

## Hymenoptera: Formicoidea

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In the Czech Republic 102 species of the ants have been ascertained and 82 of these are found in the study area. A key to the identification of central European ants (NOVÁK & SADIL 1941) has a predominantly historical value and that by SAMŠI-ŇÁK (1957) does not include the keys to larger genera. A list of the ants of the former Czechoslovakia was compiled by WERNER (1989). Ants as social insects build their nests mostly in the ground in wood, tree cavities and certain species of *Formica* form underground nests combined with aboveground domes of plant material. Most xerothermic species require warmth and dryness, some euryoecious species are widely tolerant and occur, first of all, in altered and ruderalized habitats. Ant colonies commonly comprise three castes: besides males and females there is a third, most numerous caste of workers. Besides, there are obligatorily parasitic species characterized by the absence of workers (*Plagiolepis xene*), and slave-making ones (e.g. *Strongylognathus*, *Polyergus*, *Epimyra*). All ant species are polyphagous with emphasis on the animal component of their diet. Due to predation, longevity and total biomass, ants are an important component of all natural, seminatural and supplementary communities. The main method of collecting ants consists in looking for their nests beneath stones, pieces of wood, in vegetation, earth mounds, wood, etc. Other methods include sifting of detritus, sweeping and jarring from vegetation, pitfall-trapping, or light-trapping of winged adults at night.

**History of investigation.** The first information from the study area is found in ZDOBNITZKY's (1910) paper on the ants of Moravia and later in those by SOUDEK (1922a, 1922b). In the 1930s and 1940s, ants were collected in the area of interest by F. GREGOR sen., J. STEJSKAL, J. FIALA, A. HOFFER, J. SADIL, and J. PALÁSEK. Their materials are deposited in the collections mentioned below. KRATOCHVÍL (1936) published a separate study of the ant fauna of the Pavlovské vrchy Hills on the basis of his one-year collections. From the territory, divided into the basic habitat types (woodland, forest-steppe, steppe, etc.), he reported a total of 50 forms of ants (i.e. 48 species as conceived at present), but he did not state the precise localities inhabited by the individual species. In the period from the 1950s to 1970s, ants were collected here by P. LAUTERER, J. NIEDL, K. DENEŠ, P. BÍLEK, and others. Their scanty collections come chiefly from the steppe habitats of the Pavlovské vrchy Hills or from the environs of Lednice. Since 1977, the present author has systematically investigated the myrmecofauna of the whole region, with particular attention to small protected areas.

**Remarkable records.** The ant species recorded solely in the Pálava B.R. include *Leptothorax clypeatus*, nesting in the dead trunks of old oak trees in the Castle Park at Lednice and in the Rendesvous National Nature Monument; *Plagiolepis xene*, parasitizing in the nests of *P. vindobonensis* and known only from the rocky steppe in the Svatý Kopeček Nature Reserve near Mikulov; and *Camponotus lateralis*, nesting in the dead wood of oak trees and known from a single finding in the same locality in 1937 (the original material is preserved in the collection of the National Museum in Prague). The very rare species occurring in the study area also include *Epimyrma ravouxi*, a slave-making ant living to the detriment of ants of the genus *Leptothorax*, recently again found in the Svatý Kopeček Hill (beyond the study area, the species has been recorded in the Czech Republic in a single locality in southern Bohemia); *Strongylognathus bulgaricus*, a slave-making species living to the detriment of *Tetramorium* ants, ascertained in the Kotel Nature Reserve (and known beyond the study area only from historical findings in the serpentine steppe of the Mohelno Nature Reserve); and *Liometopum microcephalum*, inhabiting very old but still living broadleaved trees (*Quercus* spp. above all). This is one of the most numerous local populations of this species within its whole range (only two other records are known in the Czech Republic in floodplain forests along the lower reaches of the Morava River near Mikulčice, the Skařiny Nature Reserve). In the Pálava B.R., all the above species attain the northern limit of their ranges in Europe. *Lasius citrinus* (= *affinis*) may be added to the mentioned rare species. It was reported by SOUDEK (1922b) from the Lednice ponds and this record was quoted by ZÁLESKÝ (1939) but the documentary specimens have not been preserved. KRATOCHVÍL (1936) reports three ant species whose occurrence in the study area is doubtful: *Leptothorax lichtensteini* (a southern element not yet reliably ascertained in the Czech Republic), *Myrmica sulcinodis* and *Camponotus herculeanus* (both actually mountain species). The documentary specimens are missing and the findings have never been repeated.

**Monitoring.** According to the experience obtained, e.g. in the serpentine steppe at Mohelno, ants are a suitable group for monitoring environmental changes, especially in steppe and xerothermic habitats. However, selecting an appropriate site for the installation of pitfall-traps is the basic prerequisite for a successful use of this method of monitoring. The site must be sufficiently distant from strong colonies of territorial ant species (*Camponotus*, *Formica*, *Lasius*). To obtain an overall picture of changes in the ant fauna, the classical monitoring method (pitfall-trapping) should be completed by additional collecting methods, as mentioned above. The only factor limiting the use of ants in monitoring is the comparatively difficult identification of species and lack of experts in this line.

**Conservation.** Most ant species are considerably stenoeccious and thus incapable of adapting to the degradation of habitats and their changes, first of all as regards the density of the vegetation cover and shading. Concrete protective measures can be employed in the case of *Liometopum microcephalum* and *Leptothorax clypeatus*. Protection of the former species should consist of the conservation of all nest trees regardless of whether they do or not grow in protected small areas and of selecting and conserving perspective trees and tree groups in the proximity of the present nest trees. In view of the radically decreased number of nests of this species within the past two decades, resulting from the construction of the Nové Mlýny waterworks, *Liometopum micro-*

*cephalum* is recommended here to be listed in the Red Book as critically endangered, as it meets the criteria of IUCN (1994). *Leptothorax clypeatus* is confined to dead trunks of oak trees devoid of bark and standing in sunlit places. Since such trees are continuously getting scarcer (see the Castle Park at Lednice, etc.), the existence of this ant species in the study area and thus also in the whole Czech Republic is in increasing danger. Therefore this species is suggested here to be listed in the Red Book as vulnerable. *Camponotus lateralis* has not been recorded in the area of interest since 1937 (see Remarkable records); hence, it may be considered to be extinct there.

#### PUBLISHED SOURCES

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2. SOUDEK Š., 1922a: Mravenci. Soustava, zeměpisné rozšíření, oekologie a určovací klíč mravenců žijících na území ČSR. /Ants. System, distribution and identification key to ants living on the territory of the Czechoslovak Republic/. Praha, 100 pp. (In Czech).
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#### COLLECTIONS EXAMINED

10. Coll. P. BEZDĚČKA.
11. Coll. P. WERNER, Gabinova 823, 152 00 Praha 5.
12. Coll. Moravian Museum, Brno.
13. Coll. National Museum, Praha.
14. Coll. Regional Museum Soběslav.
15. Coll. Regional Museum, Olomouc.
16. Coll. Regional Museum, Ostrava.

## ABBREVIATION

General abbreviations: see comments on abbreviations (pp. 13-19) and a separate Appendix.

Special abbreviations: du dulotic (slave-making species living on account of other ants), xb xylobiont, xe xenobiont (living indifferently in nests of other ants).

Example: *Hyponera punctatissima* (Roger, 1859): MI<sup>1</sup> (10)<sup>2</sup>, 2.2.8<sup>3</sup>, A1<sup>4</sup>, EUR<sup>5</sup>.

Explanation: <sup>1</sup>locality, <sup>2</sup>number of source, <sup>3</sup>ecosystem or habitat type, <sup>4</sup>abundance, <sup>5</sup>distribution.

## LIST OF SPECIES

- PONERINAE
- Hyponera punctatissima* (Roger, 1859): MI (10), 2.2.8, A1, EUR.
- Ponera coarctata* (Latreille, 1802): PV (4, 6), BV, DV, LE, ML, SA, SE, SK, TH (10), 2.1.1-3, A2, SBM.
- MYRMICINAE
- Aphaenogaster subterranea* (Latreille, 1798): PV (4, 6), BV, CH, DI, DV, KA, ML, RV, SE, SK (10), 1.1.1, 2.1.1-2, tf, A2, SBM.
- Diplorhoptrum fugax* (Latreille, 1798): common, xe, PAL.
- Epimyrma ravouxi* (André, 1896): SK (10), du, A1, EUR, host: *Leptothorax*.
- Formicoxenus nitidulus* (Nylander, 1846): PV (1, 6), BV, PS (10), xe, A3, EUS.
- Leptothorax acervorum* (Fabricius, 1793): LE, MI (10), A1, PAL.
- L. affinis* Mayr, 1855: AV, BA, BR, CA, DI, DO, HL, HO, KA, KL, LD, LE, ML, PE, PO, RE, SE, SK (10), tf, xb, A3, SBM.
- \**L. clypeatus* (Mayr, 1853): RE (9,11), LE (10), 1.1.1, tf, xb, A1, SBM, VU.
- L. corticalis* (Schenck, 1852): BV (1), PV (4, 6), DV, SE, SK (10), BR (11), xb, A2, PAL.
- L. gredleri* Mayr, 1855: LR (10), LE (11), 2.0, A1, EUR.
- L. interruptus* (Schenck, 1852): MI, SE, SK, UV (10), A2, PAL.
- L. lichtensteini* Bondriot, 1918: PV (4, 6), A1, SBM.
- L. muscorum* (Nylander, 1846): LE, PA, RA (10), A2, HOL.
- L. nigriceps* Mayr, 1855: PV (2, 4, 6), LE, SK (10), A2.; EUR.
- L. nylandereri* (Foerster, 1850): common, 1.0, sk, PAL.
- L. parvulus* (Schenck, 1852): PV (4, 6), LE (8), RE, SE (10), A2, SBM.
- L. sordidulus* Müller, 1923: SK (10), PV (11), tf, xb, A1, SBM.
- L. tuberum* (Fabricius, 1775): LE, SK (10), A1, EUR.
- L. unifasciatus* (Latreille, 1798): common, SBM.
- Messor muticus* (Nylander, 1849): TH (1, 10), PV (4, 6, 11, 12), LE (6, 10), SK (9, 10), BV, DI, DV, HV, KK, KL, KO, LV, MI, MS, MT, PA, SA, SE, TU, UV (10), KO (12), 2.1.2-4, xt, A3, SBM.
- Myrmecina graminicola* (Latreille, 1802): BV, CH, KL, KO, ML, SA, SE, SK (10), LE (10, 11), 2.1.1-3, A2, PAL.
- Myrmica deplanata* Ruzsky, 1905: PV (2, 4, 6, 7, 13), KO (2, 12, 13), KL, LE, SE, SK (10), DV (10, 13), 2.1.2-3, xt, A2, PAL.
- M. lobicornis* Nylander, 1846: PV (4, 7), SA, SE, TU (10), A2, PAL.
- M. rubra* (Linnaeus, 1758): common, PAL.
- M. ruginodis* Nylander, 1846: common, PAL.

- M. rugulosa* Nylander, 1848: PV (4, 6), LR, TU (10), 2.1.5, A2, EUR.
- M. sabuleti* Meinert, 1860: common, tf, PAL.
- M. scabrinodis* Nylander, 1846: PV (4), CA, JK, SO, UV (10), hg, A2, PAL.
- M. schencki* Emery, 1894: PV (4, 6, 12), AV, BV, KS, LE, MT, RE, RK, SE, SK, TH, TU (10), KL (10, 12), DV, KO (10, 13), 2.0, tf, A4, PAL.
- M. specioides* Bondriot, 1918: DI, DV, KO, KS, MI, SE, SN, SK, TU (10), 2.1.1-4, A3, EUR.
- M. sulcinodis* Nylander, 1846: PV (4, 6), ps, PAL.
- Stenama westwoodi* Westwood, 1840: PV (4, 6),; BV, DO, LD, SA, SE, SK (10), LE (10, 11), 1.1, sk, A3, PAL.
- Strongylognathus bulgaricus* Viehmeyer, 1922: KL (10), 2.1.2, xt, du, A1, SBM, host: *Tetramorium*.
- S. testaceus* (Schenck, 1852): MT, SE, SK, TH (10), 2.0, tf, du, A1, PAL, host: *Tetramorium* sp.
- Tetramorium caespitum* (Linnaeus, 1758): common, 2.0, tf, HOL.
- T. ferox* Ruzsky, 1903: PV (4), DV, SK, TH (10), 2.1.1-3, xt, A2, PON.
- T. impurum* (Foerster, 1850): BA, DO, HO, KP, MI, MS, SE, SN, UV (10), 2.0, A3, HOL.
- T. moravicum* Kratochvil, 1944: AV, BA, DI, KO, LV, PE, SE, SK, UV (10), 2.0, xt, A2, CEU.
- DOLICHODERINAE**
- Bothriomyrmex gibbus* Soudek, 1924: PV (4, 6), SK, TU (10), 2.1.1-3, xt, A1, SBM.
- Dolichoderus quadripunctatus* (Linnaeus, 1771): KL (1), PV (4, 6), RA (9, 10), BA, BV, CA, HV, LD, LE, LR, MI, PO, RE, SE, SK, SO (10), CH (10, 12), BR (10, 14), tf, xb, A4, EUR.
- Liometopum microcephalum* (Panzer, 1798): BV (1, 10), LE (2, 5, 6, 7, 10, 11, 12, 15, 16), PV (4, 6, 12), HO (5, 10), RA (9, 10), CA, CH, DO, HL, KA, KV, LA, LD, NM, PD, RE, SO (10), PO (10, 12), BR (11), 1.1.2, tf, xb, A2, SBM, CR.
- Tapinoma ambiguum* Emery, 1925: LE, SE (10), 2.0, A2, PAL.
- T. erraticum* (Latreille, 1798): PV (4, 7, 12), BV, DI, DO, DV, KL, KS, PE, SA, SE, SK, TH, TU, UV (10), 2.1.1-4, xt, A3, SBM.
- FORMICINAE**
- Camponotus aethiops* (Latreille, 1798): PV (2, 4, 6, 14), MI (9, 10, 13), BA, BV, DV, HO, KL, LE, PS, SE, SK, TH (10), PA (14), 2.1.2-3, xt, A3, SBM.
- C. fallax* (Nylander, 1856): MI (9), BA, CH, KL, LA, LD, LE, NM, RA, RE, SE, SK (10), PV (14), tf, xb, A3, SBM.
- C. herculeanus* (Linnaeus, 1758): PV (4), ps, xb, HOL.
- \**C. lateralis* (Olivier, 1791): SK (5, 7), tf, xb, A1, SBM, EX.
- C. ligniperda* (Latreille, 1802): common, EUS.
- C. piceus* (Leach, 1825): PV (4, 6), KL, LE, MT, PA, SE, SK, TH, UV (10), DV (10, 12), MI (12), 2.1.2-3, xt, A3, SBM.
- C. truncatus* (Spinola, 1808): BV, CA, CH, HV, KA, KL, LD, RA, RE, SE, SK, SO, TU (10), LE, ML (10, 11), tf, xb, A3, PAL.
- C. vagus* (Scopoli, 1763): PV (4, 6), BV, CH, HO, LA, LD, LE, LR, MI, ML, MT, PO, PS, RE, SA, SK (10), BR (10, 12), tf, xb, A3, PAL.
- Formica cinerea* Mayr, 1853: PV (4, 6), BA, KL, LA, MI, PE, PS, SE, SK, UV (10), A2, PAL.
- F. cunicularia* Latreille, 1798: common, 2.0, PAL.
- F. fusca* Linnaeus, 1758: common, HOL.
- F. gagates* Latreille, 1798: PV (1, 4, 6), MI (9, 10), BV, KL, LE, ML, MS,

- PA, PS, RE, SE, SK (10), tf, A3, SBM.
- F. polyctena* Foerster, 1850: BR, ML, PS, RE, SE, TU (10), 1.0, P3, EUS.
- F. pratensis* Retzius, 1783: common, 2.0, EUS.
- F. rufa* Linnaeus, 1758: PV (4), BR, BV, KL, LE, ML, PE, SK, TU (10), 1.0, A2, EUS.
- F. rufibarbis* Fabricius, 1793: common, 2.0, PAL.
- F. sanguinea* Latreille, 1798: common, PAL.
- F. truncorum* Fabricius, 1804: PV (6), BR, CH, HV, LE, PS, SE (10), 2.0, A2, PAL.
- Lasius alienus* (Foerster, 1850): common, 2.0, PAL.
- L. brunneus* (Latreille, 1798): common, 1.0, xb, PAL.
- L. citrinus* Emery, 1922: LR (3, 6), A1, PAL.
- L. distinguendus* (Emery, 1916): MS, PE, SE, SK, TH, UV (10), 2.0, xt, A2, SBM.
- L. emarginatus* (Olivier, 1791): MI (1, 10), PV (4, 12, 14), BA, DO, HO, LD, LR, PE, RE, SE, SK, SO (10), LE (10, 12), DV, TH, TU (12), A3, SBM.
- L. flavus* (Fabricius, 1781): common, 2.0, HOL.
- L. fuliginosus* (Latreille, 1798): PV (4), BR, CA, LA, LE, NM, PA, PS, RA, RE, SE, SK, SN, SO, TU (10), 1.0, xb, A4, PAL.
- L. jensi* Seifert, 1982: KL, SE, SK, SN, TH (10), PA (13), 2.1.2-3, xt, A2, PAL.
- L. mixtus* (Nylander, 1846): RE, SN (10), 1.0, sk, A1, HOL.
- L. myops* Forel, 1894: PV (2, 4, 6), KL, MI, SE, SK (10), 2.0, xt, A2, SBM.
- L. niger* (Linnaeus, 1758): common, 2.0, HOL.
- L. paralienus* Seifert, 1992: SE, UV (10), 2.0, xt, A1, PAL.
- L. platythorax* Seifert, 1992: CA, KJ, RA, SO (10), A2, PAL.
- L. psamophilus* Seifert, 1992: PS (10), 2.1.4, xt, A1, EUR.
- L. rabaudi* (Bondriot, 1917): DO (10), 2.0, A1, PAL.
- L. umbratus* (Nylander, 1846): BA, BV, CA, CH, HO, KA, LD, NM, PA, PS, RE (10), A3, HOL.
- Plagiolepis pygmaea* (Latreille, 1798): PV (4, 6, 7), MI (9), DV, SK (10), 2.1.1-2, xt, A1, SBM.
- P. vindobonensis* Lomnicki, 1925: common, 2.1.1-3, xt, SBM.
- \**P. xene* Stärcke, 1936: SK (10), 2.1.2, xt, pa, A1, SBM, host: *P. vindobonensis*.
- Polyergus rufescens* (Latreille, 1798): PV (2, 4, 6), BA, BV, DI, DV, HV, KL, MT, PE, SA, SE, SK, TH (10), 2.0, du, A3, EUR, host: *Formica*, subg. *Serviformica*.

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