeval Forest, Eastern Sudety Mts, Kraków-Wieluń Upland, Podlasie Lowland, Sandomierska Lowland and Trzebnickie Hills. So far it has not been found only in Nowotarska Valley, Pieniny Mts, Western Sudetes Mts and the Tatra Mts.

In the neighbourhood of Poland, the ant species preferences of *M. acervorum* are similar to the ones described here. In Moravia and Czech Silesia *M. acervorum* was found in 91 localities, within the nests of 20 ant species, most commonly with *Lasius* (73.0%) and with *Myrmica* (14.5%) (Bezďčka et al. 2000). In the Eberswalde area in Brandenburg (Germany) *M. acervorum* was recorded from nests of 15 ant species, most commonly with *Lasius* (49.1%), *Formica* (25.5%), and *Myrmica* (14.9%) (Möller 2002). In Slovakia it was recorded from 103 localities in a wide habitat spectrum: xerothermic grasslands, shrub overgrown slopes, heaths, forest edges, deciduous forests, wetland alder forests, as well as ruderal habitats, urban, and suburban areas. Most of the records come from *Lasius* (62.2%) and *Formica* (27.0%) nests (Franc et al. 2015).

M. acervorum was previously thought to be a typically parthenogenetic species. However, recent studies from Romania show that both sexes occur in a part of its range. A phylogenetic and phylogeographic analysis revealed the existence of few haplotypes (Iorgu et al. 2021).

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STRESZCZENIE

[Występowanie mrowiszczaka mrówkomirka *Myrmecophilus acervorum* (Panzer, 1799) (Orthoptera: Myrmecophilidae) w Polsce]

Praca podsumowuje informacje o mrowiszczaku mrówkomirku *Myrmecophilus acervorum* w Polsce z lat 1851–2022. Gatunek zanotowano na 143 stanowiskach. Podano pierwsze informacje o występowaniu gatunku z siedmiu krain: Pobrzeże Bałtyku, Podlasie, Puszcza Białowieska, Sudety Wschodnie, Nizina Sandomierska, Wyżyna Krakowsko-Wieluńska i Wzgórza Trzebnickie. Do roku 2010 gatunek był notowany rzadko (35 stanowisk), natomiast w latach 2011–2022 został odnotowany już na 108 stanowiskach. Gatunek preferował suche, ciepłe stanowiska w lasach różnego typu (bory, buczyny, dąbrowy, grądy, łęgi), skraje upraw leśnych, rzadziej parki, obrzeża kamieniołomów, murawy kserotermiczne i obszary zurbanizowane. Dominowały stwierdzenia w martwych, próchniejących drzewach i w ich fragmentach, ponadto znajdowano go pod kamieniami, płytami chodnikowymi, pokrywą studni, kostką brukową, porąbanymi szczapami drewna oraz pod fragmentami gruzu i styropianu. Gatunek notowano prawie we wszystkich miesiącach roku. W poszczególnych przypadkach, w gniazdach mrówek notowano najczęściej po 1–5 osobników, rzadziej po 6–10, a największe skupienia liczyły po: 16, 21, 23, 25–30 i 31 osobników. Łącznie w Polsce zanotowano około 443 osobniki tego gatunku, przy czym płeć oznaczono tylko dla 137, z których 134 było samicami lub larwami samic. Samce zanotowano dawniej jedynie na Pojezierzu Pomorskim (Bazyłuk 1957), chociaż obecnie należy te informacje traktować jako bardzo niepewne. W Polsce mrowiszczak występował w gniazdach 13 gatunków mrówek, najczęściej u rodzaju *Lasius* (82,1%), rzadziej u *Formica* (7,7%) i *Myrmica* (6,4%), a najrzadziej u *Tetramorium* (3,8%) (Tabela 2).