Joannea Zoologie 18: 33-152 (2020)

# The geographic distribution of ants (Hymenoptera: Formicidae) in Styria (Austria) with a focus on material housed in the Universalmuseum Joanneum

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**Zusammenfassung.** Die geografische Verbreitung der steirischen Ameisen (Hymenoptera: Formicidae) mit Schwerpunkt auf die Sammlung des Universalmuseums Joanneum. Diese Studie hat die Präsentation der Verbreitung der Ameisen der Steiermark zum Ziel. Hierbei schenkt sie dem steirischen Material des Universalmuseums Joanneum besondere Aufmerksamkeit. Dieses wurde nach dem aktuellen taxonomischen Status determiniert, vollständige Etikettenbeschriftungen der 1477 Datensätze wurden digitalisiert und geografische Koordinaten rekonstruiert. Aus der heutigen österreichischen Steiermark wurden 96 freilebende und 3 Arten in Gebäuden aus 5344 Datensätzen und von 1198 Standorten gesammelt. *Temnothorax albipennis* (Curtis, 1854) und *Tetramorium bicarinatum* (Nylander, 1846) werden erstmals für die Steiermark publiziert. *Pheidole* nahe *pallidula* ist ein Neunachweis für Österreich. Zwei Arten, *Tetramorium alpestre* Steiner et al., 2010 und *Lasius sabularum* (Bondroit, 1918), werden von der Liste der steirischen Ameisen ausgeschlossen. *Pheidole* nahe *pallidula* und *Tetramorium immigrans* Santschi, 1927 sind freilebende, etablierte Neozoen. Die gesamte steirische Ameisenliteratur, geografische Verbreitungsdaten inklusive Grafiken und relative Häufigkeiten zu vergleichbaren Arten werden angegeben. Die relative Häufigkeit von *T. immigrans* nahm über die letzten Jahrzehnte signifikant zu.

**Abstract.** This study aims to present the distribution of ant species in Styria. In so doing, it gives special attention to the Styrian material housed in the Universalmuseum Joanneum. This was determined to the up-to-date taxonomic status, full labels of all 1477 data sets were digitized, and geographic coordinates reconstructed. In today's Austrian Styria, 96 free-living and 3 indoor species from 5344 data sets and 1198 localities were collected. *Temnothorax albipennis* (Curtis, 1854) and *Tetramorium bicarinatum* (Nylander, 1846) are published for Styria for the first time. *Pheidole* near *pallidula* is a new record for Austria. Two species, *Tetramorium alpestre* Steiner et al., 2010 and *Lasius sabularum* (Bondroit, 1918), are excluded from the list of Styrian ants. *Pheidole* near *pallidula* and *Tetramorium immigrans* Santschi, 1927 are free-living, established neozoans. The complete Styrian ant literature, geographic distribution data inclusive graphics, and relative frequencies to comparable species are given. The relative frequency of *T. immigrans* significantly increased over the last decades.

**Key words.** morphometrics, allometry, faunistics, *Pheidole* near *pallidula, Tetramorium,* neozoans, distribution maps.

## 1. Introduction

The ant fauna of Central Europe is worldwide taxonomically (Seifert 2018) and ecologically (Seifert 2017) the best investigated. However, there are still knowledge gaps concerning species distribution and frequencies in some regions, which, for example, make it difficult to compare species occurrences of Austrian states (Steiner et al. 2017). The investigation of Styrian ants started in the middle of the 19th century (Mayr 1855), but the investigation status is still insufficient (Ambach 2009b). There is a couple of faunistic literature, but typical publications focus either on only rare species (e.g., Bregant 1998a, Bregant 1998b, Wagner et al. 2010) or are restricted on the species inventories of small localities (e.g., Bregant 1978, Wagner 2009, Wagner 2011b). A monograph or a red list comparable to Vorarlberg (Glaser 2005), Carinthia (Wagner 2014), Upper Austria (Ambach 2009a), Lower Austria (Schlick-Steiner et al. 2003), or Vienna (Schlick-Steiner & Steiner 1999) lacks. The recently published checklist includes 96 Styrian species (Steiner et al. 2017).

Since many cryptic species have been detected or redescribed in the last decades (e.g., Seifert 1992a, Seifert 2006b, Wagner et al. 2017), myrmecofaunistic reports from older literature (e.g., Hoffer 1890a, Eichhorn 1964, Hölzel 1966) must be treated with caution and can sometimes be interpreted using ecological or geographical information. For example, if Eichhorn (1964) reports about *Formica pratensis* in Upper Styria at a sea level of 1480 m, the record belongs with high probability to *F. lugubris*. However, the solid basis to evaluate historical occurrences or frequencies of species was the observation of ant material of the Universalmuseum Joanneum. It was collected between the early 20th and the early 21st century, but mainly between 1940 and 1990. I estimate there are over 30 000 prepared individuals in the collection, some putative nest samples comprise hundreds of individuals. Dr. Erich Kreissl (1927-1995), the former head of the department of zoology of the Universalmuseum Joanneum (Klausnitzer 1996, Spitzenberger 1996), collected – as I calculated – 95% of the ant material. The taxidermist Alfred Mauerhofer (*1938) prepared it (pers. comm. U. Hausl-Hofstätter 2020). Kreissl collected mainly in the mountainous region north of Graz and the district Murau. He visited also several localities at the Koralpe and the Poßruck, around Schloss Herberstein and around Wildon, and in southeastern Styria. Although only the minority of specimens has been determined in the past, the portion of identification errors is even for the former status of taxonomy very high. In contrast to the collection in the neighboring state Carinthia (e.g., Hölzel 1952, Wagner 2012), the majority of records has not been integrated into any publication so far (but see Kreissl 1973).

This study aims to comprise the knowledge of distribution of Styrian ant species with a particular focus on material housed in the Universalmuseum Joanneum but also

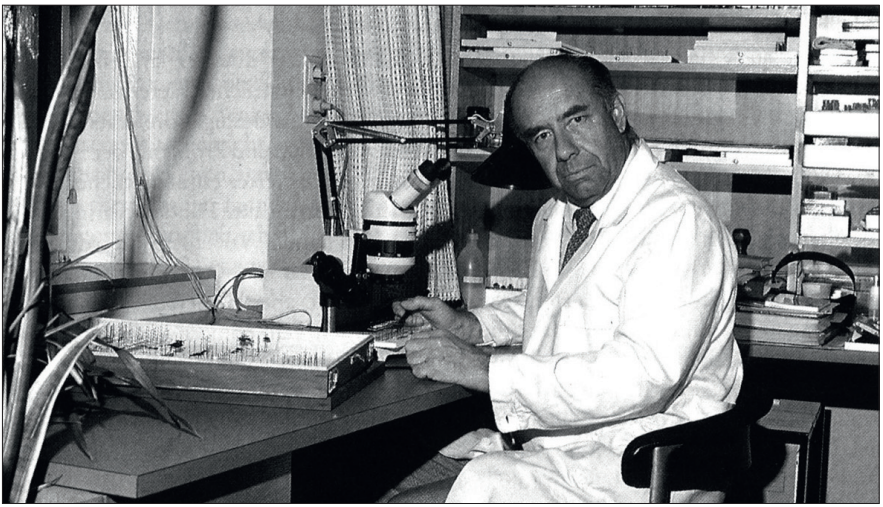

*Fig. 1:* Dr. Erich Kreissl, the collector of most ant material of the Universalmuseum Joanneum. Photo: K. Adlbauer.

under consideration of complete literature and self-collected so-far unpublished records. The horizontal and vertical geographic distribution as well as relative frequencies to comparable species are presented.

## 2. Material and Methods

The largest part of ant material considered in this study was determined by me. I roughly looked through all individuals of the Universalmuseum Joanneum and determined and labeled at least – if available – 3 female ants of all Styrian data sets to the up-to-date level of taxonomic knowledge (following Seifert 2018). Data sets are defined to differ from each other in locality, sampling date, sex, caste, or species. (In contrast, I define records to differ from each other only by locality or species.) Usually, only specimens with readable and interpretable information on locality and date have been used (ecological information lacks nearly always). Obvious species label confusions (e.g., *Formica polyctena* labeled as "*Tetram. caespit. Las. emarginat. Stenam. westwoodi*") provoked doubts also regarding correct locality and date labeling. However, Ulrike Hausl-Hofstätter from the Universalmuseum Joanneum convinced me that the second type of confusion, that is, a confusion of locality and date, is unlikely: While, in Kreissl's time, species labels were positioned next to the needled specimens but not on the same pin, which caused confusions, labels with information to locality and date were always needled on the pin with the ant material.

For the determination of workers (☿☿) and gynes (♀♀), primarily, the key of Seifert (2018) was used. Working with this key does also mean, if any doubts after determination by subjective observation of characters remain, to take morphometric measurements and proof species identity with the given discriminants. Morphometric data were collected using a LEICA MZ16 A high-performance stereomicroscope with a magnification range of 80-294×. A determination of *Pheidole* major-☿☿ was tried using the key of Seifert (2016b) and applying a wild-card linear discriminant analysis sensu Seifert et al. (2014) with calibration data of Seifert (2016b; supplement, www.soilorganisms.org) in SPSS Statistics v16.0. For *Temnothorax saxonicus/sordidulus* and untypical ☿☿ of *T. crassispinus* also discriminants in Seifert (2006b) and Csősz et al. (2015) were used. *Tetramorium bicarinatum* was determined after Hita Garcia & Fisher (2011). *Tetramorium-caespitum*-complex ☿☿ and males (♂♂) were determined using the keys of Wagner et al. (2017). In addition to the discriminants of the key, some ☿☿ were assigned as wild cards in linear discriminant analyses to any species with calibration data available (Wagner et al. 2017: Table S6). Nanitic ☿☿ of *Tetramorium* forced me to apply an allometric correction after Seifert (2008). As standard for all members of the *T. caespitum* complex, removal of allometric variance was calculated assuming all ☿☿ to have a cephalic size of CS = 0.75 mm. In so doing, k and d of linear functions (y = k * x + d) from morphometric and meristic data in Wagner et al. (2017) of the 9 species *T. alpestre*, *T. caespitum*, *T. hungaricum*, *T. indocile*, *T. caucasicum*, *T. fusciclava*, *T. staerckei*, *T. impurum*, and *T. immigrans* were calculated and arithmetic means of species were used. For each of these 9 species, data of at least 32 ☿☿ were available (Wagner et al. 2017: Table S6). Allometry of *T. breviscapus* was ignored, because only data for 15 ☿☿ were available. At the following 16 characters sensu Wagner et al. (2017), some species showed a negative and others a positive allometry: dAN, EL, EW, FL, MPPL, PEH, PEL, PLSP, PLST, PnHL, PPH, PPL, Ppss, PreOc, RTI, and SLd. Following the instruction for removal of allometric variance (Seifert 2008), allometry was not corrected here, but values were only linearly converted to ☿☿ with a head index of CS = 0.75 mm. The square root of the morphometric character Ppss (sqPpss) is negatively allometric in all species. Calculating square roots is used in myrmecology to produce data with an equal distribution (cf. Seifert 2018). Hence, allometric corrected data of sqPpss were used for discriminant analyses. From the remaining 16 characters, 12 showed a positive and 4 a negative allometry in all 9 species. The allometric corrected functions were as follows:

$CL/CS_{0.75}$ = CL / CS / (-0.053 * CS + 1.0469) * 1.0072
$CW/CS_{0.75}$ = CW / CS / (0.053 * CS + 0.953) * 0.9928
$HFL/CS_{0.75}$ = HFL / CS / (0.2992 * CS + 0.585) * 0.8094
$MC1TG/CS_{0.75}$ = MC1TG / CS / -0.0224 * CS + 0.0381) * 0.0213
$ML/CS_{0.75}$ = ML / CS / (0.2598 * CS + 0.9627) * 1.1575
$MPSP/CS_{0.75}$ = MPSP / CS / (0.1301 * CS + 0.3288) * 0.4264
$MPST/CS_{0.75}$ = MPST / CS / (0.0429 * CS + 0.2278) * 0.26
$MtpW/CS_{0.75}$ = MtpW / CS / (0.0865 * CS + 0.4242) * 0.489
$MW/CS_{0.75}$ = MW / CS / (0.1387 * CS + 0.5309) * 0.6349

PEW /$CS_{0.75}$ = PEW / CS / (0.0979 * CS + 0.2459) * 0.3193
PoOc /$CS_{0.75}$ = PoOc / CS / (-0.0715 * CS + 0.4472) * 0.3936
POTCos /$CS_{0.75}$ = POTCos / CS / (0.0114 * CS + 0.0021) * 0.0107
PPW /$CS_{0.75}$ = PPW / CS / (0.0759 * CS + 0.3491) * 0.406
SPST /$CS_{0.75}$ = SPST / CS / (0.0887 * CS + 0.126) * 0.1926
SPWI /$CS_{0.75}$ = SPWI / CS / (0.1681 * CS + 0.149) * 0.2751
sqPpss /$CS_{0.75}$ = sqPpss / CS / (-0.0142 * CS + 0.0186) * 0.0079

Nanitics of *Lasius emarginatus* with reduced hairs required using discriminants in Seifert (2020a) for a safe determination. For ♂♂, which were identified only in some cases, Kutter's (1977, 1978) key was used. For ♂♂ of *Lasius*, information from http://cle.fourmis.free.fr/ and Prince (1994) turned out to be helpful. Since not all ♂♂ were determined on the species level, they were generally excluded from any analyses (except maps of horizontal distribution) to avoid a relative under-representation of species with cryptic ♂♂. Intraspecifically, micro- and macro-♀♀ in *Myrmica ruginodis* were separated using 1.065 mm head width (HW) taken as the maximum dorsal width immediately behind the eyes (Elmes 1991). Castes in *Myrmecina graminicola* were identified using Buschinger & Schreiber (2002). To separate the intraspecific morphs of *Formica pratensis*, the *pratensis*-morph and the *nigricans*-morph, Seifert (1992b) was used. Six major ☿☿ of *Pheidole* near *pallidula* [comment: this material did not belong to the collection of the Universalmuseum Joanneum, but to my collection; 6 major ☿☿ are now housed in the Senckenberg Museum of Natural History Görlitz], a ♀ of *Temnothorax parvulus*, a micro-♀ of *Lasius umbratus*, and 3 ☿☿ of *L. umbratus* were re-determined by Bernhard Seifert.

Austrian Map online (http://www.austrianmap.at/) and exceptionally also Google Earth Pro (https://www.google.at/earth/download/gep/agree.html) were used to reconstruct geographic coordinates on the level of degrees and minutes. Since many sampling localities were in mountain valleys, reconstructed altitudes are generally not given to avoid possible errors of often several hundred meters. To interpret information on labels (e.g., old terms of localities), literature available on https://www.zobodat.at/ was helpful. Data were digitized and distribution maps were produced using Arthropoda Database (ÖKOTEAM – Institute for Animal Ecology and Landscape Planning). On the needles with prepared ants of the Universalmuseum Joanneum, printed labels with the following text were added: species name (inclusive author and year of the original description), an abbreviation for my name, and the year of determination, for example: "*Lasius platythorax* Seifert, 1991; det. H.C.Wagner 2018/19". In addition, every needle includes a label with "Steiermärkisches Landesmuseum Joanneum Graz".

The division into five landscape units was orientated towards Lieb (1991): Northern Alps (= Nordalpen), Central Alps (= Zentralalpen), Styrian Border Mountains (= Steirisches Randgebirge), West Styrian hilly Foreland (= Weststeirisches Hügelland including Sausal and Windische Bühel), and East Styrian hilly Foreland (= Oststeirisches Hügelland). For the documentation of vertical distribution, data of outlying alates were omitted (e.g., a *Lasius niger* ♀ from 1800 m). For a calculation of relative frequencies (of

positive localities), only material identified by Roman Borovsky, Eugen Bregant, Florian Glaser, Birgit C. Schlick-Steiner & Florian M. Steiner, Bernhard Seifert, or me was included. *Tetramorium* records identified by Roman Borovsky (e.g., KIRCHMAIR et al. 2017) or Eugen Bregant (e.g., FRIEDL 2000) were considered belonging to *T. caespitum*, since other species are geographically and ecologically in all cases unlikely. Doubtful (e.g., MAYR 1855, HOFFER 1890a) or selected records, for example, if an author published only rare species (e.g., FRANZ & KLIMESCH 1947, BUSCHINGER 1971, BREGANT 1998a), were ignored here. For this analysis it was advantageous using (safely identified) material collected by non-myrmecologists (who did not prefer rare species) or – if collected by myrmecologists – via unbiased sampling (how I usually try to collect). Thus, from material housed in the Universalmuseum Joanneum and the Kärntner Landesmuseum (WAGNER 2012), I ignored material collected by Eugen Bregant, who had a good ant knowledge and preferred collecting rare species (e.g., BREGANT & MAURER 1993, BREGANT 1998a, cf. WAGNER 2012). I proofed individually, if records seemed to be biased toward rare species. For example, in material collected by Roman Borovsky, I used data from full species lists of defined localities (e.g., BOROVSKY & KUNZ 2016), but not a single ☿ of *Temnothorax sordidulus* he considered as interesting and sent to me for re-determination. Rare species might still be overrepresented here, since there is a general preference of collectors for near natural or species-rich habitats (e.g., Wolfgang Paill collected in a bug and Christian Komposch in avalanche trenches). Every locality, also if later re-sampled, was only used once per species in this analysis. It is important to state that relative frequencies given in this study, however, do not mean nest frequencies (which are given in SEIFERT 2016a).

## 3. Summary of results

All in all, 99 species from 5344 data sets and 1198 localities were collected in today's Austrian Styria. Of these, the collection of the Universalmuseum Joanneum comprises 77 species from 1477 data sets and 454 localities in Styria. From the determined material of the museum, there are 9182 ☿☿, 439 ♀♀, 6 intermorphs, and 218 ♂♂. *Tetramorium bicarinatum* is a non-established neozoon introduced only once, 98 Styrian species are established. Of the latter, *Monomorium pharaonis* and *Technomyrmex vitiensis* are indoor-living established neozoans, 96 species are free-living. Of the latter, *Pheidole* near *pallidula* and *Tetramorium immigrans* are free-living, established neozoans, 94 species are native. Of the latter, the occurrence of two species, *Liometopum microcephalum* and *Camponotus lateralis*, seems possible from a zoogeographical point of view, however, the published records are doubtful and should be confirmed in future. *Tetramorium bicarinatum* and *Temnothorax albipennis* are published for Styria for the first time. *Pheidole* near *pallidula* is new for Austria. Two species, *Tetramorium alpestre* and *Lasius sabularum*, are excluded from the list of Styrian ants. *Messor* is considered as doubtful and unlikely ge-

nus for Styria. The relative frequency of *T. immigrans* significantly increased over the last decades. Without neozoans (which are known only from and around Graz and Leibnitz), 18% of species occur only and 4% mainly in the North Alps, Central Alps, and Styrian Border Mountains. Furthermore, 13% occur only and 31% mainly in the hilly Foreland. Finally, 34% are typical elements for all landscape units. For detailed information, see under the respective species profiles (for *Messor* sp. under *Manica rubida*, for *Tetramorium alpestre* under *T. impurum*, and for *Lasius sabularum* under *L. distinguendus*).

## 4. Species profiles

In the following, I present distribution details of all Styrian ant species in the traditional sequence following Seifert (2018). The complete Styrian ant literature, material housed in the Universalmuseum Joanneum inclusive label information and reconstructed geographic coordinates, geographic distribution data inclusive graphics, and relative frequencies to comparable species are given. Profiles of remarkable species (e.g., neozoans, doubtful species) include a status discussion.

[—]: separation between different labels. [/]: separation between front and back of the same label. Handwritten letters are under quotation marks. […]: unreadable information. Reconstructed information, for example, geographic coordinates, or comments of special interest, are within "[]". Two sex or caste signs, for example "☿☿", show the availability of more than one individual of this sex and caste from the respective data set in the ant collection of the Universalmuseum Joanneum, while one sign, for example "☿", shows the availability of only one. Data sets are separated by ";".

### *Ponera coarctata* (Latreille, 1802)

**Literature**: Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Hölzel 1966, Bregant 1978, Neuhäuser-Happe & Fritz 1998, Frieß et al. 2010, Wagner 2011b, Wieser & Trummer 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum**: STYRIA Grazer Bergland leg. E. Kreissl [—] Rein, ca. 450 m 10. Nov. 1967 aus alter Weide [47°08' N, 15°17' E], ♀dealate; STYRIA Umgeb. Peggau [—] E. Bregant leg. "29". August 1970 [47°12' N, 15°21' E], ☿; Styria, S Ruine Ehrenfels NNE Graz, Südhang, 720 m, Felsstelle [—] 47°10' N/15°28' E Zoodat: 164:8/O=47,17N/15,47E [—] Prot. 70-G176 11.10.1970 E. Kreissl leg. [—] *Ponera coarctata* (Latr.) E. Kreissl det., ☿☿; Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿, ♀dealate; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.3.1974 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—]

31.1.1975 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Höfbach Schöcklgebiet [—] 8. 8. 1975 E. Kreissl leg. [—] "*Ponera punctatissima*" [47°07' N, 15°29' E], ♀ dealate; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] "*Ponera coarctata*" [47°02' N, 14°26' E], ☿; Gulsen SW Kraubath, 600 m OB-STMK [—] 6.4.1980 E. Kreissl leg. [47°17' N, 14°55' E], ☿☿; Mühlbachgraben b. Rein, 460 m GRAZ-UMG. [—] 23.4.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Graz-Andritz STMK [—] 30.6.1986 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Schöcklbach STMK. 8.8.1991 E. Kreissl leg. [47°08' N, 15°28' E], ☿☿.
**Geographic distribution**: 35 localities. Central Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-800 m altitude.
**Relative frequency**: 94% of 32 Styrian Ponerine records.

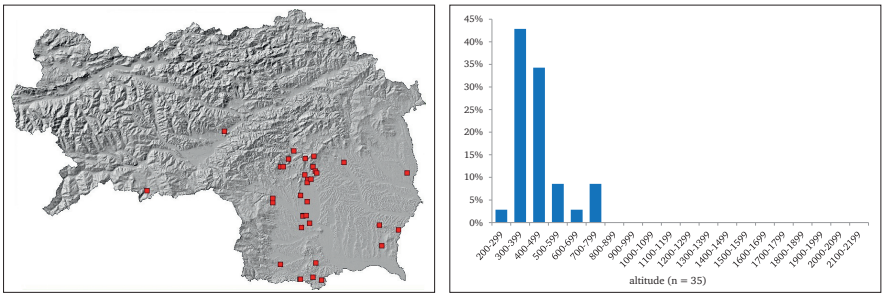


*Fig. 2: Ponera coarctata*, horizontal and vertical distribution.

## *Ponera testacea* Emery, 1895

**Literature:** Wagner 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 2 localities. East Styrian hilly Foreland. 200-500 m altitude.
**Relative frequency:** 6% of 32 Styrian Ponerine records.

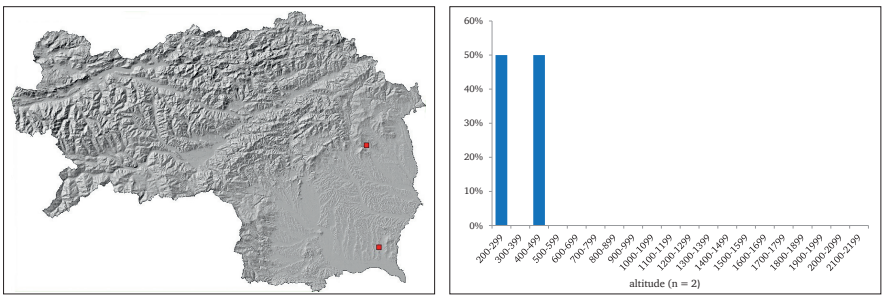


*Fig. 3: Ponera testacea*, horizontal and vertical distribution.

## *Proceratium melinum* (Roger, 1860)

**Literature:** Bregant 1998a, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 3 localities. Styrian Border Mountains and East Styrian hilly Foreland. 300-700 m altitude.
**Relative frequency:** < 1% of 32 Styrian Ponerine records.

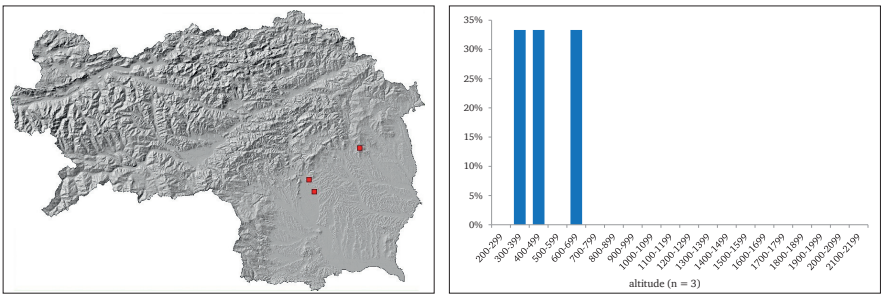


*Fig. 4: Proceratium melinum*, horizontal and vertical distribution.

## *Manica rubida* (Latreille, 1802)

**Literature:** Mayr 1855 sub *Myrmica rubida*, Hoffer 1890a sub *Atta* (*Aphaenogaster*) *structor*, Hoffer 1890b sub *Aphaenogaster structor*, Hölzel 1966 sub *Myrmica rubida*, Bregant 1978, Schlagbauer 1997, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Wagner 2010, Wagner 2011a, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Wagner 2016, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** St. Wolfgang NW Obdach, OB-STMK 1230 m [—] 18.8.1955 F. Wolf leg. [—] E4129 Coll. F. Wolf [47°05' N, 14°38' E], ♀dealate; St. Wolfgang NW Obdach, OB-STMK 1230 m [—] 18.8.1955 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°05' N, 14°38' E], ♀dealate; Graz-SO: Neufeld-Schottergrube 18.6.1957 leg. E. Kreissl [47°03' N, 15°27' E], ☿☿; Teichalpe STMK [—] 7.6.1964 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°21' N, 15°27' E], ♀alate; Soboth Koralpengebiet SW-STMK [—] Juni 1967 E. Kreissl leg. [46°40' N, 15°04' E], ♀♀alate; Ingeringsee OB-STMK [—] 20.10.1968 E. Kreissl leg. [47°20' N, 14°39' E], ☿☿; Eibisberg E-STMK [—] 6.7.1969 E. Kreissl leg. [47°18' N, 15°36' E], ♀dealate; Mühlbachgraben b. Rein, STMK [—] 18.5.1970 E. Kreissl leg. [47°08' N, 15°15' E], ☿; Gasenbachgr. Grazer Bgld. STMK [—] 7.6.1970 E. Kreissl leg. [47°21' N, 15°40' E], ♀dealate; Grebenze OB-STMK [—] 20.7.1970 E. Kreissl leg. [47°02' N, 14°20' E], ♀dealate; Lobminggraben Gleinalpengeb. OB-STMK [—] 11.8.1970 E. Kreissl leg. [47°08' N, 14°52' E], ☿☿; Mixnitzbach Hochlantschgeb. N GRAZ [—] 18.5.1973 E. Kreissl leg. [47°21' N, 15°26' E], ☿☿; Teichalpe E-STMK [—] 10.5.1974 E. Kreiss leg. [47°21' N, 15°27' E], ☿☿; Klammgraben Grazer Bergland STMK [—] 6.9.1974

E. Kreissl leg. [—] "*Manica rubida*" [47°23' N, 15°29' E], ☿; Teichalmgeb. Osser E-STMK [—] 24.6.1975 E. Kreissl leg. [47°20' N, 15°30' E], ☿; Teichalmstraße E-STMK [—] 25.6.1975 E. Kreissl leg. [—] "*Manica rubida*" [47°21' N, 15°28' E], ☿☿; Mixnitzbachgraben E-STMK [—] 25.6.1975 E. Kreissl leg. [—] "*Manica rubida*" [47°21' N, 15°26' E], ☿; Gleinalpengebiet W-STMK [—] 14.9.1975 E. Kreissl leg. [—] "*Myrm. sulcinod. Myrm. rubida*" [47°12' N, 15°02' E], ♀ dealate; Schöckl GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [—] "*Manica rubida*" [47°11' N, 15°27' E], ☿; Über Großem Sölktal OB-STMK [—] 10.6.1977 E. Kreissl leg. [47°24' N, 13°57' E], ♀ dealate; "Zirbensee", 1660 m OB-STMK [—] 28.6.1978 E. Kreissl leg. [47°04' N, 14°02' E], ☿☿; Packer Stausee W-STMK [—] 23. 7. 1978 E. Kreissl leg. [46°58' N, 15°01' E], ☿; Mühlen Hörfeld OB-STMK [—] 25.7.1978 E. Kreissl leg. [—] "*Manica rubida*" [47°01' N, 14°30' E], ☿☿; Althofen Katschtal OB-STMK [—] 27.7.1978 E. Kreissl leg. [—] "*Camponot. herculeanus*" [47°09' N, 14°14' E], ♀ dealate; Mixnitz, 1170 m Teichalpe S BRUCK/Mur [—] 26.6.1979 E. Kreissl leg. [—] 26.6.1979 E. Kreissl leg. [—] "*Manica rubida*" [47°20' N, 15°25' E], ☿☿; Fuß d. Peggauer Wand, 430 m GRAZ-UMG. [—] 7.8.1979 E. Kreissl leg. [47°12' N, 15°20' E], ☿☿; S Neumarkt, St. Veiter Bach OB-STMK [—] 760 m 15.9.1979 E. Kreissl leg. [—] "*Manica rubida*" [47°02' N, 14°26' E], ☿☿; Hochlantsch, 1140 m Mixnitzbachgraben ..... STMK [—] 13.5.1980 E. Kreissl leg. [47°21' N, 15°25' E], ☿☿; Schöttlbachgraben N Oberwölz, 880 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12' N, 14°17' E], ☿☿; W. Schöder, 940 m NNW Murau OB-STMK [—] 24.6.1980 E. Kreissl leg. [47°10' N, 14°06' E], ☿; W Thalerhof 330 m GRAZ-UMG. [—] 9.7.1981 E. Kreissl leg. [46°58' N, 15°25' E], ♀dealate; Kugelstein N Peggau STMK, 420 m [—] 4.5.1983 E. Kreissl leg. [47°13' N, 15°20' E], ☿☿; Scheifling-Mariahof OB-STMK [—] 30.6.1985 E. Kreissl leg. [47°05' N, 14°24' E], ☿☿; N Wildon S-STMK [—] 27.5.1986 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Mellach Vogelgehege-Gebiet STMK. [—] 23.4.1987 E. Kreissl leg. [46°56' N, 15°30' E], ☿☿; Mühlbachgraben b. Rein, 510 m GRAZ-UMG. [—] 20.6.1988 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Kugelstein GRAZ-UMG. [—] 12.8.1988 E. Kreissl leg. [47°13' N, 15°20' E], ☿☿; Graz-Andritz STMK [—] 18.7.1989 E. Kreissl leg. [47°06' N, 15°25' E], ☿.

**Geographic distribution:** 98 localities. All landscape units. 200-1900 m altitude.

**Status discussion:** Hoffer (1890a: 170) wrote: „*Atta (Aphaenogaster) structor Ltr.; auf dem Rosenberg, Plawutsch, St. Johann; die unterirdischen Baue haben nach außen Löcher, um die kraterartig lose Erde gehäuft ist; daran erkennt man meist schon im Vorübergehen das Nest dieser Ameise*". Although these records were – as far as I know – only cited by Kühnelt (1962) and ignored in Styrian checklists (Hölzel 1966, Steiner et al. 2017), one could argue that Hoffer's (1890a) description of *Messor* sub *Atta* (*Aphaenogaster*) *structor* nests sounds convincing. Less convincing is, however, the habitat "*Wald*" Hoffer gives for "*Aphaenogaster structor Latr.*" – probably the same species – in a further publication (Hoffer 1890b: 18), since Central European *Messor* species are mainly known from dry grasslands (Seifert 2018). Gregor Bračko (in litt. 2020) never found *Messor* in the southerly adjacent Slovenian Styria. He knows *Messor* from warm stony localities (on limestone) in the Submediterranean area of his nation (see also Bračko 2007) and from steppe-like Pannonian grasslands (e.g., in Hungary). Austrian

records are only known from the Pannonian region (Schlick-Steiner et al. 2003). Moreover, Hoffer (1890a: 170) did not give any specific information to *Manica rubida* but wrote only "*M. rubida Ltr.; wie obige*", the comment "*wie obige*" refers to *Myrmica* species described above. Also Hoffer (1890b) did not mention any details like size or habitat in addition to *Myrmica* species. Thus, I conclude Hoffer (1890a) termed *Manica rubida* "*Atta (Aphaenogaster) structor*", Hoffer (1890b) termed *Manica rubida* "*Aphaenogaster structor*", and in both papers Hoffer termed any *Myrmica* species "*Myrmica rubida*".

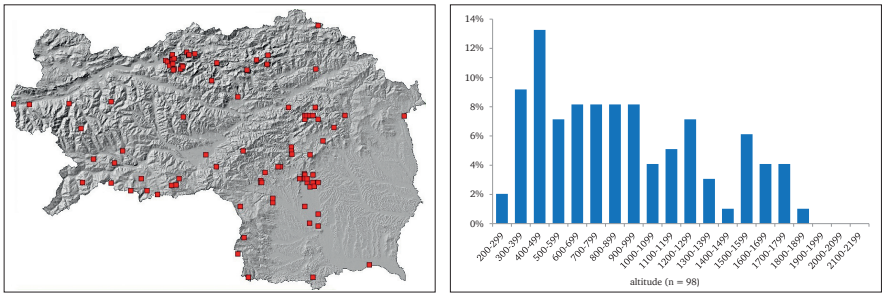


*Fig. 5: Manica rubida*, horizontal and vertical distribution.

*Fig. 6:* A worker of the *Messor structor* complex – ants like this were probably never found in Styria. Photo: G. Kunz.

## *Myrmica rugulosa* (Nylander, 1849)

**Literature:** Wagner 2008, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Graz-Andritz STMK [—] 16.4.1971 E. Kreissl leg. [47°06' N, 15°25' E], ☿.
**Geographic distribution:** 11 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-700 m altitude.
**Relative frequency:** 1.6% of 671 Styrian *Myrmica* records.

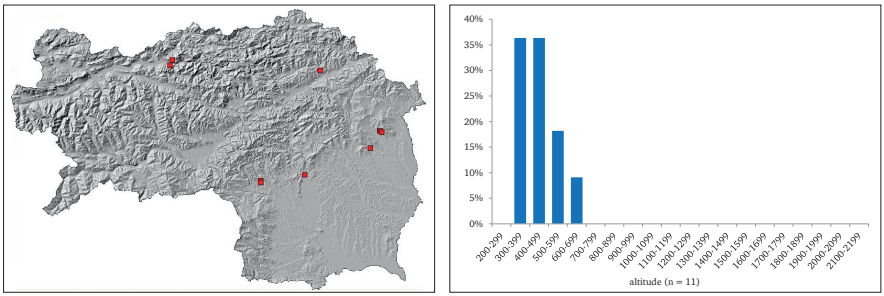


*Fig. 7: Myrmica rugulosa*, horizontal and vertical distribution.

## *Myrmica constricta* Karavajev, 1934

**Literature:** Schlick-Steiner & Steiner 2004 sub *hellenica*, Steiner et al. 2017. I redetermined the material using discriminant D(8) in Seifert et al. (2009) which allowed me to exclude *M. hellenica* Finzi, 1926.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. Styrian Border Mountains. 300-400 m altitude.
**Relative frequency:** 0.1% of 671 Styrian *Myrmica* records.

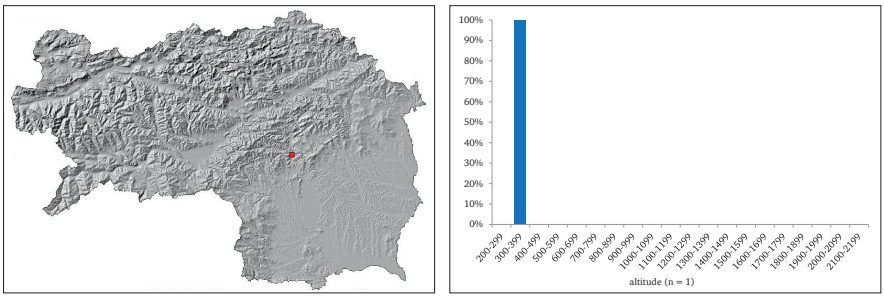


*Fig. 8: Myrmica constricta*, horizontal and vertical distribution.

## *Myrmica specioides* Bondroit, 1918

**Literature:** Wagner et al. 2010, Wagner 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10' N, 15°28' E], ♀alate; Pfaffenkogel N Graz, STMK [—] 18.10.1970 E. Kreissl leg. [47°09' N, 15°18' E], ♀alate; Riegersburg E-STMK [—] 5.8.1972 E. Kreissl leg. [47°00' N, 15°56' E], ☿.
**Geographic distribution:** 18 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 2.5% of 671 Styrian *Myrmica* records.

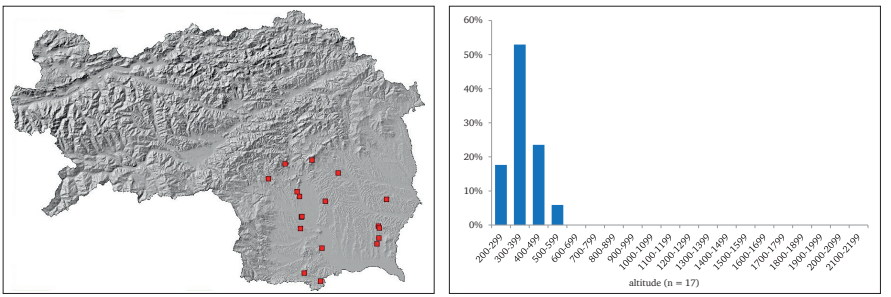


*Fig. 9: Myrmica specioides*, horizontal and vertical distribution.

## *Myrmica scabrinodis* Nylander, 1846

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Franz et Klimesch 1947, Hölzel 1966, Glaser 1997, Schlagbauer 1997, Friedl 2000, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Frieß et al. 2010, Wagner 2010, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Wagner 2012, Kudrna & Fric 2013, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Platte Graz, STMK [—] 26.12.1965 E. Kreissl leg. [—] „*Myrmica scabrinodis*" [47°06' N, 15°28' E], ♀dealate; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10' N, 15°28' E], ♀ alate; Kreuzeckgeb. OB-STMK [—] 10.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Sattental b. Pruggern OB-STMK [—] 6.6.1977 E. Kreissl leg. [47°24' N, 13°52' E], ☿; Dürnberger Moor OB-STMK [—] 22.6.1978 E. Kreissl leg. [47°05' N, 14°21' E], ☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Myrmica sabuleti*" [46°53' N, 15°58' E], ☿☿, ♀ dealate, ♂♂; Mühlbachgraben b. Rein, 450 m GRAZ-UMG. [—] 22.7.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08' N, 15°25' E], ☿☿; Stattegger Steinbruch GRAZ-UMG. [—] 15.6.1987 E. Kreissl leg. [47°08' N, 15°25' E], ☿; Schladming Untertal SSE 1070 m, STMK [—] 28.7.1987 E. Kreissl leg. [47°19' N, 13°45' E], ☿☿.

**Geographic distribution:** 61 localities. All landscape units. 200-1700 m altitude.
**Relative frequency:** 8.8% of 671 Styrian *Myrmica* records.

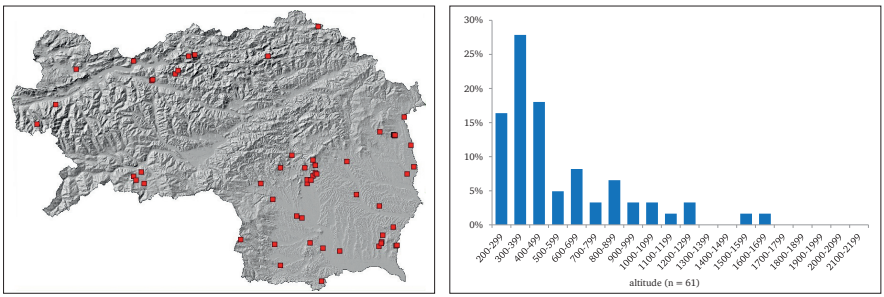


*Fig. 10: Myrmica scabrinodis*, horizontal and vertical distribution.

## *Myrmica sabuleti* Meinert, 1861

**Literature:** Bregant 1978, Schlagbauer 1997, Frieß et al. 2010, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Wagner 2012, Tartally et al. 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Platte Graz, STMK [—] 26.12.1965 E. Kreissl leg. [—] „*Myrmica scabrinodis*“ [47°06’ N, 15°28’ E], ♀dealate; Rohrerberg Graz St. Veit STMK Eiche gesiebt [—] 9.1.1966 E. Kreissl leg. [47°07’ N, 15°25’ E], ♀dealate; Graz-Andritz STMK, Eiche ges. [—] 13.2.1966 E. Kreissl leg. [47°06’ N, 15°25’ E], ♀; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10’ N, 15°28’ E], ♀ alate; Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿☿; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 10.4.1972 E. Kreissl leg. [47°09’ N, 15°17’ E], ☿☿; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.1972 „679“ [—] „*M. scabrinodis*“ [47°09’ N, 15°18’ E], ☿☿; Pfaffenkogel Ostfuß GRAZ-UMG. [—] 8.12.1974 E. Kreissl leg. [—] „*Myrmica scabrinodis*“ [47°10’ N, 15°19’ E], ☿; Pfaffenkogel NE-Abfall GRAZ-UMG. [—] 8.3.1975 E. Kreissl leg. [47°10’ N, 15°18’ E], ☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [46°39’ N, 15°28’ E], ☿; Adelsberg OB-STMK [—] 13.4.1976 E. Kreissl leg. [—] „*Myrmica scabrinodis*“ [47°06’ N, 14°22’ E], ☿☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Myrmica sabuleti*“ [46°53’ N, 15°58’ E], ☿, ♂♂[46°53’ N, 15°58’ E]; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] „*Form. fusca*“ [47°08’ N, 14°09’ E], ☿☿; Dürnstein OB-STMK [—] 23.6.1980 E. Kreissl leg. [47°00’ N, 14°23’ E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 30.9.1981 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿; E. St. Radegund NNE Graz, 700 m [—] 28.6.1982 E. Kreissl leg. [47°10’ N, 15°29’ E], ☿; Rötz, 400 m S Gratwein GRAZ-UMG

[—] 5.8.1982 E. Kreissl leg. [47°06’ N, 15°19’ E], ☿; Annengraben NNE Graz 420 m, STMK [—] 9.10.1982 E. Kreissl leg. [47°07’ N, 15°26’ E], ♀ dealate; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 3.4.1985 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿☿, ♀ dealate; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08’ N, 15°25’ E], ☿; Weiz NW Katerloch 880 m, STMK [—] 27.10.1987 E. Kreissl leg. [47°15’ N, 15°32’ E], ☿☿; Silberberg W-Leibnitz, Südhang 360 m, STMK [—] 27.10.1987 E. Kreissl leg. [46°46’ N, 15°30’ E], ☿☿; Styria, Pfaffenkogel b. Stübing Ostfuß, 400 m [—] Prot. 88-108 28.3.1988 Kreissl leg. [—] 47°09’ N/15°19’ E Zoodat: 163:9/X 47,16N/15,31 E, ☿; Graz-Andritz STMK, Platte [—] 25.1.1990 E. Kreissl leg. [47°06’ N, 15°28’ E], ♀ dealate. ***Myrmica* cf. *sabuleti*:** Graz-Andritz STMK [—] 25.11.1968 E. Kreissl leg. [47°06’ N, 15°25’ E], ♀ dealate [comment: I cannot exclude hybridization with *M. lonae*].

**Geographic distribution:** 85 localities. All landscape units. 200-1200 m altitude.

**Relative frequency:** 12.2% of 671 Styrian *Myrmica* records.

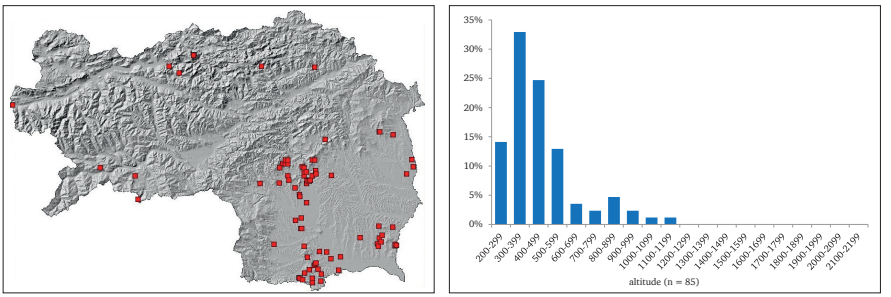


*Fig. 11: Myrmica sabuleti*, horizontal and vertical distribution.

## *Myrmica lonae* Finzi, 1926

**Literature:** Wagner et al. 2010, Wagner 2011a, Tartally et al. 2014, Wagner 2014, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** Graz-Andritz STMK [—] 17.12.1967 E. Kreissl leg. [47°06’ N, 15°25’ E], ♀ dealate; Graz-Andritz STMK [—] 22.3.1968 E. Kreissl leg. [47°06’ N, 15°25’ E], ♀ dealate; Puxberg OB-STMK [—] 18.7.1970 E. Kreissl leg. [47°09’ N, 14°20’ E], ☿; Murau Rantenbachgr. OB-STMK [—] 27.7.1970 E. Kreissl leg. [47°08’ N, 14°09’ E], ☿☿; Pfaffenkogel NE-Fuß GRAZ-UMG [—] 21.2.1971 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿☿; Pfaffenkogel E-Seite GRAZ-UMG. [—] 7.2.1975 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿☿; Schöckl N-Seite GRAZ-UMG. [—] 1975 E. Kreissl leg. [—] “*Myrmica scabrinodis*” [47°12’ N, 15°27’ E], ♀ dealate; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] “*Myrm. lonae*” [47°02’ N, 14°26’ E], ☿.

**Geographic distribution:** 14 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 300-1200 m altitude.

**Relative frequency:** 2.1% of 671 Styrian *Myrmica* records.

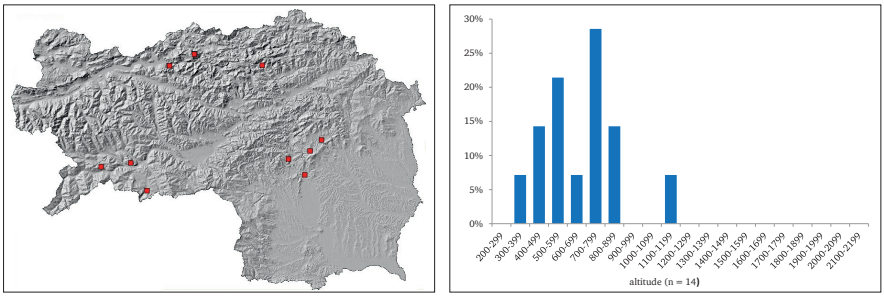


*Fig. 12: Myrmica lonae*, horizontal and vertical distribution.

## *Myrmica hirsuta* Elmes, 1978

**Literature:** Bregant 1998a, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. East Styrian hilly Foreland. 300-400 m altitude.
**Relative frequency:** < 0.1% of 671 Styrian *Myrmica* records.

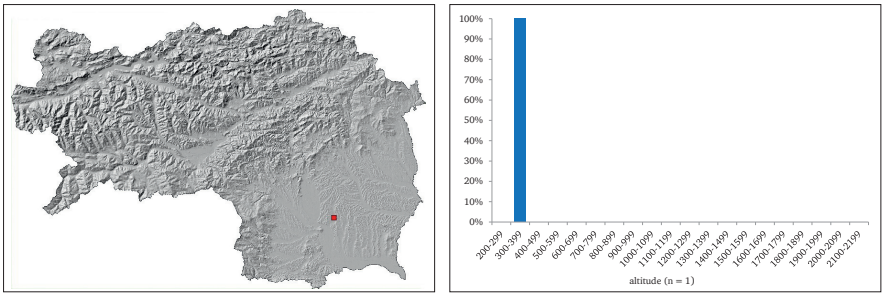


*Fig. 13: Myrmica hirsuta*, horizontal and vertical distribution.

## *Myrmica curvithorax* Bondroit, 1920

**Literature:** Frieß et al. 2010 sub *salina*, Wagner et al. 2010 sub *salina*, Wagner 2014, Wagner et al. 2015, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 6 localities. East Styrian hilly Foreland. 200-400 m altitude.
**Relative frequency:** 0,9% of 671 Styrian *Myrmica* records.

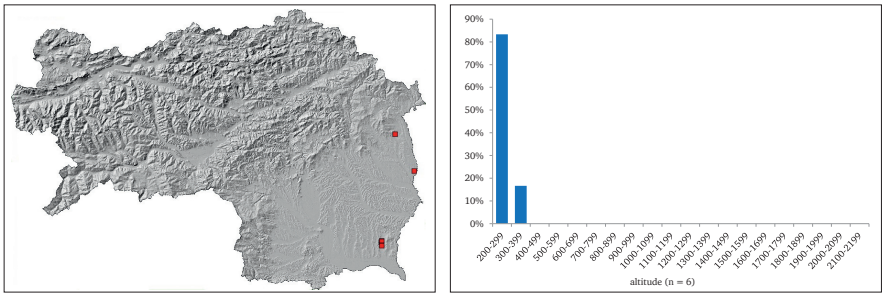


*Fig. 14: Myrmica curvithorax*, horizontal and vertical distribution.

## *Myrmica sulcinodis* Nylander, 1846

**Literature:** Mayr 1855, Hölzel 1966, Wagner 2009, Wagner 2010, Kudrna & Fric 2013, Tartally et al. 2014, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Teichalmgeb. Osser E-STMK [—] 24.6.1975 E. Kreissl leg. [—] "*Myrmica ruginodis*" [47°20' N, 15°30' E], ☿☿; Mixnitzbachgraben E-STMK [—] 25.6.1975 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°21' N, 15°26' E], ☿☿; Gleinalpengebiet W-STMK [—] 14.9.1975 E. Kreissl leg. [47°12' N, 15°02' E], ☿ [comment: aberrant individual with postpetiole inserted deeply with gaster]; Schöckl GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [—] "*Myrmica sulcinodis*" [47°11' N, 15°27' E], ♀ dealate; Plankogel, 1520 m NNE Passail E-STMK [—] 1.6.1982 E. Kreissl leg. [47°21' N, 15°33' E], ☿; Plankogel, 1520 m NNW Weiz E-STMK [—] 17.9.1982 E. Kreissl leg. [47°21' N, 15°33' E], ☿.
**Geographic distribution:** 29 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 900-2100 m altitude.
**Relative frequency:** 4.2% of 671 Styrian *Myrmica* records.

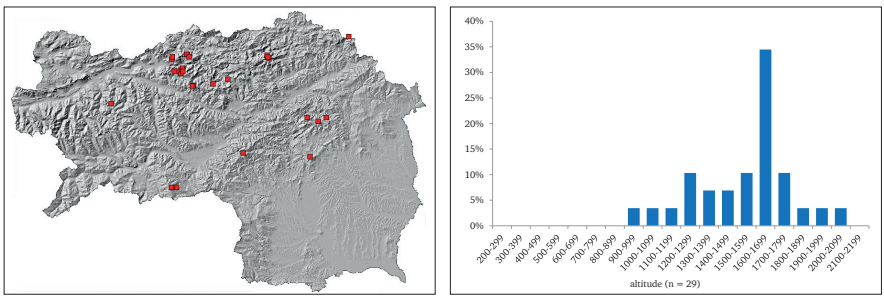


*Fig. 15: Myrmica sulcinodis*, horizontal and vertical distribution.

## *Myrmica rubra* (Linnaeus, 1758)

**Literature:** Mayr 1855 sub *laevinodis*, Hoffer 1890a sub *laevinodis*, Hoffer 1890b sub *laevinodis*, Hölzel 1936, Hölzel 1966 sub *laevinodis*, Bregant 1978 sub *laevinodis*, Friedrich & Winder 1993 sub *laevinodis*, Neuhäuser 1996 sub *laevinodis*, Glaser 1997, Schlagbauer 1997, Friedl 2000, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Frieß et al. 2010, Wagner 2010, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Ebermann & Krisper 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a.

**Material Universalmuseum Joanneum:** Umg. Graz, S. Styr. "22.5.[19]27" [—] "*M. laevinodis* ♀" Hölzel det. [—] Inv. Nr. T 30 354 [47°00' N, 15°26' E], ♀; U. Stift Rein Styr. 22.8.[19]27 [—] T 30 354 [47°08' N, 15°17' E], ♀♀; Umg. Graz (Süd) Styr. "10.4.[19]28" [—] Inv. Nr. T 30 354 [47°00' N, 15°26' E], ♀; "Ruckerlb 16.VII.[19]37" [—] T 30 356 Coll. Panek ex Coll. Salzmann [47°04' N, 15°28' E], ♀♀; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.IX.1949" [—] 1300 [—] "721" [46°47' N, 15°30' E], ♀; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.9.1949" [—] 1291 [—] "729" [46°47' N, 15°30' E], ♀; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6. IX.1949" [—] 1298 [46°47' N, 15°30' E], ♀; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.IX.1949" [—] 1293 [46°47' N, 15°30' E], ♀; STYRIA Teichgebiet bei Wundschuh [—] E. Bregant leg. 12. April 1959 [—] T 30 342 [46°55' N, 15°26' E], ♀; Graz-Andritz STMK [—] 31.10.1965 E. Kreissl leg. [47°06' N, 15°25' E], ♀; SE Spielfeld Windische Bühel S-STMK [—] 17.4.1968 E. Kreissl leg. [46°41' N, 15°38' E], ♀, ♀dealate; Graggerschlucht Furtnerteich OB-STMK [—] 20.7.1968 E. Kreissl leg. [47°04' N, 14°24' E], ♀; 15 km N Birkfeld Feistritztal STMK, 600 m [—] 7.6.1970 E. Kreissl leg. [47°25' N, 15°41' E], ♀; Pfaffenkogel N Graz STMK [—] 20.6.1970 F. Pichler leg. [47°09' N, 15°18' E], ♀; Pommesberg Gipfelregion E-STMK [—] 21.6.1970 E. Kreissl leg. [47°18' N, 15°36' E], ♀♀; Furtnerteich OB-STMK [—] 16.7.1970 E. Kreissl leg. [47°05' N, 14°23' E], ♀♀; Ochsenstallteich b. Schloß Pux OB-STMK [—] 19.7.1970 E. Kreissl leg. [47°05' N, 14°21' E], ♀; St. Lambrecht Schwarzenbach OB-STMK [—] 20.7.1970 E. Kreissl leg. [47°03' N, 14°18' E], ♀dealate; St. Lambrecht Schwarzenbach OB-STMK [—] 20.7.1970 E. Kreissl leg. [47°03' N, 14°18' E], ♀♀; Zetzgebiet Pommesberg E-STMK [—] [47°18' N, 15°36' E], ♀; Burgau E-STMK [—] 4.4.1971 E. Kreissl leg. [47°08' N, 16°05' E], ♀; Graz-Andritz STMK [—] 16.4.1971 E. Kreissl leg. [47°06' N, 15°25' E], ♀♀; Burgstallerhöhe - Schöcklkreuz GRAZ-UMG. [—] 17.4.1971 E. Kreissl leg. [47°12' N, 15°29' E], ♀; Graz-Andritz STMK [—] 18.4.1971 E. Kreissl leg. [47°06' N, 15°25' E], ♀; Graz-Andritz STMK [—] 18.4.1971 E. Kreissl leg. [47°06' N, 15°25' E], ♀dealate; Wildonerberg Buchkogelgebiet STMK [—] 27.6.1971 E. Kreissl leg. [46°52' N, 15°30' E], ♀♀; Stübinggraben N GRAZ [—] 4.9.1971 E. Kreissl leg. [47°11' N, 15°16' E], ♀♀; Höchwirt Rannachgebiet N GRAZ [—] 26.9.1971 E. Kreissl leg. [47°09' N, 15°22' E], ♀♀; Austria Styria Kapfenstein leg. Kreissl 1.6.1972 "665" [—] "*Myrmica laevinodis*" [46°53' N, 15°58' E], ♀♀; Freienberger Klamm, STMK [—] 29.6.1972 E. Kreissl leg. [47°14' N, 15°46' E], ♀♀; Schielleiten E-

STMK [—] 29.7.1972 E. Kreissl leg. [47°14' N, 15°49' E], ☿☿; Mitteregg STMK [—] 24.9.1972 E. Kreissl leg. [46°48' N, 15°26' E], ☿; Mitteregg Sausal W-STMK [—] 23.4.1973 E. Kreissl leg. [46°48' N, 15°26' E], ☿☿; "Klamm", - 812 m W St. Radegund Schöcklgebiet [—] 4.4.1974 E. Kreissl leg. [47°10' N, 15°27' E], ☿, ♀dealate; Graslupp, W Neumarkt OB-STMK [47°04' N, 14°23' E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] "*Form. gagates Myrmi. ruginodi.*" [46°39' N, 15°28' E], ☿☿; Karchauereck SE Murau OB-STMK [—] 13.7.1975 E. Kreissl leg. [47°05' N, 14°15' E], ☿; Oberschöcklbach GRAZ-UMG. [—] 30.7.1975 E. Kreissl leg. [47°08' N, 15°28' E], ☿☿, ♀♀ dealate; Kehrgraben b. Rein GRAZ-UMG. [—] 7.8.1975 E. Kreissl leg. [47°07' N, 15°15' E], ☿☿; Büchgrabenbach Schöcklgebiet GRAZ-UMG. [—] 8.8.1975 E. Kreissl leg. [47°09' N, 15°28' E], ☿☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50' N, 15°58' E], ☿☿; Lambrechtbachgraben OB-STMK [—] 20.7.1976 E. Kreissl leg. [47°03' N, 14°17' E], ☿; Olsaklamm S Neumarkt OB-STMK [—] 21.7.1976 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°02' N, 14°25' E], ☿; Karchauereckgebiet OB-STMK [—] 22.7.1976 E. Kreissl leg. [47°05' N, 14°15' E], ☿☿; Oberwölz OB-STMK [—] 1.8.1976 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°12' N, 14°17' E], ☿; Kreuzeckgeb. OB-STMK [—] 7.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Thayabach b. Mariahof [—] 11.8.1976 E. Kreissl leg. [47°04' N, 14°18' E], ☿☿; Kehrergraben b. Rein GRAZ-UMG. [—] 20.3.1977 E. Kreissl leg. [47°07' N, 15°15' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 10.4.1977 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿, ♀ ♀ dealate; Mühlbachgraben b. Rein GRAZ-UMG. [—] 25.4.1977 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿, ♀♀ dealate; Ennsauen b. Irdning OB-STMK [—] 6.6.1977 E. Kreiss leg. [47°30' N, 14°05' E], ☿☿; Über Großem Sölktal OB-STMK [—] 10.6.1977 E. Kreissl leg. [47°24' N, 13°57' E], ☿; Heimschuh Sulmtal S-STMK [—] 25.6.1977 E. Kreissl leg. [46°45' N, 15°29' E], ☿☿, ♀ dealate; Karlstein Semriach GRAZ-UMG. [—] 4.7.1977 E. Kreissl leg. [47°12' N, 15°23' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 18.7.1977 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Kapfenberg Burgberg 640 m, STMK. felsige Wegböschung [—] 28.3.1978 E. Kreissl leg. [47°26' N, 15°17' E], ☿☿; Leitersdorf Raabtal STMK. Feldbach [—] 11.4.1978 E. Kreissl leg. [46°56' N, 15°55' E], ☿☿; Ruine Katsch Pleschaitsgruppe OB-STMK [—] 18.6.1978 E. Kreissl leg. [—] "*Camp. hercul.*" [47°08' N, 14°17' E], ☿☿; Ruine Katsch Pleschaitsgruppe OB-STMK [—] 18.6.1978 E. Kreissl leg. [—] "*Myrm. laevin*." [47°08' N, 14°17' E], ☿☿; Oberwölz Stadtmauer OB-STMK [—] 19.6.1978 E. Kreissl leg. [—] "*Lasius flavus*" [47°12' N, 14°17' E], ☿☿; Oberwölz Stadtmauer OB-STMK [—] 19.6.1978 E. Kreissl leg. [—] "*Myrm. laevin*." [47°12' N, 14°17' E], ☿☿; Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [47°01' N, 14°24' E], ☿☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. "*Myrm. laevinod*." [47°01' N, 14°24' E], ☿☿; Umg. Niederwölz OB-STMK [—] 30.6.1978 E. Kreissl leg. [47°09' N, 14°22' E], ☿☿; Packer Stausee W-STMK [—] 23.7.1978 E. Kreissl leg. [—] 31. Jan. 1980 [/] "*Myrm laevin*." [46°58' N, 15°01' E], ☿; Zirbitzkogel W-Seite OB-STMK [—] 24.7.1978 E. Kreissl leg. [47°03' N, 14°33' E], ☿☿; Karchau NS OB-STMK [—] 26.7.1978 E. Kreissl leg. [47°06' N, 14°15' E], ☿; Althofen Katschtal OB-STMK [—] 27.7.1978 E. Kreissl leg. [—] "*Manica rubida* ♀" [47°09' N, 14°14' E], ☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Stenamma westwoodi*" [46°53' N, 15°58' E], ☿☿;

Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [47°00' N, 15°56' E], ☿☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°00' N, 15°56' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 26.9.1978 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°08' N, 15°15' E], ☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [—] "*Myrm. laevinodis*" [47°09' N, 15°18' E], ☿☿; Schloß Herberstein E-STMK, 370 m [—] 23.6.1979 E. Kreissl leg. [—] "*Myrm. laevinod.*" [47°12' N, 15°48' E], ☿☿; Graz-Andritz STMK [—] 29.7.1979 E. Kreissl leg. [—] "*Myrm. laevinod.*" [47°06' N, 15°25' E], ☿☿; Fuß d. Peggauer Wand GRAZ-UMG., 420 m [—] 7.8.1979 E. Kreissl leg. [—] "*Myrm. laevin*." [47°12' N, 15°20' E], ☿☿; W. Stadl a. d. Mur, 890 m OB-STMK [—] 16.9.1979 E. Kreissl leg. [—] "*Myrm. laevinod*." [47°05' N, 13°57' E], ☿; Klamm S Stubenberg E-STMK [—] 8.11.1979 E. Kreissl leg. [—] "*Myrm. laevin*." [47°14' N, 15°47' E], ☿☿; Mühlbachgraben b. Rein, 480 m GRAZ-UMG. [—] 26.3.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Riegersburg 460 m E-STMK [—] 14.4.1980 E. Kreissl leg. [47°00' N, 15°56' E], ☿☿; Düreggergraben E Hochlantsch 770 m, STMK [—] 13.5.1980 E. Kreissl leg. [47°22' N, 15°29' E], ☿; Mühlbachgraben b. Rein, 510 m GRAZ-UMG. [—] 16.5.1980 E. Kreissl leg. [47°08' N, 15°15' E], ☿ dealate; Mühlbachgraben b. Rein, 510 m GRAZ-UMG. [—] 16.5.1980 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Thayagraben NE St. Lambrecht 940 m, OB-STMK [—] 23.5.1980 E. Kreissl leg. [47°05' N, 14°19' E], ☿☿, ☿☿alate, ☿☿dealate; W Scheifling 740 m OB-STMK [—] 1.6.1980 E. Kreissl leg. [47°09' N, 14°23' E], ☿☿, ☿☿ dealate; N Mühlen, SW Neumarkt, 1000 m OB-STMK [—] 10.6.1980 E. Kreissl leg. [47°01' N, 14°30' E], ☿dealate; W. Schöder, 940 m NNW Murau OB-STMK [—] 24.6.1980 E. Kreissl leg. [47°10' N, 14°06' E], ☿; Blaubruchhöhle Zösenberg, 450 m NNE Graz [—] 28.8.1980 E. Kreissl leg. [47°08' N, 15°27' E], ☿; Zösenberg, 440 m SE-Fuß NNE Graz [—] 2.10.1980 E. Kreissl leg. [47°08' N, 15°27' E], ☿; Graz-Andritz STMK [—] 27.4.1981 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Mühlbachgraben b. Rein, 470 m GRAZ-UMG. [—] 16.5.1981 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿, ☿dealate; Zenzlwand N Eggenfeld GRAZ-UMG. [—] 15.6.1981 E. Kreissl leg. [47°09' N, 15°19' E], ☿☿; Annengraben N Graz, 420 m GRAZ-UMG. [—] 22.9.1981 E. Kreissl leg. [47°07' N, 15°26' E], ☿☿, ☿ dealate; Weizbach b. St. Ruprecht/Raab, 390 m [—] 8.4.1982 E. Kreissl leg. [47°09' N, 15°39' E], ☿; Annengraben NNE Graz 420 m, STMK [—] 15.5.1982 E. Kreissl leg. [47°07' N, 15°26' E], ☿; Annateich S Rein, 410 m GRAZ-UMG [—] 24.6.1982 E. Kreissl leg. [47°07' N, 15°17' E], ☿; Tieschen E-STMK [—] 31.5.1983 E. Kreissl leg. [46°47' N, 15°56' E], ☿☿; Grimming W Stainach, 730 m OB-STMK [—] 23.6.1983 E. Kreissl leg. [47°31' N, 14°03' E], ☿☿; Hohenberg, 700 m Schöcklgebiet GRAZ-UMG. [—] 9.8.1983 E. Kreissl leg. [47°09' N, 15°27' E], ☿☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42' N, 15°37' E], ☿☿; Fallgraben STMK, gesiebt T 33.069 [—] 3.8.1984 E. Kreissl leg. [47°02' N, 14°30' E], ☿; Hafning b. Weiz E-STMK [—] 8.5.1985 E. Kreissl leg. [47°11' N, 15°36' E], ☿☿, ☿☿dealate; Aflenz b. Leibnitz S-STMK [—] 22.5.1985 E. Kreissl leg. [46°45' N, 15°32' E], ☿☿; Weißenbach-St. Gallen OB-STMK [—] 10.6.1985 E. Kreissl leg. [47°42' N, 14°37' E], ☿☿; Silberberg b. Leibnitz S-STMK [—] 20.6.1985 E. Kreissl leg. [46°46' N, 15°30' E], ☿☿; Reitinggebiet Hohenegg-Gr. STMK [—] 3.7.1985 E. Kreissl leg. [47°26' N,

14°51’ E], ☿☿; Salzkammergut Krippau OB-STMK [—] 18.7.1985 E. Kreissl leg. [47°41’ N, 14°42’ E], ☿☿; Annengraben NNE Graz 420 m, STMK [—] 29.7.1985 E. Kreissl leg. [47°07’ N, 15°26’ E], ☿; Badlgraben N Graz STMK [—] 31.7.1985 E. Kreissl leg. [47°13’ N, 15°21’ E], ☿, ♀ dealate; Ruine Sturmberg N Weiz E-STMK [—] 1.6.1986 E. Kreissl leg. [47°14’ N, 15°36’ E], ☿☿, ♀ dealate; Graz-Andritz STMK [—] 30.6.1986 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿☿; S Kapellen Mürztal OB-STMK [—] 14.8.1986 E. Kreissl leg. [47°38’ N, 15°37’ E], ☿; Neuberg a. d. Mürz OB-STMK [—] 14.8.1986 E. Kreissl leg. [47°39’ N, 15°34’ E], ☿☿; Mitterdorf a. d. Raab, 420 m E-STMK [—] 20.8.1986 E. Kreissl leg. [47°10’ N, 15°36’ E], ☿☿; Stuhlsdorfer-Bach, auf Weide STMK [—] 14.4.1987 E. Kreissl leg. [47°06’ N, 15°36’ E], ☿; Mürzhofen rechtes Murufer [sic; probably the river Mürz but not Mur is meant] STMK. [—] 28.5.1987 E. Kreissl leg. [47°27’ N, 15°23’ E], ☿☿; Gratwein NW Graz STMK [—] 18.6.1987 E. Kreissl leg. [47°07’ N, 15°19’ E], ☿☿; Frauenberg Leibnitz 380 m, STMK [—] 3.7.1987 E. Kreissl leg. [46°46’ N, 15°31’ E], ☿☿; Sulm SW Leibnitz a. d. Altenmarkter-Brücke 266 m, STMK [—] 3.7.1987 E. Kreissl leg. [46°46’ N, 15°32’ E], ☿☿; Graz-Andritz Schöcklbach STMK [—] 8.7.1987 E. Kreissl leg. T 33 845 [47°08’ N, 15°28’ E], ♀ dealate; Schladming Untertal SSE 1050 m, STMK [—] 28.7.1987 E. Kreissl leg. [47°21’ N, 13°43’ E], ☿; Schladming S Obertal 1200 m, Eschachboden STMK [—] 30.7.1987 E. Kreissl leg. [47°18’ N, 13°42’ E], ☿☿, ♀ dealate; Graz-Andritz Schöcklbach STMK [—] 8.8.1987 E. Kreissl leg. T 33 875 [47°08’ N, 15°28’ E], ☿☿; Graz-Andritz Schöcklbach STMK [—] 8.8.1987 E. Kreissl leg. T 33 875 [47°08’ N, 15°28’ E], ♀♀ dealate; Sägewerk Stanz im Mürztal 650 m, STMK. [—] 13.8.1987 E. Kreissl leg. T 33883 [47°28’ N, 15°29’ E], ☿☿, ♀♀ alate, ♀♀ dealate, ♂♂; Eichfeld N-Mureck STMK. [—] 14.8.1987 E. Kreissl leg. T 33 884 [46°43’ N, 15°46’ E], ☿☿; Prenneggtal [sic; probably Preuneggtal is meant] SW Schladming 1200 m, OB-STMK [—] 7.7.1988 E. Kreissl leg. [47°19’ N, 13°37’ E], ☿☿; Kainach b. Wildon S-STMK [—] 3.5.1989 E. Kreissl leg. [—] [46°53’ N, 15°29’ E], ☿☿, ♀ dealate; Kastengraben b. Rein, 560 m GRAZ-UMG. [—] 26.4.1990 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿; Forsterteich unter Erle STMK. [—] 14.3.1993 E. Kreissl leg. [—] “93-63 Ges. Forsterteich unter Erle, 14.3.” [46°56’ N, 15°25’ E], ♀ dealate.

**Geographic distribution:** 217 localities. All landscape units. 200-1400 m altitude.
**Relative frequency:** 30.7% of 671 Styrian *Myrmica* records.

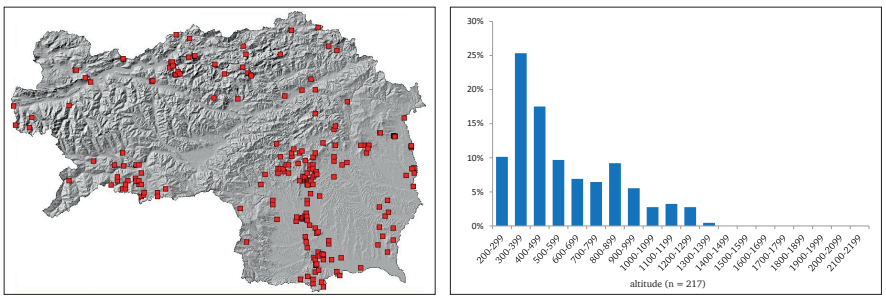


*Fig. 16: Myrmica rubra*, horizontal and vertical distribution.

## *Myrmica microrubra* (Seifert, 1993)

**Literature:** Wagner 2011a sub *Myrmica rubra*, Mikrogynen-Morphe.
**Material Universalmuseum Joanneum:** Bockernteiche SW Gratkorn GRAZ-UMG. [—] 1.11.1973 E. Kreissl leg. [47°06' N, 15°16' E], ♀ dealate; Annengraben NNE Graz 420 m, STMK [—] 19.8.1982 E. Kreissl leg. [47°07' N, 15°26' E], ♀ dealate [comment: physogastric queen].
**Geographic distribution:** 5 localities. Northern Alps, Styrian Border Mountains, and West Styrian hilly Foreland. 300-600 m altitude.
**Relative frequency:** 0.7% of 671 Styrian *Myrmica* records. 14.7% of 34 ♀ records of *M. rubra* and *M. microrubra*, which is a comparable with the situation in Carinthia (Wagner 2014).

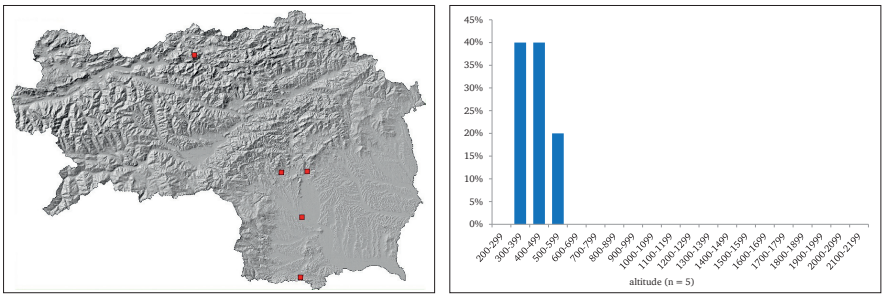


*Fig. 17: Myrmica microrubra*, horizontal and vertical distribution.

## *Myrmica ruginodis* Nylander, 1846

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Hölzel 1966, Bregant 1978, Glaser 1997, Schlagbauer 1997, Friedl 2000, Wagner 2008, Wagner 2009, Wagner 2010, Wagner 2011a, Wagner 2011b, Kudrna & Fric 2013, Ebermann & Krisper 2014, Tartally et al. 2014, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.IX.1949" [—] 1297 [—] "724" [46°47' N, 15°30' E], ☿; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.IX.1949" [—] 1296 [46°47' N, 15°30' E], ☿; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.IX.1949" [—] 1294 [—] "727" [46°47' N, 15°30' E], ☿; St. Wolfgang NW Obdach, OB-STMK 1230 m [—] 21.8.1955 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°05' N, 14°38' E], ☿, macro-♀ alate, ♂♂; Gleichenberg O-STMK [—] 28.5.1959 E. Kreissl leg. [46°53' N, 15°54' E], ☿☿; STYRIA; südl. Koralpengebiet leg. E. Kreissl [—] Umgebung von St. Oswald o. E. 14. Sept. 1961 [—] gesiebt unter *Castanea sativa* [—] 68-Hym z oo2 [46°42' N, 15°08' E], ☿; Umg. Neumarkt

OB-STMK [—] 12.-28.6.1963 E. Kreissl leg. [47°04' N, 14°25' E], ☿; Plesch Graz-Umg. STMK [—] 13.6.1965 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°08' N, 15°13' E], ☿☿; Wildonerberg STMK [—] 25.6.1965 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Badlgraben N Graz STMK [—] 28.6.1965 E. Kreissl leg. [47°13' N, 15°21' E], ☿☿; Rohrerberg Graz St. Veit STMK Eiche gesiebt [—] 9.1.1966 E. Kreissl leg. [47°07' N, 15°25' E], ☿☿, macro-♀ dealate; Graz-Andritz STMK, Eiche ges. [—] 13.2.1966 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Pailgraben Gratkorn STMK [—] 16.4.1966 E. Kreissl leg. [47°07' N, 15°23' E], ☿☿; Badlgraben N Graz STMK [—] 22.5.1966 W. [sic; Kreissl's first name was Erich] Kreissl leg. [47°13' N, 15°21' E], macro-♀ dealate; Radlpaß S-STMK [—] 15.10.1966 E. Kreissl leg. [46°38' N, 15°12' E], macro-♀ dealate; Radlberggr. S-STMK [—] 15.10.1966 E. Kreissl leg. [46°38' N, 15°14' E], ☿, macro-♀ dealate; Soboth Koralpengebiet SW-STMK [—] 5.-8.6.1967 E. Kreissl leg. [46°40' N, 15°04' E], ☿☿; Soboth Koralpengebiet SW-STMK [—] 9.6.1967 [46°40' N, 15°04' E], ☿; St. Martin a Wölln Koralpengebiet W-STMK [—] 9.8.1969 E. Kreissl leg. [47°00' N, 15°06' E], macro-♀♀ dealate; Plattengebiet-Oberweizbach Graz, STMK [—] 18.4.1970 E. Kreissl leg. [47°06' N, 15°28' E], macro-♀ dealate; Mühlbachgraben b. Rein, STMK [—] 18.5.1970 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Murau Rantenbachgr. OB-STMK [—] 27.7.1970 E. Kreissl leg. [47°08' N, 14°09' E], ☿; Goller Osthang E-STMK, 730 m [—] 17.8.1970 E. Kreissl leg. [47°14' N, 15°33' E], ☿, macro-♀♀ dealate; Zetzgebiet im Sattel E-STMK [—] 23.8.1970 E. Kreissl leg. [47°16' N, 15°39' E], ☿☿, macro-♀ alate; Enzenbachgraben Graz-Umg. STMK [—] 15.9.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Enzenbachgraben Pfaffenkogel GRAZ-UMG. [—] 15.9.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10' N, 15°28' E], ☿☿; Mühlbachgraben Enzenbach GRAZ-UMG. [—] 28.10.1970 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿, macro-♀♀ dealate; Burgstallerhöhe - Schöcklkreuz GRAZ-UMG. [—] 17.4.1971 E. Kreissl leg. [47°12' N, 15°29' E], ☿☿; Gschaidberg Wildkogel STMK [—] 9.5.1971 E. Kreissl leg. [47°19' N, 15°26' E], ☿☿; Hühnerkogel Koralmgebiet W-STMK [—] 25.5.1971 E. Kreissl leg. [47°19' N, 15°11' E], ☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], macro-♀ dealate; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°09' N, 15°18' E], macro-♀ dealate; Kapfenstein E-STMK [—] 1.6.1972 E. Kreissl leg. [46°53' N, 15°58' E], macro-♀ dealate; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.1972 "686" [—] "*Myrmica laevinodis* NYL." [47°09' N, 15°18' E], ☿☿; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.1972 "686" [47°09' N, 15°18' E], ☿☿; Hühnerkogelgeb. W-STMK [—] 27.8.1972 E. Kreissl leg. [47°19' N, 15°11' E], ☿☿; Schloßberg b. Wildon S-STMK [—] 23.5.1973 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Eibiswald-St. Lorenzen KORALPENGEBIET [—] 3.6.1973 E. Kreissl leg. [46°39' N, 15°10' E], macro-♀♀ dealate; St. Nikolai im Sausal W-STMK [—] 24.6.1973 E. Kreissl leg. [46°49' N, 15°27' E], ☿☿; Buchberg NW Herberstein E-STMK [—] 26.7.1973 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿, ♀♀ dealate; Kulm Gipfelbereich E-STMK [—] 27.7.1973 E. Kreissl leg. [47°13' N, 15°45' E], ☿☿; Pfaffenkogel GRAZ-UMG. [—] 29.7.1973 E. Kreissl leg. [47°09' N, 15°18' E], macro-♀♀ alate, ♂♂;

Wildpark Herberstein E-STMK [—] 30.7.1973 E. Kreissl leg. [47°13' N, 15°48' E], ☿, macro-☿☿ alate, ♂; Kulm Gipfelbereich E-STMK [—] 22.8.1973 E. Kreissl leg. [47°13' N, 15°45' E], macro-☿ dealate; Freienberger Klamm STMK [—] 10.8.1973 E. Kreissl leg. [47°14' N, 15°46' E], ☿; WSW Langegg NW-Hang, 350 m S-STMK [—] 21.10.1973 E. Kreissl leg. [46°38' N, 15°31' E], macro-☿ dealate; Weizgraben NE Weiz E-STMK [—] 14.11.1973 E. Kreissl leg. [47°16' N, 15°34' E], macro-☿ dealate; Hausberg, SSW Semriach GRAZ-UMG. [—] 28.11.1973 E. Kreissl leg. [47°12' N, 15°23' E], ☿; Graggerschlucht SW Neumarkt OB-STMK [—] 11.7.1974 E. Kreissl leg. [47°03' N, 14°24' E], ☿☿; Auerlingsee Grebenzengeb. OB-STMK [—] 17.7.1974 E. Kreissl leg. [47°01' N, 14°18' E], ☿; Hadernigkogel Koralpe W-STMK [—] 27.11.1974 E. Kreissl leg. [46°40' N, 15°07' E], macro-☿ ☿ dealate; Mühlbachgraben STMK. 12.1.1975 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Dürnberger Moor SW Mariahof OB-STMK [—] 24.4.1975 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿, macro-☿dealate; Kalkofen Karriegel E-STMK [—] 1.5.1975 E. Kreissl leg. [47°17' N, 15°36' E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] "*Camp. herculeanus Form. gagates Myrm laevinodis*" [46°39' N, 15°28' E], macro-☿dealate; Karchauereck SE Murau OB-STMK [—] 13.7.1975 E. Kreissl leg. [—] "*Myrmica ruginodis*" [47°05' N, 14°15' E], ☿☿; Furtnerteich OB-STMK [—] 15.7.1975 E. Kreissl leg. [47°05' N, 14°23' E], ☿☿; Kalkberg Grebenzen OB-STMK [—] 23.7.1975 E. Kreissl leg. [—] "*Myrmica ruginodis*" [47°04' N, 14°20' E], ☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 7.8.1975 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Stübinggraben GRAZ-UMG. [—] 12.8.1975 E. Kreissl leg. [—] "*Leptoth. nyland. Myrmica ruginod*." [47°11' N, 15°16' E], macro-☿ dealate; Grasluppteich b. Zeutschach OB-STMK [—] 12.4.1976 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°04' N, 14°22' E], ☿☿; Kalkofen, 1160 m, W Schafferwirt, OB-STMK [—] 22.7.1976 E. Kreissl leg. [—] "*Myrmica ruginodis*" [47°06' N, 14°15' E], ☿☿; Karchauereckgebiet OB-STMK [—] 22.7.1976 E. Kreissl leg. [47°05' N, 14°15' E], macro-☿alate; Grebenzengeb. b. Kalkofen OB-STMK [—] 28.7.1976 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°04' N, 14°21' E], ☿☿, ♂; Schweinegg STMK [—] 22.9.1976 E. Kreissl leg. [47°15' N, 15°28' E], macro-☿☿ alate; Schweinegg STMK [—] 22.9.1976 E. Kreissl leg. [47°15' N, 15°28' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 10.4.1977 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Semriach-Rechberg E-STMK [—] 2.5.1977 E. Kreissl leg. [47°15' N, 15°24' E], ☿☿; Salza Stausee Paß Stein OB-STMK [—] 9.6.1977 E. Kreissl leg. [47°31' N, 13°56' E], ☿, macro-☿dealate; Windhofkogel ENE Semriach GRAZ-UMG. [—] 7.7.1977 E. Kreissl leg. [—] "*Myrmica ruginodis*" [47°13' N, 15°26' E], ☿; Schöckl Gipfelbereich GRAZ-UMG. [—] 14.7.1977 E. Kreissl leg. [47°11' N, 15°27' E], ☿☿; Rantengraben N Murau OB-STMK [—] 12.9.1977 E. Kreissl leg. [47°08' N, 14°09' E], micro-☿ dealate; Pfaffenkogel N Graz STMK [—] 7.10.1977 E. Kreissl leg. [47°09' N, 15°18' E], macro-☿ dealate; Kehrerwald b. Rein GRAZ-UMG. [—] 25.5.1978 E. Kreissl leg. [—] "*Myrm. laevin*." [47°07' N, 15°16' E], ☿☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [47°13' N, 15°30' E], ☿☿; Mixnitzbach-Zechner Hube E-STMK [—] 30.5.1978 E. Kreissl leg. [—] "*Myrm. ruginodi*" [47°20' N, 15°25' E], ☿☿; Tyrnauer Alpe Einschnitt E-STMK [—] 30.5.1978 E. Kreissl leg. [—] "*Myrm. laevinod*." [47°20' N, 15°25' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 31.5.1978 E. Kreissl leg.

"*Myrm. ruginod.*" [47°08' N, 15°15' E], ☿☿; Hörgasgraben b. Rein, 630 m GRAZ-UMG. [—] 8.6.1978 E. Kreissl leg. [—] "*Myrm. lavin.*" [47°10' N, 15°16' E], ☿; Grebenzengebiet ehem. Kalkofen OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] "*Myrm. laevin.*" [47°04' N, 14°21' E], ☿☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] "*Myrm. laevinod*." [47°01' N, 14°24' E], ☿☿; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [47°02' N, 14°26' E], macro-☿dealate; Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [47°01' N, 14°24' E], macro-☿ dealate; Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [47°01' N, 14°24' E], ☿☿; Dürnberger Moor OB-STMK [—] 22.6.1978 E. Kreissl leg. [47°05' N, 14°21' E], ☿; Ob. Grasluppteich OB-STMK [—] 26.6.1978 E. Kreissl leg. [47°04' N, 14°22' E], macro-☿dealate; Hörgasgraben b. Rein GRAZ-UMG. [—] 17.7.1978 E. Kreissl leg. [47°10' N, 15°16' E], ☿; Pöllauer Graben Grebenzengeb. OB-STMK [—] 25.7.1978 E. Kreissl leg. [47°01' N, 14°22' E], ☿☿; Althofen Katschtal OB-STMK [—] 27.7.1978 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°09' N, 14°14' E], macro-☿alate; Dürnberger Moor OB-STMK [—] 29.7.1978 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°05' N, 14°21' E], ☿☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] 1. Jan. 1980 [/] "*Las. niger*" [47°09' N, 15°18' E], ☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] 31. Jan. 1980 [/] "*Leptoth. cortic.*" [47°09' N, 15°18' E], ☿; Kugelstein N Pegau GRAZ-UMG. [—] 18.4.1979 E. Kreissl leg. [—] "*Myrmica laevinodis*" [47°13' N, 15°20' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Hörgasgraben b. Rein, 550 m GRAZ-UMG. [—] 24.6.1979 E. Kreissl leg. [—] "*Myrm. laevinodis*" [47°09' N, 15°16' E], ☿☿; Badlgraben N Peggau GRAZ-UMG. [—] 18.7.1979 E. Kreissl leg. [—] "13.10.1979" [/] "*Myrm. laevindis*" [47°13' N, 15°21' E], ☿; Fuß d. Peggauer Wand GRAZ-UMG., 420 m [—] 7.8.1979 E. Kreissl leg. [47°12' N, 15°20' E], ☿☿; Kornock W Turracherhöhe 2190 m, OB-STMK [—] 16.9.1979 E. Kreissl leg. [—] "*Manica rubida*" [46°54' N, 13°51' E], macro-☿dealate; Fuß d. Peggauer Wand GRAZ-UMG. [—] 16.10.1979 E. Kreissl leg. [—] "*Leptoth. unifasc.*" [47°12' N, 15°20' E], micro-☿dealate; Klamm S Stubenbergsee E-STMK, 380 m [—] 13.12.1979 E. Kreissl leg. [47°13' N, 15°47' E], macro-☿☿dealate; WNW St. Ulrich b. Rein, 550 m GRAZ-UMG. [—] 13.2.1980 E. Kreissl leg. [47°08' N, 15°16' E], macro-☿ dealate; Zirbitzkogel W-Seite, 1220 m OB-STMK [—] 24.5.1980 E. Kreissl leg. [47°04' N, 14°30' E], ☿; Adelsberg NW Neumarkt OB-STMK [—] 25.5.1980 E. Kreissl leg. [47°06' N, 14°22' E], ☿☿; Bischofgraben, NNW Oberwölz, 900 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12' N, 14°16' E], ☿☿; Puxberg NW Teufenbach OB-STMK, 760 m [—] 22.6.1980 E. Kreissl leg. [47°09' N, 14°20' E], macro-☿dealate; Dürnstein OB-STMK [—] 23.6.1980 E. Kreissl leg. [47°00' N, 14°23' E], macro-☿dealate; Paalgraben S Stadl a. d. Mur OB-STMK, 980 m [—] 12.8.1980 E. Kreissl leg. [47°03' N, 13°59' E], macro-☿dealate; Blaubruchhöhle Zösenberg, 450 m NNE Graz [—] 28.8.1980 E. Kreissl leg. [47°08' N, 15°27' E], ☿☿; Burgstallerhöhe NNE Graz, STMK, 1020-1140 m [—] 23.9.1981 E. Kreissl leg. [47°13' N, 15°30' E], ☿☿, micro-☿alate; Hörgasgraben b. Rein, 600 m GRAZ-UMG. [—] 6.4.1982 E. Kreissl leg. [47°09' N, 15°16' E], ☿, [47°09' N, 15°16' E], macro-☿dealate; Plankogel, 1440 m NNE Passail E-STMK [—] 1.6.1982 E. Kreissl leg. [47°21' N, 15°33' E], ☿; Kehrerwald SW Rein, 650 m GRAZ-UMG. [—] 24.6.1982 E. Kreissl leg. [47°07' N,

15°16' E], ☿☿; Annengraben NNE Graz 420 m, STMK [—] 14.9.1982 E. Kreissl leg. [47°07' N, 15°26' E], micro-♀dealate; Buchkogel b. Wildon, 420 m STMK [—] 22.5.1983 E. Kreissl leg. [46°52' N, 15°30' E], ☿; Greiml WSW Stainach OB-STMK [—] 23.6.1983 E. Kreissl leg. [47°31' N, 14°03' E], ☿; Patschaberg NNW Weiz 1020 m, E-STMK [—] 30.6.1983 E. Kreissl leg. [47°16' N, 15°36' E], macro-♀dealate; NW Stainz W-STMK, 790 m [—] 30.9.1983 E. Kreissl leg. [46°56' N, 15°11' E], ☿, ♂; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42' N, 15°37' E], ☿☿; Ruine Peggau GRAZ-UMG. [—] 4.4.1985 E. Kreissl leg. [47°12' N, 15°21' E], ☿☿; Weißenbach-St. Gallen OB-STMK [—] 10.6.1985 E. Kreissl leg. [47°42' N, 14°37' E], ☿☿, macro-♀dealate; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 21.6.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Salzkammergut Blaa-Alm OB-STMK [—] 17.7.1985 E. Kreissl leg. [47°40' N, 13°44' E], ☿; Salzkammergut Blaa-Alm OB-STMK [—] 19.7.1985 E. Kreissl leg. [47°40' N, 13°44' E], ☿☿; Kastengraben b. Rein GRAZ-UMG. [—] 22.7.1985 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Salzastausee OB-STMK [—] 29.7.1985 E. Kreissl leg. [47°31' N, 13°56' E], ☿☿; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08' N, 15°25' E], ☿; Ruine Schmirnberg STMK [—] 16.6.1987 E. Kreissl leg. [46°37' N, 15°29' E], ☿☿; Pfaffenkogel E-Fuß, Umg. Graz STMK [—] 4.8.1987 E. Kreissl leg. T 33 874 [47°10' N, 15°19' E], macro-♀♀alate; Stanzbachgraben SSE Stanz im Mürztal 680 m, STMK. [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°27' N, 15°30' E], ☿☿; Ellersbachgraben NNW Stanz im Mürztal 720 m, STMK [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°28' N, 15°29' E], ☿☿, ♂♂; Frohnleiten N-Rabenstein STMK. [—] 15.9.1987 E. Kreissl leg. T 33 912 [47°15' N, 15°18' E], ☿☿; Schwarze Lacke N Eisenerz OB-STMK [—] 22.8.1988 E. Kreissl leg. [47°34' N, 14°49' E], macro-♀dealate; Schlossberg b. Wildon S-STMK [—] 3.5.1989 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Forsterteich unter Erle STMK. [—] 14.3.1993 E. Kreissl leg. [—] "93-63 Ges. Forsterteich unter Erle, 14.3." [46°56' N, 15°25' E], ☿☿.

**Geographic distribution:** 218 localities. All landscape units. 200-2100 m altitude.

**Relative frequency:** 31.1% of 671 Styrian *Myrmica* records. Of the material of the Universalmuseum Joanneum, 9.1% of 44 ♀-records were micro-♀♀. Hence, micro-♀♀ in *M. ruginodis* have similar frequencies than ♀♀ of *M. microrubra* in *M. rubra* (chi-square-test, p = 0.44).

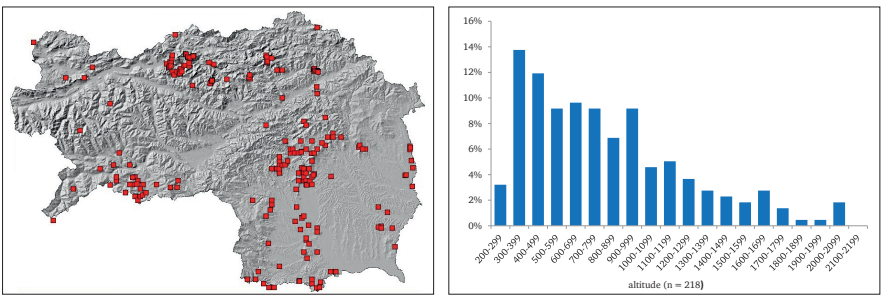


*Fig. 18: Myrmica ruginodis*, horizontal and vertical distribution.

## *Myrmica lobicornis* Nylander, 1846

**Literature:** Hölzel 1966, Wagner 2010, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 6 localities. Northern Alps. 700-1300 m altitude.
**Relative frequency:** 0.9% of 671 Styrian *Myrmica* records.

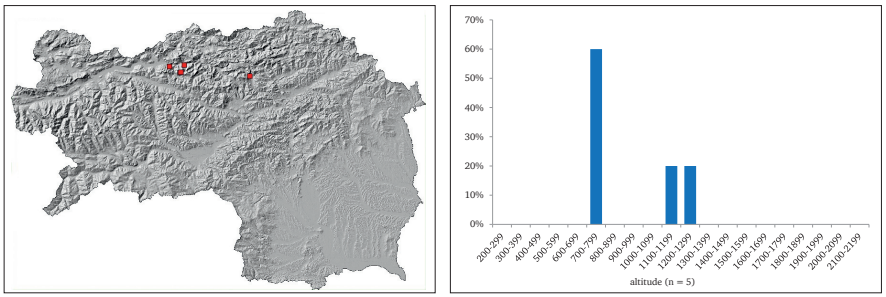


*Fig. 19: Myrmica lobicornis*, horizontal and vertical distribution.

## *Myrmica lobulicornis* Nylander, 1857

**Literature:** Wagner 2009, Wagner 2010, Kudrna & Fric 2013, Tartally et al. 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Bösenstein Rottenmann. Tauern OB-STMK [—] 19.6.1956 E. Kreissl leg. [47°26' N, 14°24' E], ☿☿.
**Geographic distribution:** 10 localities. Northern Alps and Central Alps. 1400-2100 m altitude.
**Relative frequency:** 1.5% of 671 Styrian *Myrmica* records.

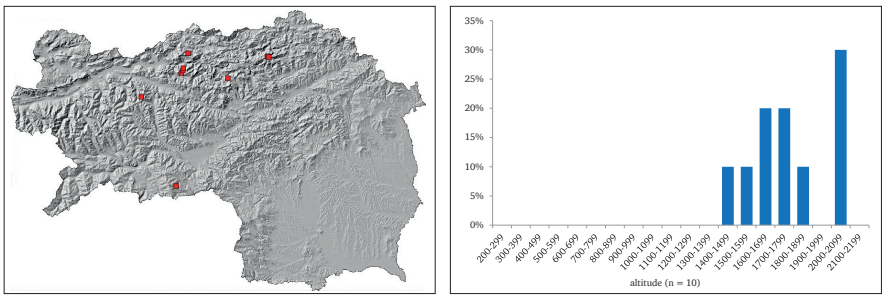


*Fig. 20: Myrmica lobulicornis*, horizontal and vertical distribution.

## *Myrmica schencki* Viereck, 1903

**Literature:** Hoffer 1890a sub *lobicornis*, Hoffer 1890b sub *lobicornis*, Gunhold 1949, Hölzel 1966, Bregant 1978, Glaser 1997, Wagner 2011a, Borovsky & Kunz 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Furtnerteich OB-STMK [—] 3.8.1974 E. Kreissl leg. [47°05' N, 14°23' E], ☿.
**Geographic distribution:** 18 localities. All landscape units. 200-900 m altitude.
**Relative frequency:** 2.4% of 671 Styrian *Myrmica* records.

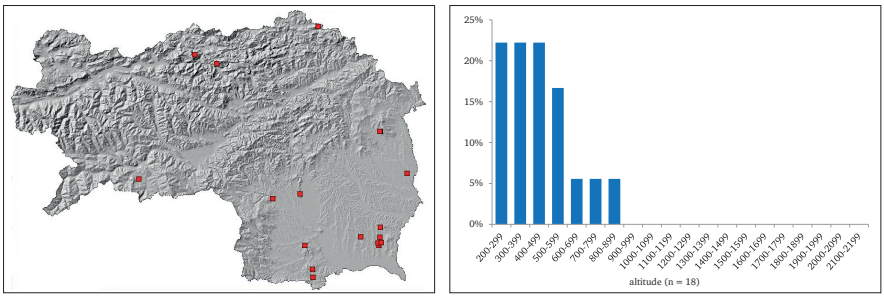


*Fig. 21: Myrmica schencki*, horizontal and vertical distribution.

## *Aphaenogaster subterranea* (Latreille, 1798)

**Literature:** Hölzel 1966, Ebermann & Krisper 2014, Wieser & Trummer 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 10.4.1972 E. Kreissl leg. [47°09' N, 15°17' E], ☿; Pfaffenkogel N Graz, STMK [—] 15.8.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿, ♀♀alate; Wildpark Herberstein E-STMK [—] 16.6.1974 E. Kreissl leg. [47°13' N, 15°48' E], ☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] „*Tetram. caespit. Las. emarginat. Stenam. westwoodi*" [46°39' N, 15°28' E], ☿; Pfaffenkogel N Graz STMK [—] 7.10.1977 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 30.9.1981 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 3.4.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Gsollerkogel N Gratwein STMK. [—] 28.4.1987 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Styria, Pfaffenkogel b. Stübing Ostfuß, 400 m [—] Prot. 88-108 28.3.1988 Kreissl leg. [—] 47°09' N/15°19' E Zoodat: 163:9/X 47,16N/15,31 E, ☿.

**Geographic distribution:** 17 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-700 m altitude.
**Relative frequency:** 2.2% of 686 Styrian records of *Myrmica* and *Aphaenogaster*.

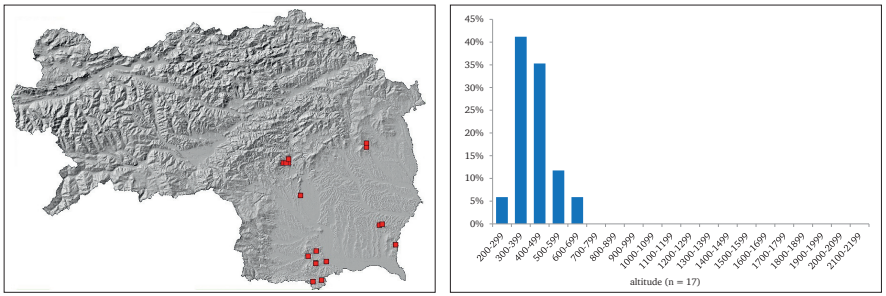


*Fig. 22: Aphaenogaster subterranea*, horizontal and vertical distribution.

## *Pheidole* near *pallidula*

**Literature:** None. New species for Austria!
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. Established outdoor-living neozoon in Graz. 300-400 m altitude.
**Status discussion:** In Graz, Lange Gasse house numbers 9, 11, and 13, 47°04‘54“N, 15°26‘13“ E, 353 m (Fig. 24), I collected *Pheidole* at the 6.VII.2019 (WAG2449) and 18.VIII.2019 (WAG2460). First, piles of dead ♂♂ of *Lasius emarginatus* attracted attention, in the following I found minor ☿☿ of *Pheidole* and nest entrances close to them. Minor ☿☿ were identifiable in the field by their shine, smaller size (Fig. 25), and faster movement in comparison to *Tetramorium immigrans* (Fig. 54). The *Pheidole* colony had several nest entrances at the intersection between pavement and house walls in a vegetation-free habitat (Fig. 24), the house walls were facing to NNE. From similar habitats in southwestern Germany, records of *Pheidole pallidula* (Nylander, 1849) are known (Heller & Bretz 2019, Seifert 2020b). The colony territory extended over a length of 39 meters and was restricted by territories of *T. immigrans* at both sides. The size of the colony indicates polygyny (cf. Seifert 2018, cf. Heller & Bretz 2019). Morphometric values of 3 major ☿☿ were taken (Tab. 1; for definitions of characters, see Seifert 2016b).

| PoOc | ExOcc | CL | CW | dAN | SL | MW | PEW | PPW | Pn-Haa | PEH | PrOc | EL | GuHL | ML | Fe3L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 608 | 95 | 1152 | 1177 | 332 | 681 | 546 | 160 | 298 | 417 | 226 | 284 | 149 | 176 | 977 | 890 |
| 673 | 129 | 1234 | 1294 | 368 | 703 | 597 | 171 | 301 | 441 | 251 | 292 | 165 | 183 | 1067 | 936 |
| 697 | 145 | 1255 | 1328 | 360 | 709 | 615 | 185 | 320 | 441 | 254 | 299 | 159 | 211 | 1066 | 955 |

*Tab. 1:* Morphometric values of 3 major workers of *Pheidole* near *pallidula* [µm].

Since neither the identification via discriminants in Seifert (2016b) nor a wild-card linear discriminant analysis of 3 major ☿☿ brought clear result to decide between *Pheidole pallidula* and *P. balcanica* Seifert, 2016, I sent 6 major ☿☿ to Bernhard Seifert and got the following answer (B. Seifert in litt. 2019): "The specimens from Graz belong undoubtedly to the *Ph. pallidula* species complex. Further conclusions are very uncertain. The wild-card LDA analyses with both full and reduced character set give a weak signal in favour of *balcanica* whereas all four variants of NC-clustering allocate them to *pallidula*. The specimens are either (a) *balcanica* with an abnormally high petiole and abnormally short scape, (b) *pallidula* with abnormally small eyes or (c) an unknown fifth species of the *pallidula* complex with unclear geographic origin. I favour explanation (c). A *balcanica* x *pallidula* hybrid identity appears unlikely because of the low ratio of intermediate vs. extreme character expressions ...".

Since no species of the *P. pallidula* complex was mentioned in Austrian checklists (Steiner et al. 2017, Seifert 2018), this species with unknown taxonomic status is a national first record. I observed direct competition against other ant species several times: A ♂ of *Lasius emarginatus* was brought out of the nest alive during my first observation. Later, I saw a dead *Solenopsis fugax* ☿ locked in a leg of a *Pheidole* major ☿. At the 31.VIII.2019, I found several dead ☿☿ of *T. immigrans* and a part of a ♀ of *Ponera* at the nest entrances. At the 11.IX.2019, many dead ♂♂ of *Solenopsis fugax*, a species which swarmed at several sites in Graz the day before, were brought out of the nest. Major ☿☿ cut them with their mandibles. *Pheidole* near *pallidula* occupies the ecological niche of *T. immigrans* and, based on similar size and behavior, competition should occur frequently. It should be observed if *Pheidole* will spread out in Graz in the next years or decades. In addition to the probably increasing temperature, also competition against *T. immigrans* and *L. emarginatus* will decide its success. The intranest cooperation behavior of ☿☿ of the *Pheidole pallidula* complex in some way outmatches those of all native ant species. In difference to, for example, our wood ants, ☿☿ of *Pheidole*, as I saw at expeditions at the Mediterranean, respond very sensitive to the movements of nestmates while carrying large pieces of food and usually move coordinated in the same direction. Also their fighting behavior in combination with morphological dimorphism (Fig. 26) comprises a peculiarity: While some minor ☿☿ fix the non-nestmate ☿ at its appendages, others put a pheromone trail to the nest to recruit major ☿☿. The latter appear after a few

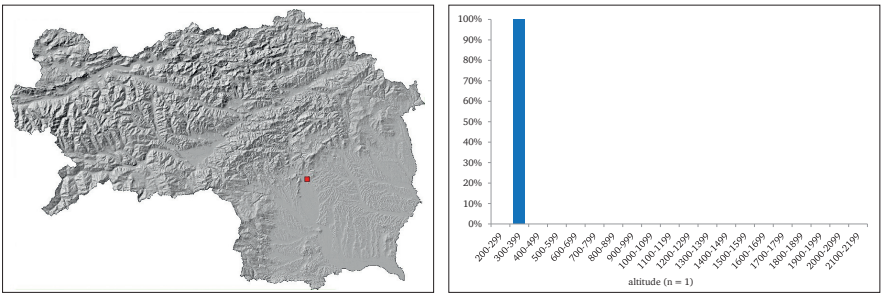


*Fig. 23: Pheidole* near *pallidula*, horizontal and vertical distribution.

*Fig. 24:* The habitat of *Pheidole* near *pallidula*, a newly detected established neozoon, in Graz, Lange Gasse. Photo: H. Wagner.

*Fig. 25:* The field impression of a new discovery: Dead males of *Lasius emarginatus* and 2 minor workers of *Pheidole* near *pallidula* near their nest entrances. Photo: H. Wagner.

minutes and – as I saw in Montenegro – can cut through a stretched ☿ of *L. emarginatus* with one bite in the mid mesosoma. Volker Borovsky (pers. comm. 2019) saw minor ☿☿ of the *Pheidole pallidula* complex fixing a ☿ of *Myrmica*. Here, the major ☿☿ cut off only the appendages.

*Fig. 26:* Workers of the *Pheidole pallidula* complex are represented by two different morphs with different functions. Photo: R. Borovsky.

### *Solenopsis fugax* (Latreille, 1798)

**Literature:** Hoffer 1890a, Goetsch 1950, Franz 1960, Hölzel 1966, Bregant 1978, Glaser 1997, Friedl 2000, Frieß et al. 2010, Wagner et al. 2010, Wagner 2011b, Wagner 2012, Ebermann & Krisper 2014, Wieser & Trummer 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 10.4.1972 E. Kreissl leg. [47°09' N, 15°17' E], ☿; Graz-Andritz STMK [—] 8.9.1987 E. Kreissl leg. [47°06' N, 15°25' E], ♀dealate; Stainzbachgraben NW Stainz 520 m STMK [—] 29.9.1990 E. Kreissl leg. [46°55' N, 15°11' E], ♀♀dealate; Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Graz-Andritz STMK [—] E. Kreissl leg. [—] „Schattengebiet […] od. bei *Las. ful.* WWS 1957" [47°06' N, 15°25' E], ☿☿.

**Geographic distribution:** 51 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-700 m altitude.

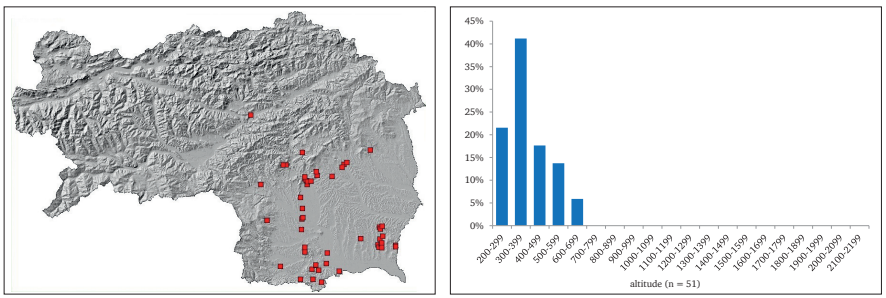


*Fig. 27: Solenopsis fugax*, horizontal and vertical distribution.

## *Monomorium pharaonis* (Linnaeus, 1758)

**Literature:** Hölzel 1966, Bregant 1998a, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. Established indoor-living neozoon in Leibnitz. 200-300 m altitude.

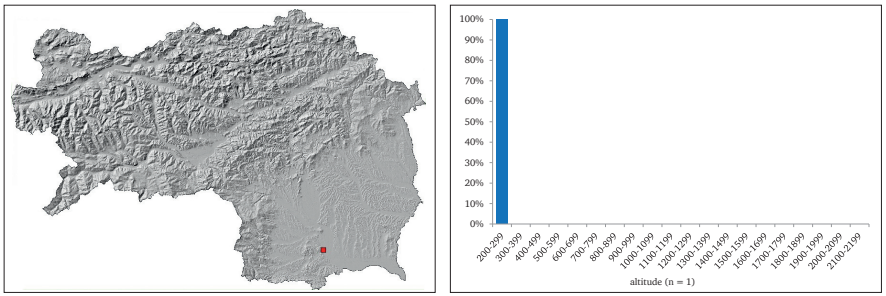


*Fig. 28: Monomorium pharaonis*, horizontal and vertical distribution.

## *Myrmecina graminicola* (Latreille, 1802)

**Literature:** Hoffer 1890a sub *Latreillei*, Hoffer 1890b sub *Latreillei*, Hölzel 1966, Bregant 1978, Buschinger et al. 2003, Wagner 2011a, Wagner 2011b, Wieser & Trummer 2014, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Einödgraben b. Lineck Graz-Umg. [—] 9.4.1957 E. Kreissl leg. [47°08' N, 15°28' E], ☿; Pailgraben N Graz STMK [—] 21.4.1963 E. Kreissl leg. [47°07' N, 15°23' E], ☿; Weinitzen Graz-Umg. [—] 22.4.1963 E. Kreissl leg. [47°08' N, 15°29' E], ☿☿; Kulm E-STMK [—] 30.5./1.6.1965 E. Kreissl leg. [47°13' N, 15°45' E], ☿; Buchkogel W Graz STMK [—] 19.6.1965 E. Kreissl leg. [47°02' N, 15°22' E], ♀dealate; Graz-Andritz STMK, Eiche ges. [—] 13.2.1966 E. Kreissl leg. [47°06' N, 15°25'

E], ♀dealate; Schloß Seggau S-STMK [—] 23.6.1967 E. Kreissl leg. [46°46' N, 15°31' E], ☿☿; Plattengebiet-Oberweizbach Graz, STMK [—] 18.4.1970 E. Kreissl leg. [47°06' N, 15°28' E], ☿, ♀dealate; Pfaffenkogel Stübing STMK. [—] 8.5.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Wildonerberg Buchkogelgebiet STMK [—] 27.6.1971 E. Kreissl leg. [46°52' N, 15°30' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Kapfenstein E-STMK [—] 1.6.1972 E. Kreissl leg. [46°53' N, 15°58' E], ☿☿; W Leutschach Windisch Bühel S-STMK [—] 21.10.1973 E. Kreissl leg. [46°39' N, 15°27' E], ☿; Weizgraben NE Weiz E-STMK [—] 14.11.1973 E. Kreissl leg. [47°16' N, 15°34' E], ♀dealate; Wildpark Herberstein E-STMK [—] 16.6.1974 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿; Wildoner Schloßberg S-STMK [—] 18.5.1975 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Wildoner Schloßberg S-STMK [—] 18.5.1975 E. Kreissl leg. [46°53' N, 15°30' E], ♀dealate; Oberschöcklbach GRAZ-UMG. [—] 30.7.1975 E. Kreissl leg. „*Leptoth. tuberum Myrmec. graminic*" [47°08' N, 15°28' E], ☿; Mitteregg Sausal W-STMK [—] 23.4.1977 E. Kreissl leg. [46°48' N, 15°26' E], ☿; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Myrmecina graminicola*" [47°02' N, 14°26' E], ☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. „*Myrmecina graminicola*" [46°53' N, 15°58' E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 30.9.1981 E. Kreissl leg. [47°09' N, 15°18' E], ☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42' N, 15°37' E], ☿☿; Gsollerkogel N Gratwein STMK. [—] 28.4.1987 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Schöcklbach STMK. 2.8.1991 E. Kreissl leg. [47°08' N, 15°28' E], ☿.
**Geographic distribution:** 48 localities. All landscape units. 200-800 m altitude.
**Relative frequency:** 40.2% of 107 Styrian records of *Myrmecina* and *Stenamma*.

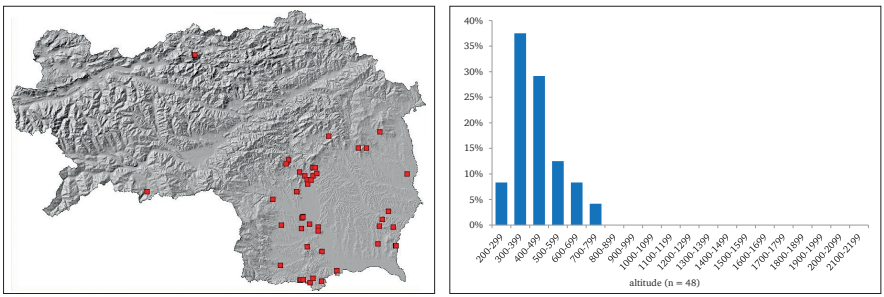


*Fig. 29: Myrmecina graminicola*, horizontal and vertical distribution.

## *Leptothorax acervorum* (Fabricius, 1793)

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Franz & Klimesch 1947, Hölzel 1966, cf. Buschinger 1971, Glaser 1997, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Wagner 2010, Wagner 2011a, Wagner 2012, Borovsky & Kunz 2016, Wagner et al. 2016, Steiner et al. 2017, Wagner et al. 2018.
**Material Universalmuseum Joanneum:** nördl. Umg. Graz, St. Schlag ober St. Veit Rannachgebiet [—] leg. E. Kreissl 2.4.1959 [47°08' N, 15°24' E], ☿; Neumarkter Sattel,

OB-STMK [—] 1964 E. Kreissl leg. [47°06' N, 14°22' E], ♀dealate; Soboth Koralpengebiet SW-STMK [—] 5.-8.6.1967 E. Kreissl leg. [46°40' N, 15°04' E], ☿☿; St. Lambrecht Schwarzenbach OB-STMK [—] 20.7.1970 E. Kreissl leg. [47°03' N, 14°18' E], ♀dealate; Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Eibisberg Zetzgebiet E-STMK [—] 31.10.1971 E. Kreissl leg. [47°18' N, 15°36' E], ☿☿, ♀dealate; Reiteregg STMK [—] 6.-8.12.1971 E. Kreissl leg. [47°03' N, 15°16' E], ☿☿; Burgstallerhöhe NNE GRAZ, STMK [—] 30.5.1972 E. Kreissl leg. [47°13' N, 15°30' E], ☿; Schöckl SE GRAZ-UMG. [—] 3.10.1972 E. Kreissl leg. [47°11' N, 15°28' E], ☿, ♀♀dealate; Teichalmgeb. Osser E-STMK [—] 24.6.1975 E. Kreissl leg. [47°20' N, 15°30' E], ☿☿; Karchauereck SE Murau OB-STMK [—] 13.7.1975 E. Kreissl leg. [47°05' N, 14°15' E], ☿, ♀dealate; Thomabachgraben OB-STMK [—] 20.7.1975 [—] „*Camp. herculean. Leptoth. acervorum Formica fusca aquilonia*" [47°02' N, 14°19' E], ☿☿; Teichalpe W-STMK [—] 19.8.1975 E. Kreissl leg. [—] „*Leptothorax acervorum*" [47°21' N, 15°27' E], ♀dealate; Schöcklplateau S-Seite GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [—] „*Leptothor. acervorum*" [47°11' N, 15°27' E], ☿☿; Furtnerteich OB-STMK [—] 19.7.1976 E. Kreissl leg. [—] „*Lepthot. acerv. nigrescens*" [47°05' N, 14°23' E], ☿; Olsaklamm S Neumarkt OB-STMK [—] 21.7.1976 E. Kreissl leg. [—] „*Leptothor. acervorum*" [47°02' N, 14°25' E], ☿☿; Grebenzengeb. b. Kalkofen OB-STMK [—] 28.7.1976 E. Kreissl leg. [—] „*Leptoth. acervorum*" [47°04' N, 14°21' E], ☿; Kreuzeckgeb. OB-STMK [—] 10.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Tyrnauer Alpe GRAZ-UMG. [—] 2.5.1977 E. Kreissl leg. [—] „*Leptothorax acervorum*" [47°20' N, 15°25' E], ☿; Grebenzengebiet ob. Thomabachgraben OB-STMK [—] 20.6.1978 E. Kreissl leg. [47°01' N, 14°19' E], ☿☿; Dürnberger Moor OB-STMK [—] 22.6.1978 E. Kreissl leg. [47°05' N, 14°21' E], ☿, ♀dealate; Mühlbachgraben b. Rein, 560 m GRAZ-UMG. [—] Juni 1979 E. Kreissl leg. [—] „*Leptoth. acervorum*" [47°09' N, 15°15' E], ☿; Adelsberg N Neumarkt, 1020 m OB-STMK [—] 2.6.1980 E. Kreissl leg. [47°06' N, 14°22' E], ♀dealate; Salzastausee OB-STMK [—] 29.7.1985 E. Kreissl leg. [47°31' N, 13°56' E], ☿; Ellersbachgraben NNW Stanz im Mürztal 720 m, STMK [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°28' N, 15°29' E], ☿☿.

**Geographic distribution:** 86 localities. All landscape units. 200-2000 m altitude.

**Relative frequency:** 77.1% of 96 Styrian *Leptothorax* and *Harpagoxenus* records.

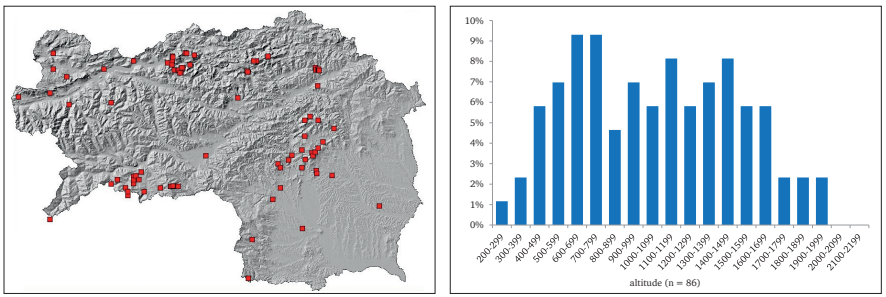


*Fig. 30: Leptothorax acervorum*, horizontal and vertical distribution.

## *Leptothorax muscorum* (Nylander, 1846)

**Literature:** Hoffer 1890a, Hoffer 1890b, Hölzel 1966, Wagner 2009, Wagner 2012, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Styria, S Ruine Ehrenfels NNE Graz, Südhang, 720 m, Felsstelle [—] 47°10' N/15°28' E Zoodat: 164:8/O=47,17N/15,47E [—] Prot. 70-G176 11.10.1970 E. Kreissl leg., ♀dealate; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ♀ dealate; Schöckl SE GRAZ-UMG. [—] 3.10.1972 E. Kreissl leg. [47°11' N, 15°28' E], ☿☿, ♀dealate; Rote Wand GRAZ-UMG. [—] 6.9.1974 E. Kreissl leg. [47°19' N, 15°24' E], ☿; Dürnberger Moor SW Mariahof OB-STMK [—] 24.4.1975 E. Kreissl leg. [47°05' N, 14°21' E], ♀dealate; Wildbad-Einöd OB-STMK [—] 21.7.1976 E. Kreissl leg. [—] „*Leptothor. acervorum*" [47°01' N, 14°24' E], ☿; Dürnberger Moor OB-STMK [—] 22.6.1978 E. Kreissl leg. [47°05' N, 14°21' E], ☿.
**Geographic distribution:** 19 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 400-1300 m altitude.
**Relative frequency:** 18.8% of 96 Styrian *Leptothorax* and *Harpagoxenus* records.

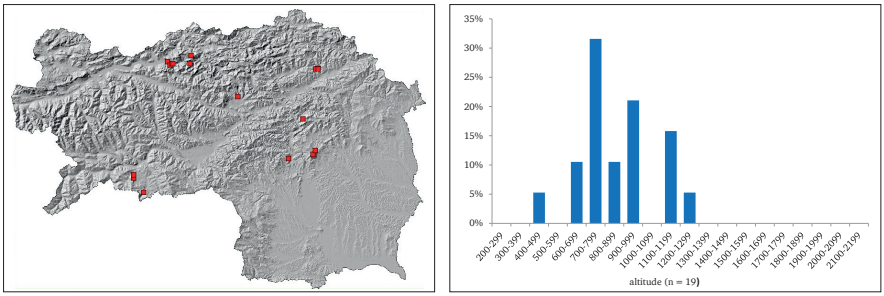


*Fig. 31: Leptothorax muscorum*, horizontal and vertical distribution.

## *Leptothorax kutteri* Buschinger, 1965

**Literature:** Buschinger 1971, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. Northern Alps. 700-800 m altitude.
**Relative frequency:** < 1% of 96 Styrian *Leptothorax* and *Harpagoxenus* records.

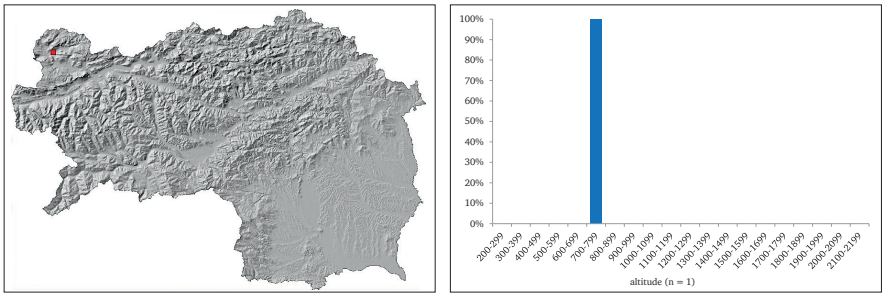


*Fig. 32: Leptothorax kutteri*, horizontal and vertical distribution.

## *Leptothorax gredleri* Mayr, 1855

**Literature:** Hölzel 1966, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 2 localities. East Styrian hilly Foreland. 300-400 m altitude.
**Relative frequency:** 2.1% of 96 Styrian *Leptothorax* and *Harpagoxenus* records.

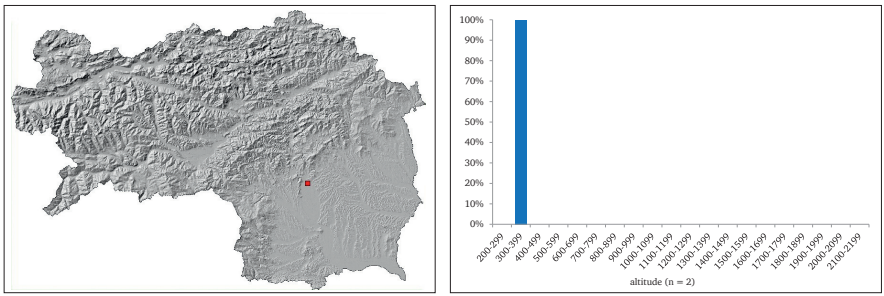


*Fig. 33: Leptothorax gredleri*, horizontal and vertical distribution.

## *Harpagoxenus sublaevis* (Nylander, 1849)

**Literature:** Buschinger 1966, Buschinger 1971, Winter 1974, Bregant 1998a, Wagner 2012, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Schöckl SE GRAZ-UMG. [—] 3.10.1972 E. Kreissl leg. [47°11' N, 15°28' E], ☿ [comment: Congruence of locality, date, and collected species between E. Kreissl and Emil Hölzel (Wagner 2012) indicates that both collectors were together in the field].

**Geographic distribution:** 12 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 600-1800 m altitude.
**Relative frequency:** 2.1% of 96 Styrian *Leptothorax* and *Harpagoxenus* records.

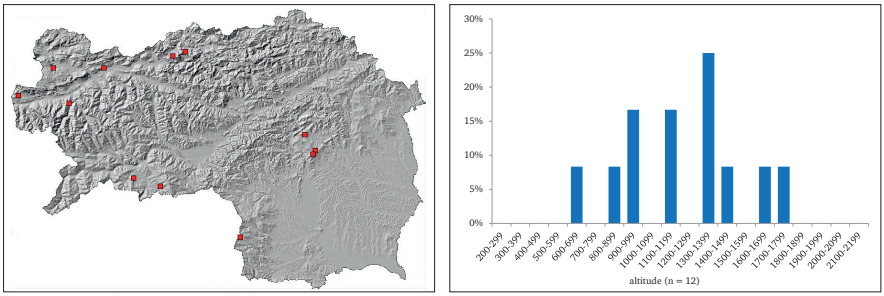


*Fig. 34: Harpagoxenus sublaevis*, horizontal and vertical distribution.

## *Formicoxenus nitidulus* (Nylander, 1846)

**Literature:** Hoffer 1890a sub *Stenamma Westwoodii*, Hoffer 1890b sub *Stenamma Westwoodii* [comment: Hoffer found "*Stenamma Westwoodii*" only in wood-ant mounds. Lubbock (1883), who was cited by Hoffer, captioned a drawing of *Formicoxenus nitidulus* "*Stenamma Westwoodii*" – a mistake which was obviously copied by Hoffer.], Hölzel 1966, Wagner 2012, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Schöcklgebiet E Erhardhöhe 700 m, STMK [—] 13.12.1970 E. Kreissl leg., [47°09' N, 15°26' E], ☿☿, ♀dealate [comment: the putative host is *F. polyctena x rufa*, the only species which was found at the same locality and day]; Pfaffenkogel N-Seite GRAZ-UMG. [—] 12.12.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿ [comment: since one ☿ of *Formica polyctena* has an individual of *Formicoxenus nitidulus* in its mandibles beneath its body, I consider it as its host]; Pfaffenkogel N Graz [—] 6.10.1974 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿, ♀dealate; Erharthöhe [sic; Erhardhöhe is meant] Schöcklgebiet GRAZ-UMG. [—] 3.3.1976 E. Kreissl leg. [—] "*Formicoxen. nitidulus*" [47°09' N, 15°26' E], intermorphs, ♀dealate.
**Geographic distribution:** 11 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1700 m altitude.
**Relative frequency:** Found at 2.8% of 326 Styrian *Formica* s. str. records (following Ölzant 2001 this low value must be explained by insufficient recording).

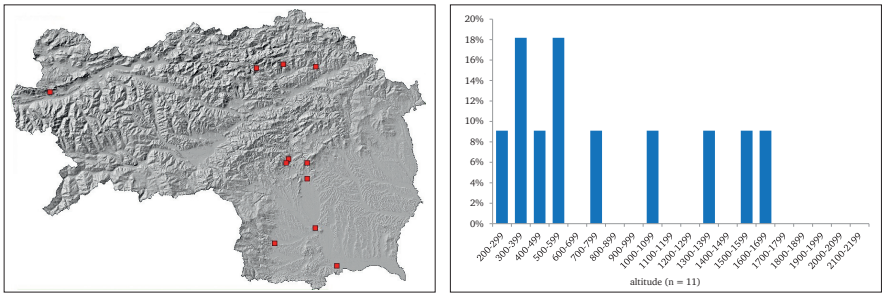


*Fig. 35: Formicoxenus nitidulus*, horizontal and vertical distribution.

## *Temnothorax clypeatus* (Mayr, 1853)

**Literature:** Hölzel 1966 sub *Leptothorax clypeatus*, Bregant 1978 sub *Leptothorax clypeatus*, Bregant 1998a sub *Leptothorax clypeatus*, Wagner 2011b, Wagner 2012, Wagner 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Steiner et al. 2017, Wagner 2019a, Wagner & Zettel 2019.
**Material Universalmuseum Joanneum:** STYRIA, Karnerberg bei Leutschach [—] "*Leptothorax clypeatus* Mayr" [46°40' N, 15°28' E], ☿☿ [comment: published by Bregant (1978) and collected between 1969 and 1977].
**Geographic distribution:** 9 localities. West Styrian hilly Foreland and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 3.1% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

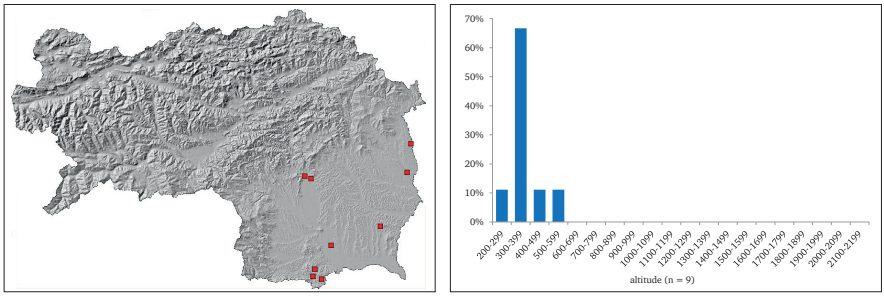


*Fig. 36: Temnothorax clypeatus*, horizontal and vertical distribution.

## *Temnothorax affinis* (Mayr, 1855)

**Literature:** Bregant 1978 sub *Leptothorax affinis*, Friedl 2000 sub *Leptothorax affinis*, Wagner 2011b, Wagner et al. 2012, Wagner 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Steiner et al. 2017, Wagner 2019a.
**Material Universalmuseum Joanneum:** Pfaffenkogel Graz-Umg. STMK [—] 7.4.1968 E. Kreissl leg. [—] "*Leptothorax* …" [47°09' N, 15°18' E], ☿☿; Murau S Graz, STMK [—] 28.5.1968 E. Kreissl leg. [47°00' N, 15°28' E], ☿; Graz-Andritz STMK [—] 10.5.1973 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Graz-Andritz STMK [—] 3.7.1975 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Graz-Andritz STMK [—] 1.5.1977 E. Kreissl leg. [—] "*Leptothorax nylanderi*" [47°06' N, 15°25' E], ☿; Pfaffenkogel N Graz STMK [—] 7.10.1977 E. Kreissl leg. [47°09' N, 15°18' E], ♀dealate; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Leptotho. nigriceps*" [47°00' N, 15°56' E], ☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [—] "*Leptothorax nylanderi*" [47°09' N, 15°18' E], ☿; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08' N, 15°25' E], ☿; Schlossberg b. Wildon S-STMK [—] 3.5.1989 E. Kreissl leg. [46°53' N, 15°30' E], ♀dealate; Haselleitgraben STMK, NE Jasen Ahorn [—] 5.2.1990 E. Kreissl leg. [47°09' N, 15°22' E], ♀dealate.
**Geographic distribution:** 23 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 8.4% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

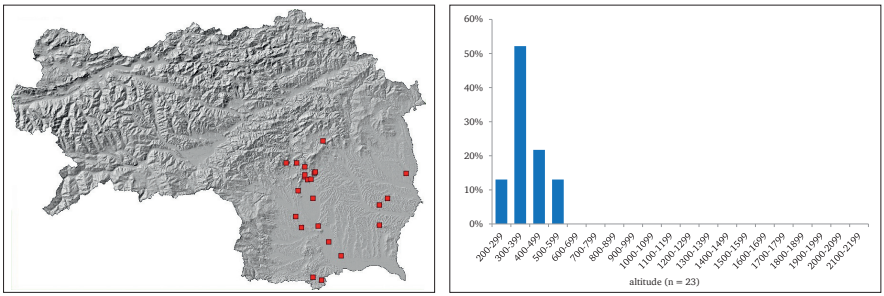


*Fig. 37: Temnothorax affinis*, horizontal and vertical distribution.

## *Temnothorax corticalis* (Schenck, 1852)

**Literature:** Wagner 2008, Wagner 2011b, Wagner 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Graz-Andritz STMK [—] 2.6.1967 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Murau S Graz, STMK [—] 28.5.1968 E. Kreissl leg. [47°00' N, 15°28' E], ☿; St. Radegund Schöcklgebiet GRAZ-UMG. [—] 4.7.1977 E. Kreissl leg. [47°10' N, 15°29' E], ☿.

**Geographic distribution:** 7 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-800 m altitude.
**Relative frequency:** 2.7% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

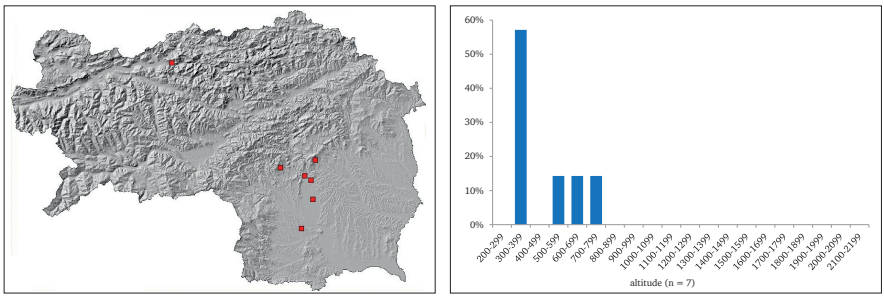


*Fig. 38: Temnothorax corticalis*, horizontal and vertical distribution.

## *Temnothorax interruptus* (Schenck, 1852)

**Literature:** Wagner et al. 2010, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿, ♀ dealate; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.3.1974 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 26.2.1990 E. Kreissl leg. [47°09' N, 15°18' E], ☿, ♀ dealate.
**Geographic distribution:** 5 localities. Styrian Border Mountains and East Styrian hilly Foreland. 300-600 m altitude.
**Relative frequency:** 1.1% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

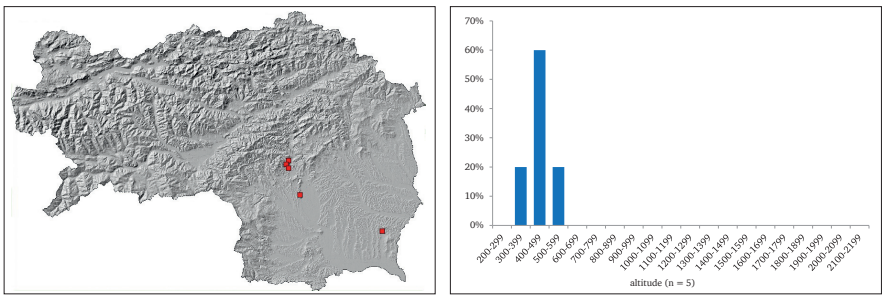


*Fig. 39: Temnothorax interruptus*, horizontal and vertical distribution.

## *Temnothorax nigriceps* (Mayr, 1855)

**Literature:** Bregant 1998a sub *Leptothorax nigriceps* and *Leptothorax sordidulus*, Wagner 2008, Wagner 2009, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Wagner 2014, Wagner et al. 2016, Steiner et al. 2017, Wagner & Zettel 2019.
**Material Universalmuseum Joanneum:** Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿, ♀dealate; Pfaffenkogel NE-Fuß GRAZ-UMG [—] 21.2.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel NE-Fuß GRAZ-UMG. [—] 8.5.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 15.8.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Teichalmgeb. Osser E-STMK [—] 24.6.1975 E. Kreissl leg. [47°20' N, 15°30' E], ☿☿; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [47°21' N, 15°04' E], ☿☿; Schloß Herberstein E-STMK, 410 m [—] 19.5.1979 E. Kreissl leg. 19.5.1979 [sic; date is given twice] [—] "*Leptothorax nigriceps*" [47°12' N, 15°48' E], ☿☿; Styria, Graz XII. St. Veit, Böschungsmauer, 400 m [—] Nr. 91-278 28.7.1991 Kreissl leg. [47°06' N, 15°24' E], ☿☿; Graz-Andritz STMK [—] 6.10.1991 E. Kreissl leg. [47°06' N, 15°25' E], ☿.
**Geographic distribution:** 27 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-1300 m altitude.
**Relative frequency:** 9.9% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

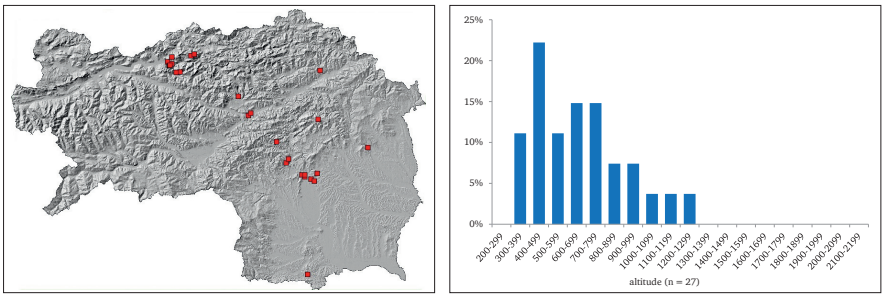


*Fig. 40: Temnothorax nigriceps*, horizontal and vertical distribution.

## *Temnothorax tuberum* (Fabricius, 1775)

**Literature:** Hölzel 1966 sub *Leptothorax tuberum tuberum*, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. Northern Alps. 700-800 m altitude.
**Relative frequency:** 0.4% of 262 Styrian *Temnothorax* and *Myrmoxenus* records. This species is much rarer in eastern than in western Austria (see also Wagner 2014).

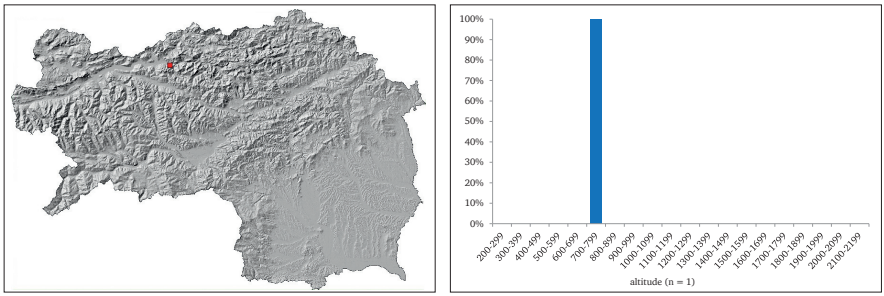


*Fig. 41: Temnothorax tuberum*, horizontal and vertical distribution.

### *Temnothorax albipennis* (Curtis, 1854)

**Literature:** None. New species for Styria!
**Material Universalmuseum Joanneum:** Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Leptothor. tuberum*" [47°00' N, 15°56' E], ☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Leptothorax nylanderi*" [47°00' N, 15°56' E], ♀dealate.
**Geographic distribution:** 1 locality. East Styrian hilly Foreland. 300-400 m altitude.
**Relative frequency:** 0.4% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

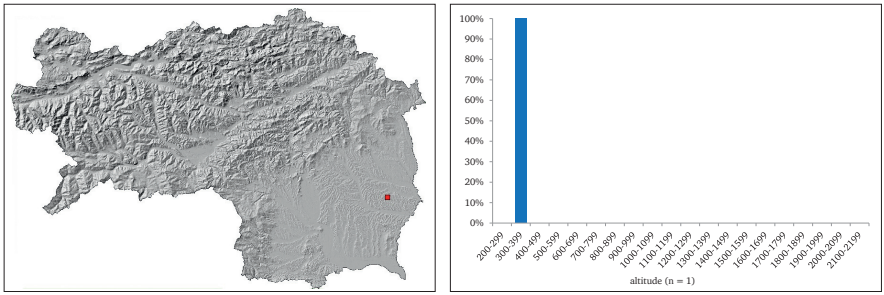


*Fig. 42: Temnothorax albipenis*, horizontal and vertical distribution.

*Fig. 43:* A nest of *Temnothorax albipennis* – this is a new species for Styria detected in the collection of the Universalmuseum Joanneum. Photo: B. Seifert.

### *Temnothorax unifasciatus* (Latreille, 1798)

**Literature:** Hoffer 1890a sub *Leptothorax unifasciatus*, Hoffer 1890b sub *Leptothorax unifasciatus*, Friedl 2000 sub *Leptothorax unifasciatus*, Wagner 2008, Wagner 2009, Wagner 2011a, Wagner 2011b, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** Pfaffenkogel N Graz STMK [—] 18.5.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09' N, 15°18' E], ☿☿, ♀dealate; Styria, S Ruine Ehrenfels NNE Graz, Südhang, 720 m, Felsstelle [—] 47°10'N/15°28'E Zoodat: 164:8/O=47,17N/15,47E [—] Prot. 70-G176 11.10.1970 E. Kreissl leg. [47°10' N, 15°28' E], ☿☿; Pfaffenkogel NE-Fuß GRAZ-UMG. [—] 8.5.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 14.3.1972 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel N Graz, STMK [—] 8.7.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Mitteregg Sausal S-STMK [—] 24.6.1973 E. Kreissl leg. [46°48' N, 15°26' E], ☿☿; Adelsberg OB-STMK [—]

13.4.1976 E. Kreissl leg. [—] "*Leptoth. tuberum*" [47°06' N, 14°22' E], ♀dealate; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] "*Leptothorax unifasciatus*" [47°02' N, 14°26' E], ☿☿; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09' N, 15°18' E], ♀dealate; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] "*Leptothorax unifasciatus*" [47°00' N, 15°56' E], ☿; Oberwölz, 850 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12' N, 14°17' E], ☿☿; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 3.4.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿, ♀dealate; Frohnleiten E-Rabenstein STMK. [—] 15.9.1987 E. Kreissl leg. T 33 912 [47°15' N, 15°18' E], ☿☿; Weiz NW Katerloch 880 m, STMK [—] 27.10.1987 E. Kreissl leg. [47°15' N, 15°32' E], ☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 26.2.1990 E. Kreissl leg. [47°09' N, 15°18' E], ☿.
**Geographic distribution:** 50 localities. All landscape units. 200-1200 m altitude.
**Relative frequency:** 18.3% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

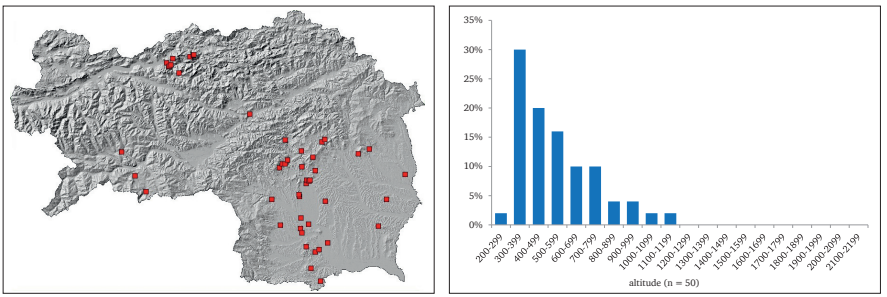


*Fig. 44: Temnothorax unifasciatus*, horizontal and vertical distribution.

## *Temnothorax crassispinus* (Karavajev, 1926)

**Literature:** Hölzel 1966 sub *Leptothorax nylanderi*, Glaser 1997, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Graz, "Rosenberg" Styr. "21.3.[19]31" [—] "*Leptothorax Nylanderi* Gysy" Hölzel det. [—] Inv. Nr. T 30 354 [47°07' N, 15°28' E], ♀ dealate; Leibnitz, Stmk. "Kreuzkogl" [sic; Kreuzkogel is meant] [/] "6.IX.1949" [—] 1305 [46°47' N, 15°30' E], ☿; nördl. Umgb. Graz St., leg. E. Bregant [—] Weinitzen "19.3.1959" [—] Inv. Nr. T 30 352 [47°08' N, 15°29' E], ☿☿; Gleichenberg O-STMK [—] 28.5.1959 E. Kreissl leg. [46°53' N, 15°54' E], ☿☿; Weinitzen Graz-Umg. [—] 22.4.1963 E. Kreissl leg. [47°08' N, 15°29' E], ☿☿, ♀dealate; Plesch Graz-Umg. STMK [—] 13.6.1965 E. Kreissl leg. [—] "*Leptothor. nylanderi*" [47°08' N, 15°13' E], ☿☿; Buchkogel b. Graz, STMK 550-630 m [—] 19.6.1965 E. Kreissl leg. [47°02' N, 15°22' E], ☿☿; Buchkogel W Graz STMK [—] 19.6.1965 E. Kreissl leg. [—] "*Leptothor. nylanderi*" [47°02' N, 15°22' E], ☿☿; Wildonerberg STMK [—] 25.6.1965 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Badlgraben N Graz STMK [—] 28.6.1965 E. Kreissl leg. [47°13' N, 15°21' E], ☿☿; Lampers-

berg-St. Radegund N Graz [—] 19.8.1965 E. Kreissl leg. [47°10' N, 15°29' E], ☿, ♀ dealate; Rohrerberg Graz St. Veit STMK Eiche gesiebt [—] 9.1.1966 E. Kreissl leg. [47°07' N, 15°25' E], ☿☿; Graz-Andritz STMK, Eiche ges. [—] 13.2.1966 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Rannachergebiet STMK, Eiche [—] 20.2.1966 E. Kreissl leg. [47°08' N, 15°23' E], ☿☿; Graz-Andritz STMK, Eiche ges. [—] 26.2.1966 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Badlgraben N Graz STMK [—] 22.5.1966 W. [sic; Kreissl's first name was Erich] Kreissl leg. [47°13' N, 15°21' E], ☿; Sausal SW STMK [—] 30.10.1966 E. Kreissl leg. [46°47' N, 15°25' E], ♀ dealate; Kanzel N Graz [—] 17.4.1967 E. Kreissl leg. [47°07' N, 15°22' E], ☿☿; Klöch SE-STMK [—] 1967 E. Kreissl leg. [46°45' N, 15°57' E], ☿☿; Schloß Seggau S-STMK [—] 23.6.1967 E. Kreissl leg. [46°46' N, 15°31' E], ☿☿; Graz-Andritz STMK [—] 17.12.1967 E. Kreissl leg. [47°06' N, 15°25' E], ☿, ♀ dealate; Graz-Andritz STMK [—] 31.1.1968 E. Kreissl leg. [47°06' N, 15°25' E], ☿, ♀♀ dealate; Graz-Andritz STMK [—] 4.2.1968 E. Kreissl leg. [47°06' N, 15°25' E], ♀ dealate; Graz-Andritz STMK [—] 22.3.1968 E. Kreissl leg. [47°06' N, 15°25' E], ♀ dealate; Stift Rein GRAZ-UMG. [—] 30.3.1968 E. Kreissl leg. [47°08' N, 15°17' E], ☿; Graz-Andritz STMK [—] 10.4.1968 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿, ♀♀ dealate; Graz-Andritz STMK [—] 27.8.1968 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Peggau GRAZ-UMG. [—] 21.9.1968 E. Kreissl leg. [47°12' N, 15°21' E], ☿☿, ♀ alate; Graz-Andritz STMK [—] 21.11.1968 E. Kreissl leg. [47°06' N, 15°25' E], ☿, ♀ dealate; Rein-Enzenbach, GRAZ-UMG. [—] 5.3.1969 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿, ♀ dealate; Plattengebiet-Oberweizbach Graz, STMK [—] 18.4.1970 E. Kreissl leg. [47°06' N, 15°28' E], ☿☿, ♀♀ dealate; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10' N, 15°28' E], ♀ dealate; Mühlbachgraben Enzenbach GRAZ-UMG. [—] 28.10.1970 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿; Arnfels-Leutschach S-STMK [—] 28.11.1970 E. Kreissl leg. [46°40' N, 15°26' E], ☿☿; Pfaffenkogel NE-Fuß GRAZ-UMG [—] 21.2.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿, ♀♀ dealate; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 14.3.1971 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿; Pfaffenkogel über Enzenbach GRAZ-UMG [—] 9.4.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 9.4.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel über Enzenbach GRAZ-UMG. [—] 9.4.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Schöckl N-Seite GRAZ-UMG. [—] 21.4.1971 E. Kreissl leg. [47°12' N, 15°27' E], ☿; Pfaffenkogel NE-Fuß GRAZ-UMG. [—] 8.5.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel Stübing STMK. [—] 8.5.1971 E. Kreissl leg. [47°09' N, 15°18' E], ♀♀ dealate; Wildonerberg Buchkogelgebiet STMK [—] 27.6.1971 E. Kreissl leg. [46°52' N, 15°30' E], ☿☿, ♀ dealate; Ruine Gösting N Graz [—] 12.8.1971 E. Kreissl leg. [47°06' N, 15°22' E], ♀ alate; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ♀ dealate; Pfaffenkogel N Graz [—] 3.10.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Hauenstein NE Graz STMK [—] 620 m 8.3.1972 E. Kreissl leg. [47°07' N, 15°29' E], ☿☿; Schlossberg b. Wilson S Graz [—] 28.3.1972 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.1972 "632" [—] "*Leptothorax nylanderi*" [47°09' N, 15°17' E], ☿☿; Kapfenstein E-STMK [—] 1.6.1972 E. Kreissl leg. [46°53' N, 15°58' E], ☿☿, ♀♀ dealate; Murberg NNE Wildon S Graz [—] 24.9.1972 E. Kre-

issl leg. [46°56' N, 15°30' E], ☿; Waldschacherteiche Sausal, W-STMK [—] 1.11.1972 E. Kreissl leg. [46°49' N, 15°24' E], ☿; Schloßberg b. Wildon S-STMK [—] 20.5.1973 E. Kreissl leg. [46°53' N, 15°30' E], ☿; St. Nikolai im Sausal W-STMK [—] 24.6.1973 E. Kreissl leg. [46°49' N, 15°27' E], ☿; Freienberger Klamm STMK [—] 10.8.1973 E. Kreissl leg. [47°14' N, 15°46' E], ☿; Mandlkogel Sausal S-STMK [—] 9.10.1973 E. Kreissl leg. [46°47' N, 15°25' E], ☿☿; Bubenberg SSE Spielberg S-STMK, 270 m [—] 21.10.1973 E. Kreissl leg. [46°41' N, 15°38' E], ☿☿, ♀dealate; Nikolaiberg Sausal S-STMK [—] 24.10.1973 E. Kreissl leg. [46°49' N, 15°26' E], ☿☿, ♀♀dealate; Weizgraben NE Weiz E-STMK [—] 14.11.1973 E. Kreissl leg. [47°16' N, 15°34' E], ♀dealate; Pfaffenkogel NW Fuß GRAZ-UMG. [—] 15.11.1973 E. Kreissl leg. [47°10' N, 15°18' E], ☿☿; Hausberg, SSW Semriach GRAZ-UMG. [—] 28.11.1973 E. Kreissl leg. [47°12' N, 15°23' E], ☿☿, ♀dealate; Graz-Andritz STMK [—] 14.12.1973 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Wildpark Herberstein E-STMK [—] 16.6.1974 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿; Freienberger Klamm E-STMK [—] 26.3.1975 E. Kreissl leg. [—] "*Leptoth. nylanderi*" [47°14' N, 15°46' E], ♀dealate; Pfaffenkogel GRAZ-UMG. [—] 30.4.1975 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Wildoner Schloßberg S-STMK [—] 18.5.1975 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Einödgraben Schöcklgebiet GRAZ-UMG. [—] 30.7.1975 E. Kreissl leg. [—] "*Leptothor. Nylanderi*" [47°07' N, 15°26' E], ☿; Oberschöcklbach GRAZ-UMG. [—] 30.7.1975 E. Kreissl leg. [47°08' N, 15°28' E], ☿☿; Oberschöckl GRAZ-UMG. [—] 31.7.1975 E. Kreissl leg. [—] "*Leptothorax nylanderi*" [47°09' N, 15°28' E], ☿; Stübinggraben GRAZ-UMG. [—] 12.8.1975 E. Kreissl leg. [47°11' N, 15°16' E], ☿☿, ♀♀dealate; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [—] "*Leptothor. tuberum*" [46°50' N, 15°58' E], ☿; Mitteregg Sausal W-STMK [—] 23.4.1977 E. Kreissl leg. [46°48' N, 15°26' E], ☿, ♀dealate; Pfaffenkogel N Graz STMK [—] 7.10.1977 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿, ♀dealate; St. Ulrich b. Rein 550 m, Felsgruppe gesiebt STMK. [—] 8.3.1978 E. Kreissl leg. [47°08' N, 15°16' E], ♀dealate; Pfaffenkogel Stübing 420 m, STMK. um Baum gesiebt [—] 22.3.1978 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Klamm Stubenberg Hartberg STMK. Mischwald gesiebt [—] 3.5.1978 E. Kreissl leg. [47°14' N, 15°47' E], ☿☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] 31. Jan. 1980 [/] "*Leptoth. nyland*." [47°09' N, 15°18' E], ☿; Riegersburg N-Seite E-STMK [—] 14.9.1978 E. Kreissl leg. [47°00' N, 15°56' E], ♀dealate; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [46°53' N, 15°58' E], ☿☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Leptoth. nylanderi*" [46°53' N, 15°58' E], ♀dealate; Riegersburg N-Seite E-STMK [—] 14.9.1978 E. Kreissl leg. [47°00' N, 15°56' E], ♀dealate; Riegersburg N-Seite E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Leptothor. nylanderi*" [47°00' N, 15°56' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 18.5.1979 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [—] "3.10.1979 [/] *Leptothorax nylanderi*" [47°09' N, 15°18' E], ☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; S Peggauer Wand, 430 m GRAZ-UMG [—] 7.8.1979 E. Kreissl leg. [47°11' N, 15°21' E], ☿☿; Pfaffenkogel b. Stübing, 410 m GRAZ-UMG. [—] 8.10.1979 E. Kreissl leg. [47°09' N, 15°18' E], ♀dealate; Pfaffenkogel b. Stübing, 410 m GRAZ-UMG. [—] 8.10.1979 E. Kre-

issl leg. [—] "*Leptoth. nyland*." [47°09' N, 15°18' E], ♀dealate; WNW St. Ulrich b. Rein, 550 m GRAZ-UMG. [—] 13.2.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿, ♀dealate; Mühlbachgraben b. Rein, 460 m GRAZ-UMG. [—] 23.4.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Annengraben NE Graz STMK, 420 m [—] 12.8.1980 E. Kreissl leg. [47°07' N, 15°26' E], ☿; ENE Rein, 430 m GRAZ-UMG. [—] 9.3.1981 E. Kreissl leg. [47°08' N, 15°18' E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 30.9.1981 E. Kreissl leg. [47°09' N, 15°18' E], ♀dealate; Schlossberg b. Wildon, 400 m STMK [—] 22.5.1983 E. Kreissl leg. [46°53' N, 15°30' E], ☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42' N, 15°37' E], ☿; Teigitschgraben 300 m, STMK gesiebt T 33.067 [—] 9.8.1984 E. Kreissl leg. [47°01' N, 15°10' E], ☿; S Mahorko S STMK [—] 31.5.1986 E. Kreissl leg. [46°40' N, 15°32' E], ☿☿, ♀♀dealate; Hohenberg NNW-Graz STMK. [—] 1.4.1987 E. Kreissl leg. T 33 769 [47°09' N, 15°27' E], ☿☿, ♀dealate; Schlossberg b. Wildon NW-Hang STMK [—] 14.5.1987 E. Kreissl leg. T 33.801 [46°53' N, 15°30' E], ☿☿, ♀♀dealate; Sulm SW Leibnitz a. d. Altenmarkter-Brücke 266 m, STMK [—] 3.7.1987 E. Kreissl leg. [46°46' N, 15°32' E], ☿☿; Graz-Andritz Schöcklbach STMK [—] 8.8.1987 E. Kreissl leg. T 33 875 [47°08' N, 15°28' E], ☿; Weinitzen Graz-Andritz STMK [—] 21.4.1988 E. Kreissl leg. [47°08' N, 15°29' E], ☿☿, ♀dealate; Aflenz a. d. Sulm, 300 m S-STMK [—] 10.6.1988 E. Kreissl leg. [46°45' N, 15°32' E], ☿☿; Wiesberg NNW Leibnitz, 350 m S-STMK [—] 28.6.1988 E. Kreissl leg. [46°47' N, 15°31' E], ☿, ♀dealate; Kainach b. Wildon S-STMK [—] 3.5.1989 E. Kreissl leg. [46°53' N, 15°29' E], ☿; Schlossberg b. Wildon S-STMK [—] 3.5.1989 E. Kreissl leg. [46°53' N, 15°30' E], ♀♀dealate.

**Geographic distribution:** 129 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1100 m altitude.

**Relative frequency:** 48.9% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

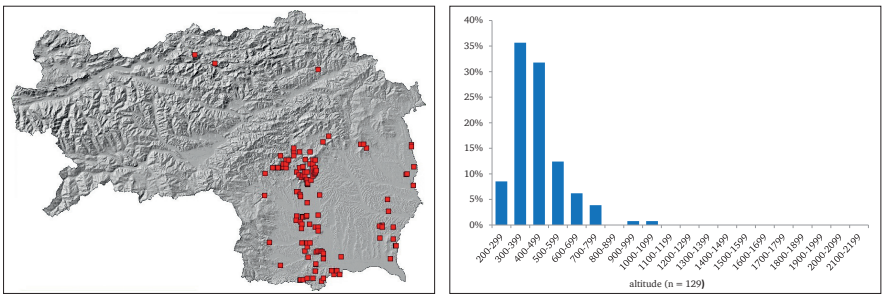


*Fig. 45: Temnothorax crassispinus*, horizontal and vertical distribution.

## *Temnothorax sordidulus* (Müller, 1923)

**Literature:** Bregant 1998a sub *Leptothorax sordidulus*, Borovsky & Kunz 2016, Wagner 2019b.
**Material Universalmuseum Joanneum:** Graz-Andritz Felder südöstl. St. Gotthard STMK. [—] 21.3.1970 Dr. Turek leg. det. E. Kreissl [—] "aus e 70-02 Dr. Turek" [47°06' N, 15°24' E], ☿; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [47°21' N, 15°04' E], ☿☿; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [47°02' N, 14°26' E], ☿.
**Geographic distribution:** 6 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 300-800 m altitude.
**Relative frequency:** 1.1% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

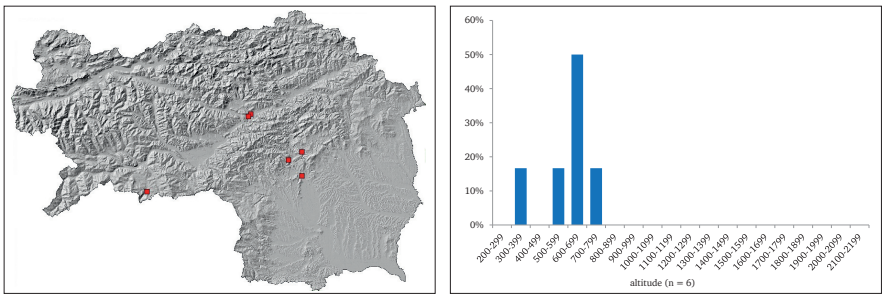


*Fig. 46: Temnothorax sordidulus*, horizontal and vertical distribution.

## *Temnothorax saxonicus* (Seifert, 1995)

**Literature:** Österreichische Gesellschaft für Ameisenkunde 1995 sub *Leptothorax sordidulus*, Seifert 2006b, Wagner 2014, Wieser & Trummer 2014, Steiner et al. 2017, Seifert 2018, Wagner 2019b.
**Material Universalmuseum Joanneum:** Weizklamm GRAZ-UMG. [—] 6.7.1977 E. Kreissl leg. [47°16' N, 15°34' E], ☿; Riegersburg N-Seite E-STMK [—] 14.9.1978 E. Kreissl leg. [47°00' N, 15°56' E], ☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] „*Leptothor. nylanderi*" [47°00' N, 15°56' E], ☿.
**Geographic distribution:** 8 localities. Styrian Border Mountains and East Styrian hilly Foreland. 300-700 m altitude.
**Relative frequency:** 2.7% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

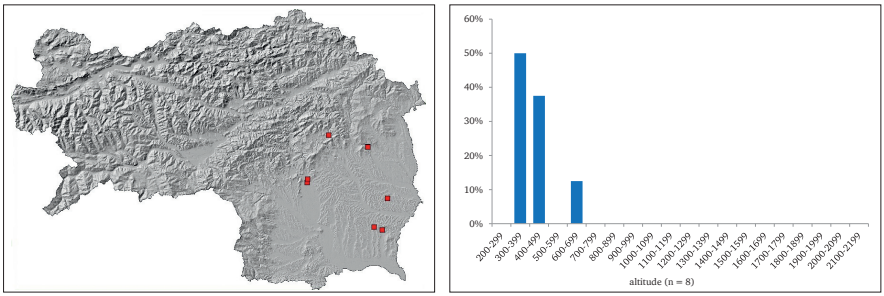


*Fig. 47: Temnothorax saxonicus*, horizontal and vertical distribution.

## *Temnothorax parvulus* (Schenck, 1852)

**Literature:** Kinzner & Wagner 2014, Kirchmair et al. 2017 sub cf. *parvulus*, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** Mühlbachgraben Enzenbach GRAZ-UMG. [—] 28.10.1970 E. Kreissl leg. [47°09' N, 15°17' E], ♀dealate; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ♀♀dealate; Wildpark Herberstein E-STMK [—] 16.6.1974 E. Kreissl leg. [47°13' N, 15°48' E], ♀dealate; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09' N, 15°18' E], ♀dealate; Fuß d. Peggauer Wand GRAZ-UMG. [—] 16.10.1979 E. Kreissl leg. [47°12' N, 15°20' E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 30.9.1981 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿, ♀♀dealate; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 3.4.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 26.2.1990 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿.
**Geographic distribution:** 7 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-600 m altitude.
**Relative frequency:** 2.7% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

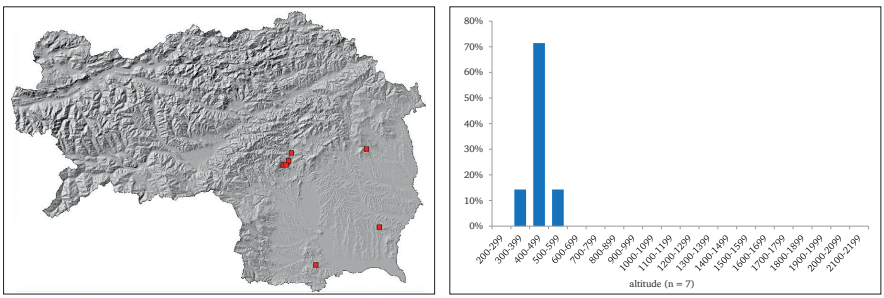


*Fig. 48: Temnothorax parvulus*, horizontal and vertical distribution.

## *Myrmoxenus ravouxi* (André, 1896)

**Literature:** Wagner et al. 2010, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 5 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 0.4% of 262 Styrian *Temnothorax* and *Myrmoxenus* records.

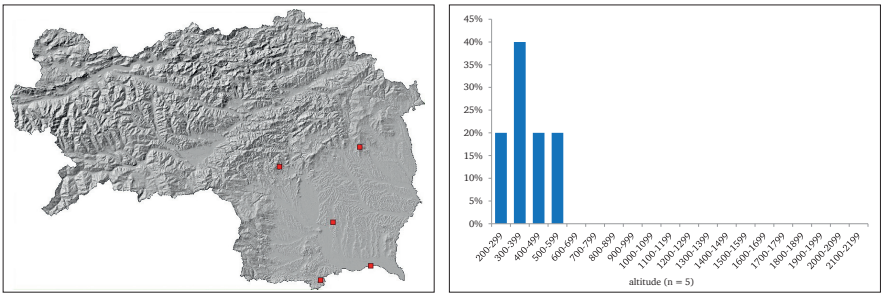


*Fig. 49: Myrmoxenus ravouxi*, horizontal and vertical distribution.

## *Stenamma debile* (Foerster, 1850)

**Literature:** Hölzel 1966 sub *westwoodi*, Glaser 1997, Schlick-Steiner & Steiner 2004, Wagner 2011a, Wagner 2011b, Ebermann & Krisper 2014, Wagner 2014, Wagner et al. 2015, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Gleichenberg O-STMK [—] 28.5.1959 E. Kreissl leg. [46°53' N, 15°54' E], ☿☿; Bad Gleichenberg E-STMK 29.5.1959 [46°52' N, 15°54' E], ☿; STYRIA; südl. Koralpengebiet leg. E. Kreissl [—] Umgebung von St. Oswald o. E. 14. Sept. 1961 [—] gesiebt unter *Castanea sativa* [—] 68-Hym z oo5 [46°42' N, 15°08' E], ♀dealate; STYRIA; südl. Koralpengebiet leg. E. Kreissl [—] Umgebung von St. Oswald o. E. 14. Sept. 1961 [—] gesiebt unter *Castanea sativa* [—] 68-Hym z oo3 [46°42' N, 15°08' E], ☿; STYRIA; südl. Koralpengebiet leg. E. hölzel [sic; Hölzel's last name in lower case] [—] Umgebung von St. Oswald o. E. 16. Sept. 1961 [—] 68-Hym z o12 [46°42' N, 15°08' E], ♀dealate; STYRIA Grazer Bergland leg. E. Kreissl [—] Rannachgebiet Admonterkogel Nordostseite [—] ca. 510 m 11.IX.1962 [—] gesiebt unter *Fagus silvatica* [—] 68-Hym z 237 [47°07' N, 15°23' E], ♀dealate; STYRIA Grazer Bergland leg. E. Kreissl [—] Rannachgebiet Admonterkogel Nordostseite [—] ca. 510 m 11.IX.1962 [—] gesiebt unter *Fagus silvatica* [—] 68-Hym z 236 [—] „*Stenamma Westwoodi* ?" [47°07' N, 15°23' E], ♀dealate; Admonterkogel N Graz STMK [—] 8.5.1965 E. Kreissl leg. [47°06' N, 15°23' E], ☿☿; Kulm Stubenberg E-STMK [—] 29.5.1965 E. Kreissl leg. [—] „*Stenamma Westwoodi*" [47°13' N, 15°46' E], ☿☿; Plesch Graz-Umg. STMK [—]

13.6.1965 E. Kreissl leg. [47°08' N, 15°13' E], ☿☿; Buchkogel W Graz STMK [—] 19.6.1965 E. Kreissl leg. [—] „*Stenamma Westwoodi*" [47°02' N, 15°22' E], ☿☿; Buchkogel b. Graz, STMK 550-630 m [—] 19.6.1965 E. Kreissl leg. [47°02' N, 15°22' E], ☿☿; Pailgraben N Graz [—] 22.6.1965 E. Kreissl leg. [47°07' N, 15°23' E], ♀dealate; Pailgraben N Graz [—] 22.6.1965 E. Kreissl leg. [47°07' N, 15°23' E], ☿☿; Badlgraben N Graz STMK [—] 28.6.1965 E. Kreissl leg. [47°13' N, 15°21' E], ☿, ♀♀dealate; Radlberggr. S-STMK [—] 15.10.1966 E. Kreissl leg. [46°38' N, 15°14' E], ☿☿, ♀♀dealate; Radlpaß S-STMK [—] 15.10.1966 E. Kreissl leg. [46°38' N, 15°12' E], ☿☿; Peggau N Graz, STMK [—] 12.-22.10.1966 E. Kreissl leg. [47°12' N, 15°21' E], ☿; Sausal SW STMK [—] 30.10.1966 E. Kreissl leg. [46°47' N, 15°25' E], ♀dealate; Klöch SE-STMK [—] 1967 E. Kreissl leg. [46°45' N, 15°57' E], ☿☿, ♀dealate; SE Spielfeld Windische Bühel S-STMK [—] 17.4.1968 E. Kreissl leg. [46°41' N, 15°38' E], ☿, ♀♀dealate; Plattengebiet-Oberweizbach Graz, STMK [—] 18.4.1970 E. Kreissl leg. [47°06' N, 15°28' E], ☿☿; Pfaffenkogel Stübing STMK. [—] 28.10.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Arnfels-Leutschach S-STMK [—] 28.11.1970 E. Kreissl leg. [46°40' N, 15°26' E], ☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 9.4.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel über Enzenbach GRAZ-UMG. [—] 9.4.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Pfaffenkogel Stübing STMK. [—] 8.5.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Wildonerberg Buchkogelgebiet STMK [—] 27.6.1971 E. Kreissl leg. [46°52' N, 15°30' E], ☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel N Graz [—] 3.10.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Kapfenstein E-STMK [—] 1.6.1972 E. Kreissl leg. [46°53' N, 15°58' E], ☿☿; Murberg NNE Wildon S Graz [—] 24.9.1972 E. Kreissl leg. [46°56' N, 15°30' E], ☿; Schloßberg b. Wildon S-STMK [—] 20.5.1973 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Schloßberg b. Wildon S-STMK [—] 23.5.1973 E. Kreissl leg. [46°53' N, 15°30' E], ♀dealate; Eibiswald-St. Lorenzen KORALPENGEBIET [—] 3.6.1973 E. Kreissl leg. [46°39' N, 15°10' E], ♀♀dealate; St. Lorenzen südl. Koralpengeb., Eibiswald [—] 3.6.1973 E. Kreissl leg. [—] „73-62 Ges. 3.6.1973" [46°39' N, 15°10' E], ☿; St. Nikolai im Sausal W-STMK [—] 24.6.1973 E. Kreissl leg. [46°49' N, 15°27' E], ☿; Demmerkogel Sausal S-STMK [—] 24.6.1973 E. Kreissl leg. [46°47' N, 15°25' E], ☿☿, ♀dealate; Buchberg NW Herberstein E-STMK [—] 17.7.1973 E. Kreissl leg. [47°13' N, 15°48' E], ☿; Freienberger Klamm STMK [—] 10.8.1973 E. Kreissl leg. [47°14' N, 15°46' E], ☿☿; Mandlkogel Sausal S-STMK [—] 9.10.1973 E. Kreissl leg. [46°47' N, 15°25' E], ☿; Bubenberg SSE Spielberg S-STMK, 270 m [—] 21.10.1973 E. Kreissl leg. [46°41' N, 15°38' E], ☿☿; WSW Langegg NW-Hang, 350 m S-STMK [—] 21.10.1973 E. Kreissl leg. [46°38' N, 15°31' E], ☿☿; W Leutschach Windisch Bühel S-STMK [—] 21.10.1973 E. Kreissl leg. [46°39' N, 15°27' E], ☿; Radlpass Radlberg S-STMK [—] 22.10.1973 E. Kreissl leg. [46°38' N, 15°14' E], ☿; Remschnigg S-STMK 500-600 m [—] 23.10.1973 E. Kreissl leg. [46°39' N, 15°25' E], ♀dealate; Wildoner Schloßberg S-STMK [—] 18.5.1975 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Höfbach Schöcklgebiet [—] 8.8.1975 E. Kreissl leg. [—] „*Stenamma westwoodi*" [47°07' N, 15°29' E], intermorph; Ruine Gleichenberg E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Stenamma westwoodi*" [46°53' N, 15°53' E], ☿; Mitteregg Sausal W-STMK [—] 23.4.1977 E. Kreissl leg. [46°48' N, 15°26' E], ☿; Wildonerberg S Graz STMK [—] 20.5.1977 E. Kreissl leg. [—] „*Stenam-*

*ma westwoodi*“ [46°53’ N, 15°30’ E], ☿; Klamm Stubenberg Hartberg STMK. Mischwald gesiebt [—] 3.5.1978 E. Kreissl leg. [47°14’ N, 15°47’ E], ☿☿; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Stenamma Westwoodi*“ [47°02’ N, 14°26’ E], ☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Tetram. caespit*.“ [47°01’ N, 14°24’ E], ♀dealate; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [47°01’ N, 14°24’ E], ♀dealate; Hörgasgraben b. Rein GRAZ-UMG. [—] 17.7.1978 E. Kreissl leg. [47°10’ N, 15°16’ E], ☿☿; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] 31. Jan. 1980 [/] „*Stenamma westwoodi*“ [47°09’ N, 15°18’ E], ☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [46°53’ N, 15°58’ E], ☿; Riegersburg N-Seite E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Stenamma westwoodi*“ [47°00’ N, 15°56’ E], ☿; E. Schloß Herberstein E-STMK, 370 m [—] 13.4.1979 E. Kreissl leg. [47°12’ N, 15°49’ E], ☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 18.5.1979 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿, ♀dealate; Kastengraben Rein STMK. [—] 26.4.1980 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿; Schlossberg b. Wildon, 400 m STMK [—] 22.5.1983 E. Kreissl leg. [46°53’ N, 15°30’ E], ☿; Königskogel b. Tieschen E-STMK [—] 31.5.1983 E. Kreissl leg. [46°47’ N, 15°57’ E], ☿☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42’ N, 15°37’ E], ☿☿; Spielfeld-Ehrenhausen S-STMK [—] 15.5.1984 E. Kreissl leg. [46°43’ N, 15°35’ E], ☿, ♀♀ dealate; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42’ N, 15°37’ E], ♀dealate; St. Ulrich b. Rein STMK [—] 14.6.1984 E. Kreissl leg. [47°08’ N, 15°16’ E], ☿; Ruine Peggau GRAZ-UMG. [—] 4.4.1985 E. Kreissl leg. [47°12’ N, 15°21’ E], ☿; Schlossberg b. Wildon NW-Hang STMK [—] 14.5.1987 E. Kreissl leg. T 33.801 [46°53’ N, 15°30’ E], ☿☿; Leutschach Ruine Schmirnberg STMK [—] 16.6.1987 E. Kreissl leg. [46°37’ N, 15°29’ E], ♀♀dealate; Frohnleiten N-Rabenstein STMK. [—] 15.9.1987 E. Kreissl leg. T 33 912 [47°15’ N, 15°18’ E], ☿☿; Aflenz a. d. Sulm, 300 m S-STMK [—] 10.6.1988 E. Kreissl leg. [46°45’ N, 15°32’ E], ☿☿; Kastengraben b. Rein, 600 m GAZ-UMG. [sic; GRAZ-UMG. is meant] [—] 26.4.1990 E. Kreissl leg. [47°08’ N, 15°15’ E], ♀dealate; Rabenstein STMK. v. Felsen 15.7.1991 E. Kreissl leg. [—] „*Stenamma Westwoodi*“ [47°15’ N, 15°18’ E], ☿; Pfanghofweg Graz-Andritz 400 m, STMK. Mischwald [—] 9.4.1992 E. Kreissl [47°06’ N, 15°26’ E], ☿.

**Geographic distribution:** 66 localities. All landscape units. 200-1000 m altitude.
**Relative frequency:** 59.8% of 107 Styrian records of *Myrmecina* and *Stenamma*.

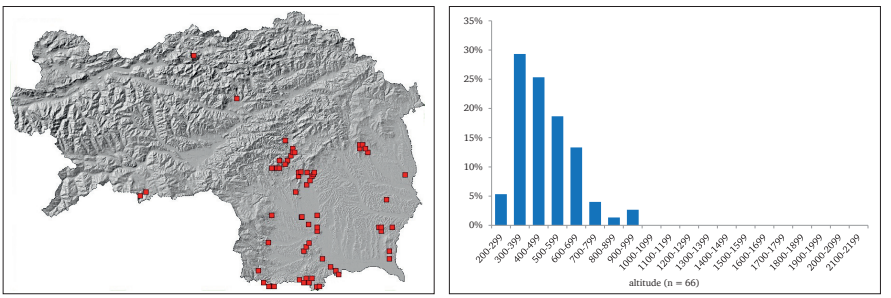


*Fig. 50: Stenamma debile*, horizontal and vertical distribution.

### *Tetramorium caespitum* (Linnaeus, 1758)

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Hoffer 1907, Hölzel 1936, Ritter 1953, Hölzel 1966, Bregant 1978 sub spec., Ebermann 1980, Friedrich & Winder 1993, Glaser 1997, Schlagbauer 1997, Neuhäuser-Happe & Fritz 1998, Friedl 2000, Frieß et al. 2010 sub cf. *caespitum*, Wagner et al. 2010 sub cf. *caespitum*, Wagner 2011a sub *caespitum* and cf. *caespitum*, Wagner 2012 sub *caespitum* and *caespitum* oder sp. B, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Kinzner et al. 2015, Wagner et al. 2015 sub *caespitum/impurum*-Komplex, Borovsky & Kunz 2016 sub sp., Kirchmair et al. 2017 sub sp., Steiner et al. 2017, Wagner et al. 2017.
**Material Universalmuseum Joanneum:** "Sonnberg, 1200 m St. Erhart [sic; St. Erhard is meant]/Br. 20.8.[19]51" [—] *"Tetramorium caespitum* ?" [—] Inv. Nr. 30 320 [47°23' N, 15°27' E], ☿; Wundschuher Teiche, Graz-Umg. STMK [—] 23.4.1966 E. Kreissl leg. [46°55' N, 15°26' E], ☿☿; Soboth Koralpengebiet SW-STMK [—] 6.6.1967 E. Kreissl leg. [46°40' N, 15°04' E], ☿☿; Pfaffenkogel N Graz STMK [—] 20.6.1970 F. Pichler leg. [47°09' N, 15°18' E], ☿☿; Puxberg OB-STMK [—] 18.7.1970 E. Kreissl leg. [47°09' N, 14°20' E], ☿☿; Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10' N, 15°28' E], ☿☿; Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 10.4.1972 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿; Leber Schöcklgebiet GRAZ-UMG. [—] 28.6.1972 E. Kreissl leg. [47°10' N, 15°25' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 8.7.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Steinbruch Stubenberg E-STMK [—] 29.7.1972 E. Kreissl leg. [47°15' N, 15°50' E], ♂♂; Steinbruch Stubenberg E-STMK [—] 29.7.1972 E. Kreissl leg. [47°15' N, 15°50' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 15.8.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.3.1974 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] "*Tetram. caespit. Las. emarginat. Stenam. westwoodi*" [46°39' N, 15°28' E], ☿☿; Stübinggraben GRAZ-UMG. [—] 28.7.1975 E. Kreissl leg. [47°11' N, 15°16' E], ☿☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] "*Tetram. caesp.*" [47°13' N, 15°30' E], ☿☿; Karlstein STMK [—] 9.9.1978 E. Kreissl leg. [47°12' N, 15°23' E], ☿☿; "Södingberg W Graz Wiese 13.7.[19]79" [47°06' N, 15°10' E], ☿☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] "*Tetramor. caespitum*" [47°00' N, 15°56' E], ☿☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿; Kehrergraben b. Rein, 520 m GRAZ-UMG. [—] 7.7.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Blaubruchhöhle Zösenberg, 450 m NNE Graz [—] 28.8.1980 E. Kreissl leg. [47°08' N, 15°27' E], ☿☿.
**Geographic distribution:** 87 localities. All landscape units. 200-1300 m altitude.
**Relative frequency:** 59.7% of 124 Styrian *Tetramorium* records.

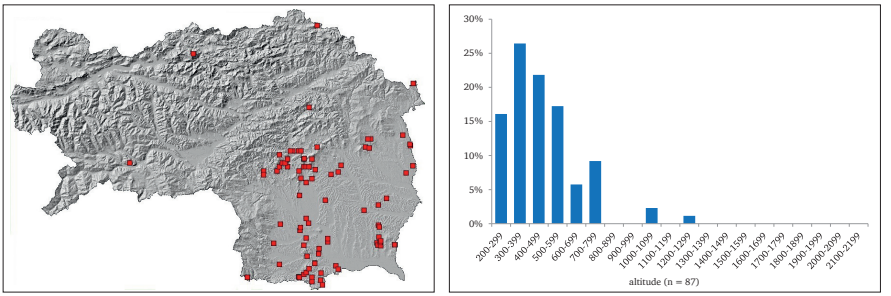


*Fig. 51: Tetramorium caespitum*, horizontal and vertical distribution.

## *Tetramorium impurum* (Foerster, 1850)

**Literature:** Wagner 2009, Wagner 2011a, Wagner et al. 2012, Ebermann & Krisper 2014, Wagner et al. 2016, Steiner et al. 2017 sub *impurum* and *alpestre*, Wagner et al. 2017 sub *impurum* and *alpestre*.

**Material Universalmuseum Joanneum:** Graggerschlucht SW Neumarkt OB-STMK [—] 11.7.1974 E. Kreissl leg. [47°03' N, 14°24' E], ☿; Adelsberg OB-STMK [—] 13.4.1976 E. Kreissl leg. [47°06' N, 14°22' E], ☿☿; Wildbad-Einöd OB-STMK [—] 21.7.1976 E. Kreissl leg. [—] „*Tetramor. caespitum*" [47°01' N, 14°24' E], ☿☿; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [—] „*Tetram. caesp*." [47°21' N, 15°04' E], ☿☿; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Tetramor. caespitum*" [47°02' N, 14°26' E], ☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. „*Stenam. Westwoodi*" [47°01' N, 14°24' E], ☿☿; S Kugelstein N Peggau, 410 m GRAZ-UMG [—] 18.7.1979 E. Kreissl leg. [—] „*Tetram. caesp*." [47°13' N, 15°20' E], ☿☿, ♂♂, ♀♀alate; S Kugelstein N Peggau, 410 m GRAZ-UMG [—] 18.7.1979 E. Kreissl leg. [—] „13.9.[19]79" [/] „*Myrmica* s..." [47°13' N, 15°20' E], ♀alate, ♂♂; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [47°08' N, 14°09' E], ☿☿, ♀ alate, ♂; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] „*Tetram. caesp*." [47°08' N, 14°09' E], ☿☿.

**Geographic distribution:** 27 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 400-1600 m altitude.

**Status discussion:** From the Biodiversity Day in the Gesäuse National Park in 2011, I determined *Tetramorium* material based on drawings of ♂ genital morphology in Schlick-Steiner et al. (2006) as *T. alpestre*. Before my PhD about the *Tetramorium caespitum* complex (2012-2017), I misjudged the genital-morphological interspecific similarity and intraspecific variability of *T. alpestre* and *T. impurum*. Unfortunately, this old determination error was – without re-evaluation – incorporated into the distribution maps of a taxonomic revision of the *T. caespitum* complex (Wagner et al. 2017: Figure 13) and the checklist of Austrian ants (Steiner et al. 2017). According to our new key (Wagner et al. 2017), the ☿☿ belong to *T. impurum*. Thus, there is no Styrian record of *T.*

*alpestre* and, consequently, Carinthia seems to be the northeastern distribution border in the east of the Eastern Alps.
**Relative frequency:** 21.8% of 124 Styrian *Tetramorium* records.

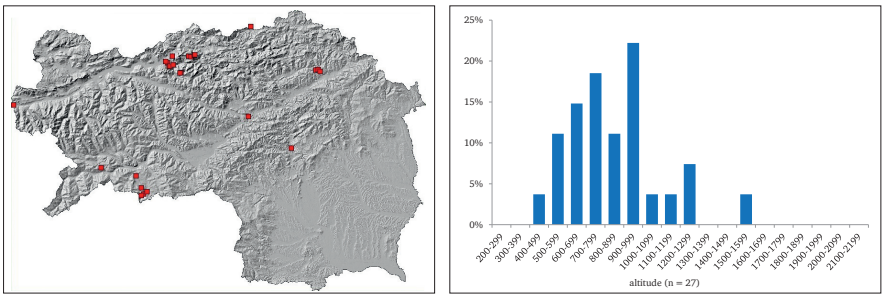


*Fig. 52: Tetramorium impurum*, horizontal and vertical distribution.

## *Tetramorium immigrans* Santschi, 1927

**Literature:** Wagner et al. 2010 sub cf. sp. E, Wagner 2011b sub sp. E, Steiner et al. 2017, Wagner et al. 2017, Wagner & Zettel 2019.
**Material Universalmuseum Joanneum:** Graz STMK. T33 222 18.2.1985 Holzer leg. [47°04' N, 15°26' E], ☿☿; Graz-Waltendorf STMK [—] 13.4.1985 E. Kreissl leg. [47°04' N, 15°28' E], ☿☿ [comment: These nanitics with a mean CS of 661 µm could not be determined using discriminants in Wagner et al. (2017). Using allometric corrected data, the geometric mean of 3 ☿☿ in a wild-card linear discriminant analysis resulted in p = 0.99 for *T. immigrans*.].
**Geographic distribution:** 25 localities. Established outdoor-living neozoon in the Graz Basin. 200-500 m altitude.
**Status discussion:** *Tetramorium immigrans* is believed to be a neozoon in both Americas (Santschi 1927, Steiner et al. 2008, Wagner et al. 2017), at least in parts of France (Gippet et al. 2017, Cordonnier et al. 2020), Germany (Seifert 2018), at least in parts of Italy (Castracani et al. 2020), Denmark (Sheard et al. 2020), and Poland (Borowiec & Salatea 2018). In Austria it is known from Carinthia, Lower Austria, Vienna, Burgenland, and Styria (Steiner et al. 2017, Huber et al. 2020). In Styria, *T. immigrans* was found so far only in the Graz Basin. I found that Styrian *T.-immigrans*-records collected by unbiased sampling are significant younger than those of other Styrian species of the *T. caespitum* complex, that is, *T. caespitum* and *T. impurum* (p = 0.002, Student's t-test, 2-sides, type 3 because of unequal variances; n = 125 samples). Since there are no records in the east and south of Styria (where xerothermophilous rocky habitats occur), it represents an isolated population (but see Huber et al. 2020 for a record in a near-natu-

ral habitat in southern Burgenland). Thus, I consider it as neozoon for Styria which was (probably passively) introduced to Graz. When? The oldest Styrian record I saw (OÖ Landesmuseum-Biologiezentrum) was labeled as follows: "STYRIA Graz VI. G. Klingberg leg. "Ende Feber 1970"." The 6th district of Graz, Jakomini, is centrally located and strongly anthropogenic influenced with large areas of concreted surface (see also Cordonnier et al. 2018 for the preference of anthropogenic influenced habitats in *T. immigrans*). Since the normal-sized ☿☿ were collected in February 1970, the colonization of Graz must have been started in the 1960s (or earlier). There are three further records from Graz from the 20th century (leg. E. Holzer: 1985; E. Kreissl: 1985; E. Bregant: 1997). Records from the 21st century are also from other localities of the Graz Basin (e.g., Dobl-Zwaring, Preding), but always from strongly anthropogenic influenced localities. I do not know to which degree the urban area of Graz was inhabited by *T. caespitum* before *T. immigrans* putatively replaced it, but I found *T. caespitum* at fully concreted anthropogenic sites outside of the Graz Basin (e.g., Sankt Ruprecht an der Raab, Glanz an der Weinstraße). Consequently, I suggest a replacement in the Graz Basin at least to a small extent which justifies terming this neozoon "invasive". In a near-natural quarry in Seiersberg, which is located closely to Graz, I found *T. caespitum* but not *T. immigrans*. In the quarry in Weitendorf 20 km south of Graz, mtDNA of both species was found in 2009 (Wagner et al. 2017: Tab. S1). For the Pannonian region of Austria, in contrast, I consider *T. immigrans* as native species or archeozoon sensu Klingenstein et al. (2005), since also near-natural habitats are used there (Tista 2019, Wagner 2019c, Wagner & Zettel 2019, Wagner et al. 2019).

**Relative frequency:** 18.5% of 124 Styrian *Tetramorium* records.

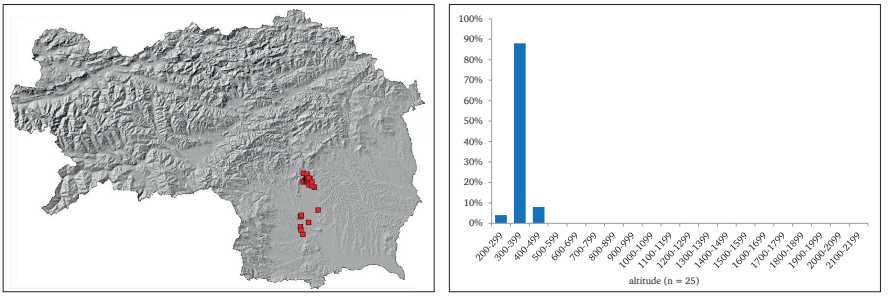


*Fig. 53: Tetramorium immigrans*, horizontal and vertical distribution.

*Fig. 54:* A worker of *Tetramorium immigrans* – an established neozoon in the Graz Basin. Photo: G. Kunz.

### *Tetramorium bicarinatum* (Nylander, 1846)

**Literature:** None. New species for Styria!
**Material Universalmuseum Joanneum:** Graz-Andritz STMK [—] 19.4.1983 E. Kreissl leg. [47°06' N, 15°25' E], ☿.
**Geographic distribution:** 1 locality. Unestablished neozoon in Graz. 300-400 m altitude.
**Status discussion:** The origin of *Tetramorium bicarinatum* is probably Southeast Asia (Bolton 1977). It is known as trump species since the 19th century and occurs worldwide today (Wetterer 2009). In Austrian checklists it is mentioned for Lower Austria and Vienna, both findings were made indoor (Hölzel 1966 sub *guineense* Fabricius, 1793, Steiner et al. 2017). The only ☿ of the collection of the Universalmuseum Joanneum was collected at the 19. April 1983 in Andritz by E. Kreissl. Kreissl lived close to the main square of Andritz. He was on vacation on Gran Canaria from March to early April 1983 (U. Hausl-Hofstätter in litt. 2020). *Tetramorium bicarinatum* was found on several localities on the Canary islands, the oldest record there is from before 1922 (leg. R.C. Wroughton; Wetterer 2009). An introduction from Gran Canaria to Andritz by Kreissl himself is the most probable explanation.

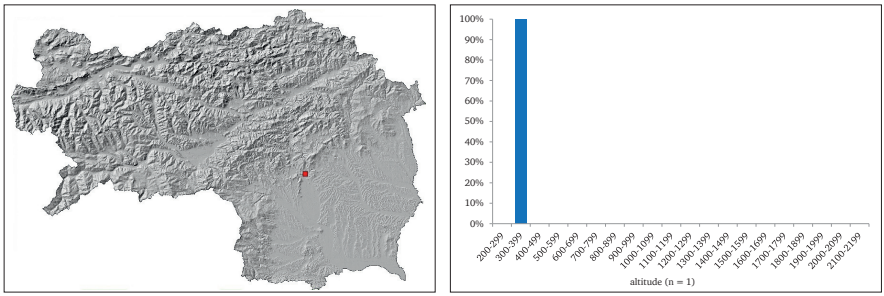


*Fig. 55: Tetramorium bicarinatum*, horizontal and vertical distribution.

## *Anergates atratulus* (Schenck, 1852)

**Literature:** Hoffer 1907, Ritter 1953, Hölzel 1966, Bregant 1978, Bregant 1998a, Wagner 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 5 localities. Northern Alps, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-1100 m altitude.
**Relative frequency:** < 1% of 124 Styrian *Tetramorium* records.

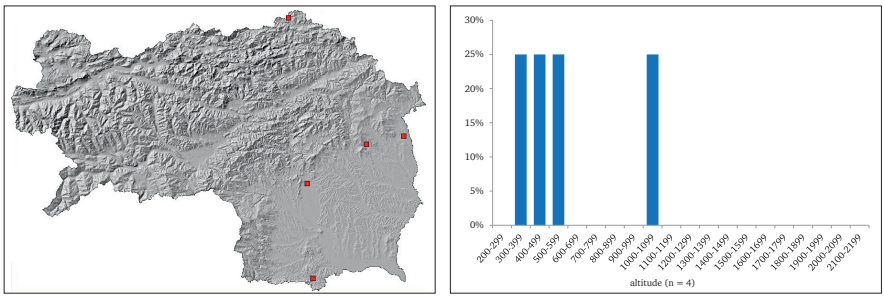


*Fig. 56: Anergates atratulus*, horizontal and vertical distribution.

## *Strongylognathus testaceus* (Schenck, 1852)

**Literature:** Hoffer 1890a, Hoffer 1907, Bregant 1973, Bregant 1978, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 7 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 400-800 m altitude.
**Relative frequency:** < 1% of 124 Styrian *Tetramorium* records.

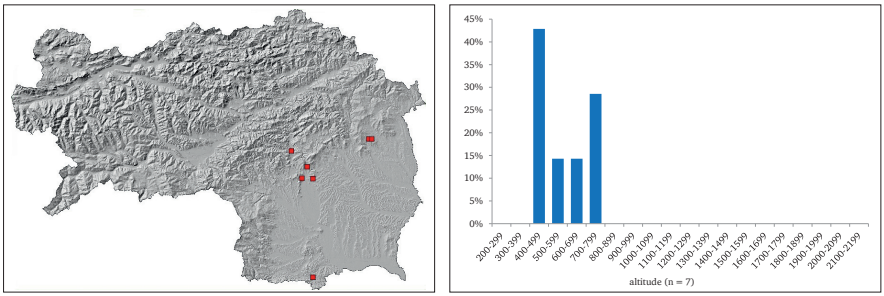


*Fig. 57: Strongylognathus testaceus*, horizontal and vertical distribution.

## *Dolichoderus quadripunctatus* (Linnaeus, 1771)

**Literature:** Hoffer 1890a sub *Hypoclinea quadripunctata*, Hoffer 1890b sub *Hypoclinea quadripunctata*, Goetsch 1950, Hölzel 1966, Bregant 1978, Glaser 1997, Friedl 2000, Wagner et al. 2010, Wagner 2011b, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a.
**Material Universalmuseum Joanneum:** Leibnitz, Stmk. „Kreuzkogl“ [sic; Kreuzkogel is meant] [/] „6.IX.1949“ [—] 1301 [46°47’ N, 15°30’ E], ☿; Riegersburg E-STMK [—] 15.4.1959 E. Kreissl leg. [47°00’ N, 15°56’ E], ☿☿; Murau S Graz, STMK [—] 28.5.1968 E. Kreissl leg. [47°00’ N, 15°28’ E], ☿; Graz-Andritz STMK [—] 21.3.1970 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 15.4.1973 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿; Anna-Teiche b. Rein GRAZ-UMG. [—] 1.4.1977 E. Kreissl leg. [47°07’ N, 15°17’ E], ☿; Weizklamm GRAZ-UMG. [—] 6.7.1977 E. Kreissl leg. [47°16’ N, 15°34’ E], ☿☿; Schloß Dornhofen Rabnitztal NE Graz, 435 m [—] 1.12.1979 E. Kreissl leg. [—] „*Dolich. quadrip.*” [47°08’ N, 15°33’ E], ♀dealate.
**Geographic distribution:** 73 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-700 m altitude.
**Relative frequency:** 80.2% of 81 Styrian records of *Dolichoderus* and *Colobopsis*. 60.7% of 107 Styrian records of *Dolichoderus*, *Camponotus fallax*, and *Colobopsis*.

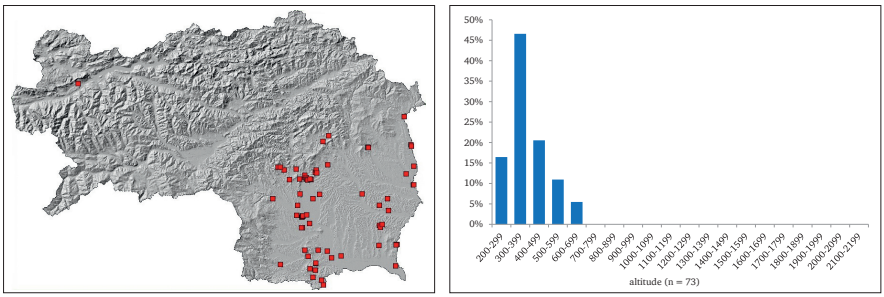


*Fig. 58: Dolichoderus quadripunctatus*, horizontal and vertical distribution.

### *Technomyrmex vitiensis* Mann, 1921

**Literature:** Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. Established indoor-living neozoon in the Botanical Garden Graz. 300-400 m altitude.
**Status discussion:** *Technomyrmex vitiensis* was probably introduced after the 11. VI.2011, since I have not found it at the Biodiversity Day in the Botanical Garden Graz (Wagner 2011b).

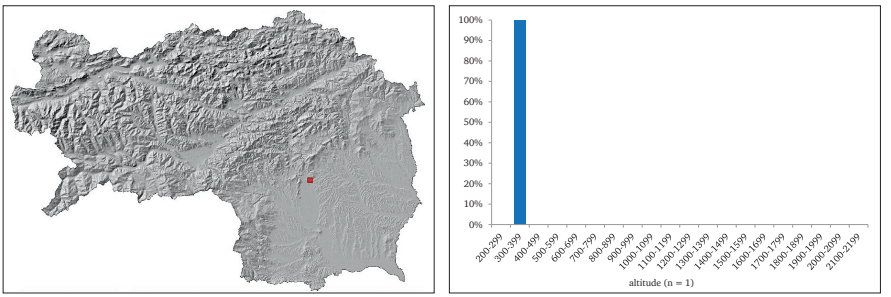


*Fig. 59: Technomyrmex vitiensis*, horizontal and vertical distribution.

### *Tapinoma erraticum* (Latreille, 1798)

**Literature:** Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Goetsch 1950, Franz 1960, Hölzel 1966, Bregant 1978, Wagner et al. 2010, Wieser & Trummer 2014, Borovsky & Kunz 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E] ☿☿; Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09' N, 15°18' E], ☿; Enzenbachgraben Graz-Umg. STMK [—] 15.9.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Pfaffenkogel NE-Fuß GRAZ-UMG [—] 21.2.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Stübinggraben - Hörgaspauli Pfaffenkogel [—] 23.6.1971 E. Kreissl leg. GRAZ-UMG. [47°09' N, 15°17' E], ♀ dealate; S Kugelstein N Peggau, 410 m GRAZ-UMG [—] 18.7.1979 E. Kreissl leg. [47°13' N, 15°20' E], ☿.
**Geographic distribution:** 29 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 50.0% of 56 Styrian *Tapinoma* records.

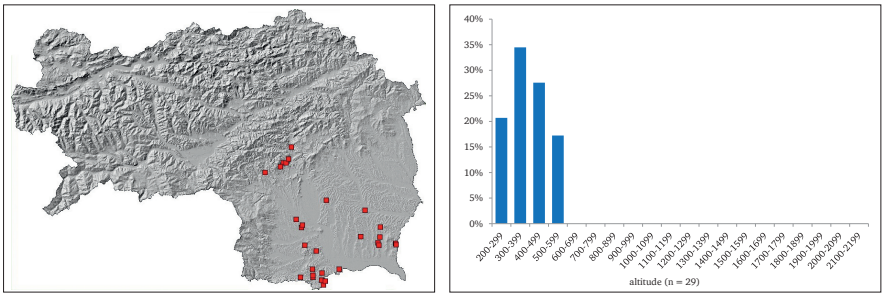


*Fig. 60: Tapinoma erraticum*, horizontal and vertical distribution.

## *Tapinoma subboreale* Seifert, 2012

**Literature:** Wagner et al. 2010 sub *ambiguum*, Wagner 2011a sub *ambiguum*, Wagner 2011b sub *ambiguum*, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.[19]72 „680" [—] „*Lasius alienus*" [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 8.7.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Mitteregg Sausal W-STMK [—] 23.4.1973 E. Kreissl leg. [46°48' N, 15°26' E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] „*Tapinoma erraticum*" [46°39' N, 15°28' E], ☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 24.3.1977 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿.
**Geographic distribution:** 28 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1000 m altitude.
**Relative frequency:** 50.0% of 56 Styrian *Tapinoma* records.

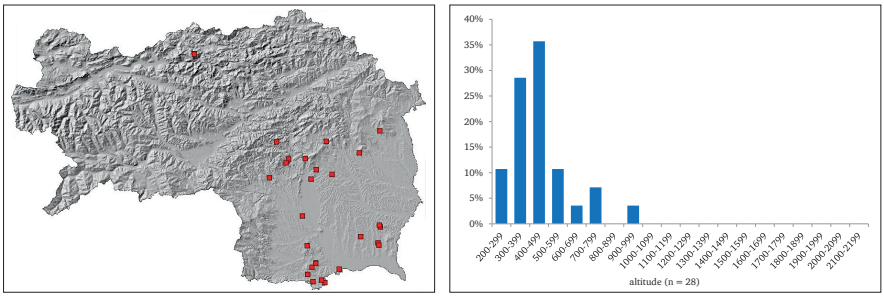


*Fig. 61: Tapinoma subboreale*, horizontal and vertical distribution.

## *Liometopum microcephalum* (Panzer, 1798)

**Literature:** Hölzel 1966, Wieser & Trummer 2014, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** None. One headless ☿ of *Lasius emarginatus* was labeled as follows: "Gösting St. 3.4.[19]27" [—] "*Liometopum microcephalum* ☿" Hölzel det. [—] Inv. Nr. T 30 354 [47°06' N, 15°24' E].
**Geographic distribution:** 1 locality. West Styrian hilly Foreland. 200-300 m altitude.
**Status discussion:** The occurrence in Styria is zoogeographically possible but doubtful. Hölzel (1966) mentioned 2 Styrian localities: Spielfeld and Gösting. Since the former record turned out to be a headless ☿ of *L. emarginatus*, it seems possible that also the latter refers to material of *L. emarginatus*. *Liometopum microcephalum* should be searched in southeastern Styrian riparian forests close to the river Mur. The nearest reliable record I heard about is from Lendava in Slovenia (34 km ESE of Austrian Styria, Gregor Bračko in litt. 2013, cf. Bračko 2007).

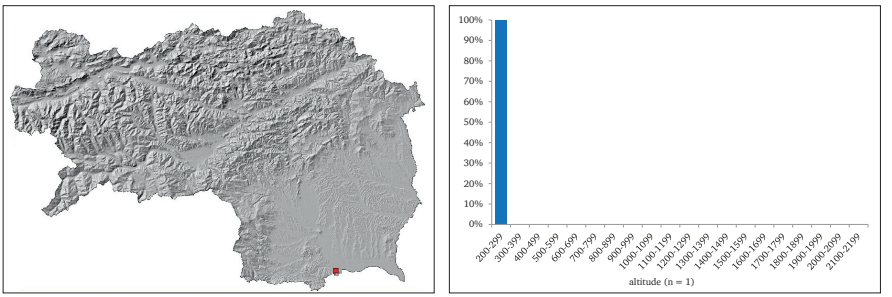


*Fig. 62: Liometopum microcephalum*, horizontal and vertical distribution.

## *Plagiolepis pygmaea* (Latreille, 1798)

**Literature:** Hoffer 1890a, Bregant 1978, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a.
**Material Universalmuseum Joanneum:** Pfaffenkogel E-Seite GRAZ-UMG. [—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Pfaffenkogel N Graz, STMK [—] 8.7.1972 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Plagiolepis pygmaea*" [46°50' N, 15°55' E], ☿☿.
**Geographic distribution:** 18 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.

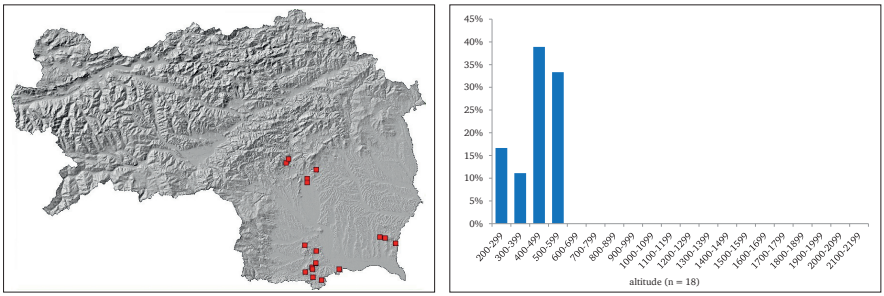


*Fig. 63: Plagiolepis pygmaea*, horizontal and vertical distribution.

## *Prenolepis nitens* (Mayr, 1853)

**Literature:** Hoffer 1890a, Kreissl 1973, Bregant 1998b, Wagner et al. 2010, Wagner 2012, Wagner 2014, Wieser & Trummer 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a.

**Material Universalmuseum Joanneum:** Austria Styria Riegersburg leg. Kreissl 5.8.[19]72 „103“ [—] „*Prenolepis nitens*“ [47°00’ N, 15°56’ E], ☿☿; Riegersburg E-STMK [—] 5.8.1972 E. Kreissl leg. [47°00’ N, 15°56’ E], ☿☿; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50’ N, 15°55’ E], ☿☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Prenolepis nitens*“ [47°00’ N, 15°56’ E], ☿☿; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Prenolepis nitens*“ [46°53’ N, 15°58’ E], ☿☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] „*Prenolepis nitens*“ [47°00’ N, 15°56’ E], ☿☿; Riegersburg 460 m E-STMK [—] 14.4.1980 E. Kreissl leg. [47°00’ N, 15°56’ E], ☿; Ehrenhausen S-STMK, 290 m [—] 31.10.1983 E. Kreissl leg. [46°43’ N, 15°35’ E], ☿☿; St., Windische Bühel Kranach (Menhart) NNE Leutschach 46°41‘/15°28‘ [—] E. Bregant leg. „18.10.“1997 [—] *Prenolepis nitens* (Mayr) E. Bregant det. 199“7“ [46°41’ N, 15°28’ E], ☿☿.

**Geographic distribution:** 20 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.

**Relative frequency:** 2.2% of 641 Styrian records of *Prenolepis* and *Lasius* s. str.

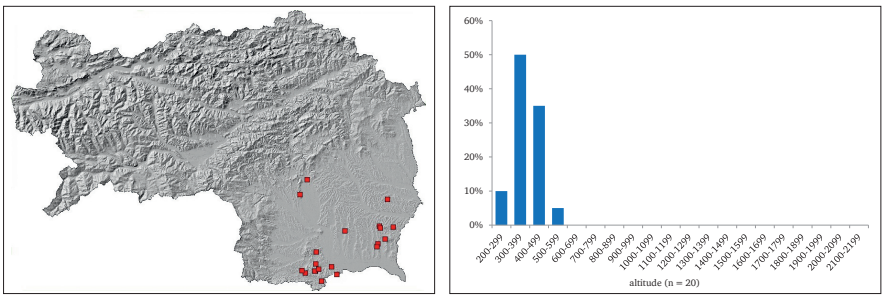


*Fig. 64: Prenolepis nitens*, horizontal and vertical distribution.

### *Camponotus* (*Camponotus* s. str.) *herculeanus* (Linnaeus, 1758)

**Literature:** Mayr 1855 sub *Formica herculeana*, Hölzel 1966, Neuhäuser 1996, Neuhäuser-Happe 1996b, Neuhäuser-Happe 1999, Wagner 2008, Wagner 2009, Wagner 2010, Wagner et al. 2016, Steiner et al. 2017, Wagner et al. 2018.

**Material Universalmuseum Joanneum:** „Ameisenschwarm am 24/7.1906. in großer Menge in Graz gefallen zwischen 2-3 Uhr." [—] Inv. Nr. T 30 354 [47°04' N, 15°26' E], ♀ alate [comment: this old observation is interesting, since *C. herculeanus* does no longer occur in and around Graz today]; "e. p. 10/6 [19]39 b. Bruck a M. [/] Aus Fichtenstamm (Spechtbaum!) J. u. Fleischhackeralm […]" [—] "*Camponot. herculeanus*" Hölzel det. [—] Inv. Nr. T 30 354 [47°23' N, 15°15' E], ♀alate; "Sonnberg, 1200 m St. Erhart[sic; St. Erhard is meant]/Br. 20.8.[19]51" [—] Inv. Nr. 30 320 [—] "*Camponotus herculeanus* ☿" Hölzel det. [47°23' N, 15°27' E], ☿☿; Johnsbach OB-STMK [—] 27.5.1953 E. Kreissl leg. [47°34' N, 14°35' E], ♀dealate; "Styr. Pürgg 26.6.1953 D. Mayer" [—] "*Camponotus herculeanus* ☿" Hölzel det. [47°31' N, 14°04' E], ♀alate; "Styr. Gaishorn 24.7.[19]53 D. Mayer" [—] "*Camponotus herculeanus* ☿" Hölzel det. [47°29' N, 14°32' E], ♀dealate; St. Wolfgang NW Obdach, OB-STMK 1230 m [—] 21.8.1955 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°05' N, 14°38' E], ☿; Hintertober Teichalmgebiet STMK [—] Juni 1964 E. Kreissl leg. [47°19' N, 15°29' E], ☿☿; Neuberg a. d. Mürz, OB-STMK [—] 29.6.1966 E. Kreissl leg. [47°39' N, 15°34' E], ☿; Teichalpe Mixnitzbach STMK [—] 6.10.1968 E. Kreissl leg. [47°21' N, 15°26' E], ☿; Ingeringsee OB-STMK [—] 20.10.1968 E. Kreissl leg. [—] "*Camponotus herculeanus* […] II.1969 ♀ […]" [47°20' N, 14°39' E], ☿☿, ♀alate; Zetzgebiet E-STMK [—] 18./19.7.1969 E. Kreissl leg. [47°16' N, 15°39' E], ☿; Zetz-Hohe Zetz E-STMK, 1240 m [—] 21.6.1970 E. Kreissl leg. [47°16' N, 15°39' E], ☿; Zetzgebiet im Sattel E-STMK [—] 23.8.1970 E. Kreissl leg. [47°16' N, 15°39' E], ♀♀alate; Gleinalpengeb. SE Walzkogel W-STMK [—] 20.9.1970 E. Kreissl leg. [47°12' N, 15°08' E], ♀♀dealate; Eibisberg Zetzgebiet E-STMK [—] 31.10.1971 E. Kreissl leg. [47°18' N, 15°36' E], ♀dealate; Mühlbachgraben b. Rein [—] 30.4.1975 E. Kreissl leg. [47°08' N, 15°15' E], ♀dealate; Karchauereck SE Murau OB-STMK [—] 13.7.1975 E. Kreissl leg. [47°05' N, 14°15' E], ♀dealate; Thomabachgraben OB-STMK [—] 20.7.1975 E. Kreissl leg. [—] "*Camp. herculean. Leptoth. acervorum Formica fusca aquilonia*" [47°02' N, 14°19' E], ♀♀dealate; Kreuzeckgeb. OB-STMK [—] 10.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿; Burgstallerhöhe NNE Graz STMK [—] 23.10.1976 E. Kreissl leg. [47°13' N, 15°30' E], ☿; Johnsbachtal OB-STMK [—] 11.6.1977 E. Kreissl leg. [—] "*Camponot. herculeanus*" [47°34' N, 14°35' E], ♀dealate; Gipfelbereich Schöckl GRAZ-UMG. [—] 14.7.1977 E. Kreissl leg. [47°11' N, 15°27' E], ♀♀dealate; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [47°13' N, 15°30' E], ☿; Ob. Grasluppteich OB-STMK [—] 26.6.1978 E. Kreissl leg. [47°04' N, 14°22' E], ☿; Althofen Katschtal OB-STMK [—] 27.7.1978 E. Kreissl leg. [—] "*Camp. hercul*." [47°09' N, 14°14' E], ☿☿; Dürnberger Moor OB-STMK [—] 29.7.1978 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿; Station Furtnerteich OB-STMK [—] 3.8.1978 E. Kreissl leg. [—] "*Formica pratensis*" [47°05' N, 14°23' E], ☿☿; Mühlbachgraben b. Rein, 620 m GRAZ-UMG. [—] 2.6.1979 E. Kreissl leg. [—] "*Camp. herculeanus*" [47°08' N, 15°15' E], ☿☿; Dürnberger Moor, 990 m OB-STMK [—] 18.9.1979 E. Kreissl leg. [—] "*Camp.*

*herculeanus*" [47°05' N, 14°21' E], ☿☿; SW Althofen im Katschtal, 840 m OB-STMK [—] 22.5.1980 E. Kreissl leg. [47°09' N, 14°14' E], ☿; Thayagraben NE St. Lambrecht 940 m, OB-STMK [—] 23.5.1980 E. Kreissl leg. [47°05' N, 14°19' E], ☿☿; Kreuzeck N Neumarkt, 760 m OB-STMK [—] 1.6.1980 E. Kreissl leg. [47°07' N, 14°24' E], ☿; Paalgraben S Stadl a. d. Mur 1020 m, OB-STMK [—] 3.6.1980 E. Kreissl leg. [47°02' N, 14°00' E], ☿☿, ♀alate, ♂♂; Schöttlbachgraben N Oberwölz, 880 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12' N, 14°17' E], ☿; Padulerteich NW Neumarkt 1050 m, OB-STMK [—] 6.6.1980 E. Kreissl leg. [47°05' N, 14°20' E], ☿☿; Pöllauer Graben SW Neumarkt 1140 m, OB-STMK [—] 8.6.1980 E. Kreissl leg. [47°01' N, 14°22' E], ☿; Furtnerteich 870 m OB-STMK [—] 11.6.1980 E. Kreissl leg. [47°05' N, 14°23' E], ♀alate; Donnersbachtal SSE Irdning OB-STMK, 1080 m [—] 3.6.1981 E. Kreissl leg. [47°21' N, 14°09' E], ♀alate, ♀dealate; Krippau, Ob.-Stmk., 30.6.1985, O. Platzer leg. T33.442 [47°41' N, 14°42' E], ☿; Reitinggebiet Hohenegg-Gr. STMK [—] 3.7.1985 E. Kreissl leg. [47°26' N, 14°51' E], ☿; Zetz E-STMK [—] 12.12.1986 E. Kreissl leg. [47°16' N, 15°39' E], ♀♀dealate; Ellersbachgraben NNW Stanz im Mürztal 720 m, STMK [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°28' N, 15°29' E], ☿☿; Sägewerk Stanz im Mürztal 650 m, STMK. [—] 13.8.1987 E. Kreissl leg. T 33883 [47°28' N, 15°29' E], ☿☿; Prenneggtal [sic; probably Preuneggtal is meant] SW Schladming 1200 m, OB-STMK [—] 7.7.1988 E. Kreissl leg. [47°19' N, 13°37' E], ♀alate.

**Geographic distribution:** 79 localities. Northern Alps, Central Alps, Styrian Border Mountains, and West Styrian hilly Foreland. 400-1800 m altitude.

**Relative frequency:** 32.5% of 236 Styrian *Camponotus* records.

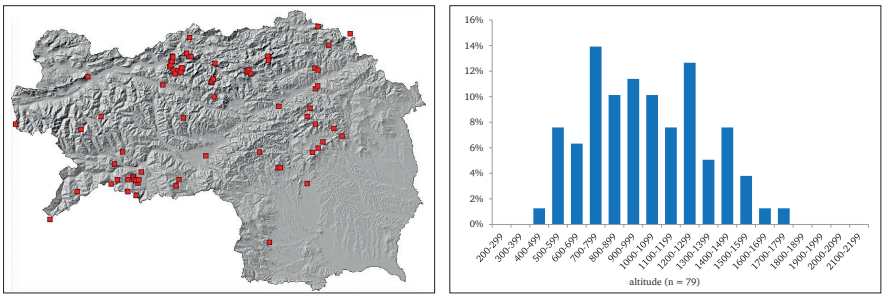


*Fig. 65: Camponotus herculeanus*, horizontal and vertical distribution.

## *Camponotus* (*Camponotus* s. str.) *ligniperda* (Latreille, 1802)

**Literature:** Mayr 1855 sub *Formica ligniperda*, Hoffer 1890a partly sub *herculeanus*, Hoffer 1890b partly sub *herculeanus*, Hoffer 1906, Hölzel 1966, Schlagbauer 1997, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Wagner et al. 2010, Wagner 2011a, Wieser & Trummer 2014, Borovsky & Kunz 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** „Umg. Graz Styr. 13.6.[19]26“ [—] „*Camponotus ligniperda* ☿“ Hölzel det. [47°04’ N, 15°26’ E], ☿; Umg. Graz (N) Styr. “3.5.[19]31” [—] “*Camponotus ligniperda* ☿” Hölzel det. [—] Inv. Nr. 30 354 [47°08’ N, 15°25’ E], ☿; Wiesberg bei Leibnitz, Stmk. [/] “15.6.[19]41” [—] “747” [46°47’ N, 15°31’ E], ☿; Wiesberg bei Leibnitz, Stmk. [/] “19.8.[19]49” [—] ex. Coll. Sattler [—] 880 [46°47’ N, 15°31’ E], ☿; “KREUZKOGL” [sic; Kreuzkogel is meant] Leibnitz, Stmk. [—] leg. Sattler “14.IX.1949” [—] 1882 [46°47’ N, 15°30’ E], ☿; Graz, Maria Trost STMK [—] 3.6.1951 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°06’ N, 15°29’ E], ☿; Graz, Wetzelsdorf STMK [—] 16.6.1951 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°03’ N, 15°23’ E], ♀dealate; Laßnitz b. Murau 1000 m OB-STMK [—] 20.7.1951 F. Wolf leg. [—] E4129 Coll. F. Wolf [47°04’ N, 14°11’ E], ♀dealate; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 4.8.1952 F. Wolf leg. [—] 4129 Coll. F. Wolf [47°09’ N, 15°17’ E], ☿☿; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 23.4.1953 F. Wolf leg. [—] E4129 Coll. F. Wolf [47°09’ N, 15°17’ E], ☿☿; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 23.4.1953 F. Wolf leg. [—] E4129 Coll. F. Wolf [47°09’ N, 15°17’ E], ♀alate; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 8.5.1953 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°09’ N, 15°17’ E], ♀dealate; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 16.5.1953 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°09’ N, 15°17’ E], ♀alate; nördl. Umgb. Graz St, leg. E. Bregant [—] Auf der Leber 1.4.1959 [—] T 30 320 STMK [47°10’ N, 15°25’ E], ♀dealate; Plesch Graz-Umg. STMK [—] 9.10.1966 E. Kreissl leg. [47°08’ N, 15°13’ E], ☿☿; Graz-Andritz STMK [—] 12.5.1968 E. Kreissl leg. [47°06’ N, 15°25’ E], ♀alate; Furtnerteich OB-STMK [—] 28.7.1968 E. Kreissl leg. [47°05’ N, 14°23’ E], ♀dealate; Mühlbachgraben b. Rein GRAZ-UMG. [—] 26.4.1969 E. Kreissl leg. [47°08’ N, 15°15’ E], ♀dealate; Hörgas Pauli-Pfaffenkogel STMK [—] 30.8.1969 E. Kreissl leg. [47°09’ N, 15°17’ E], ☿; Novystein Schöcklgebiet STMK [—] 26.10.1969 E. Kreissl leg. [47°10’ N, 15°28’ E], ☿☿; Zetz, NE-Hang E-STMK, 1100 m [—] 21.6.1970 E. Kreissl leg. [47°17’ N, 15°39’ E], ☿☿; Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿; Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09’ N, 15°18’ E], ☿☿; Enzenbachgraben Graz-Umg. STMK [—] 15.9.1970 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿☿; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10’ N, 15°28’ E], ☿☿; Mühlbachgraben Enzenbach GRAZ-UMG. [—] 28.10.1970 E. Kreissl leg. [47°09’ N, 15°17’ E], ♀ dealate; bei Semriach, STMK, 26.9.1971 T36.341 [47°13’ N, 15°24’ E], ♀♀ alate; bei Semriach, STMK, 26.9.1971 T36.341 [47°13’ N, 15°24’ E], ☿; Zösenberg Schöcklgebiet GRAZ-UMG. [—] 13.3.1972 E. Kreissl leg. [47°08’ N, 15°26’ E], ☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.[19]72 “630” [—] “*Camponotus ligniperda*” [47°09’ N, 15°17’ E], ☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.[19]72 “630” [47°09’ N, 15°17’ E], ☿☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.[19]72 “C29” [—] “*Camponotus herculeanus*” [47°09’ N, 15°17’ E], ☿; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.1972 “632” [—] “*Campanotus* [sic; *Camponotus* is meant] *herculeanus* L.” [47°09’ N, 15°18’ E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] “*Tetram. caespit. Las. emarginat. Stenam. westwoodi*” [46°39’ N, 15°28’ E], ☿; Römerweg Grazer Bgld. STMK [—] 17.5.1976 E. Kreissl

leg. "*Camponot. ligniperda*" [47°11' N, 15°28' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 24.3.1977 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel Stübing 390 m, STMK. von Grasbüschelhang gesiebt [—] 22.3.1978 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 1.6.1978 E. Kreissl leg. [—] "*Camp. hercul*." [47°08' N, 15°15' E], ♀♀ alate; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [—] "*Form. fusca*" [47°21' N, 15°04' E], ♀ dealate; Ruine Katsch Pleschaitsgruppe OB-STMK [—] 18.6.1978 E. Kreissl leg. [47°08' N, 14°17' E], ☿☿; Karlstein STMK [—] 9.9.1978 E. Kreissl leg. [47°12' N, 15°23' E], ☿☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Camponot. herculeanus*" [47°00' N, 15°56' E], ☿☿; Stradnerkogel E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Campono. herculeanus*" [46°50' N, 15°55' E], ☿☿; Annateich b. Gratwein GRAZ-UMG. [—] 18.9.1978 E. Kreissl leg. [—] "*Campon. herculeanus*" [47°07' N, 15°17' E], ☿; E. Schloß Herberstein E-STMK, 370 m [—] 23.5.1979 E. Kreissl leg. [47°12' N, 15°49' E], ☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [—] "*Campon. vagus*" [47°09' N, 15°18' E], ☿☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] "*Camp. ligniperda*" [47°00' N, 15°56' E], ☿☿; Riegersburg Burggraben E-STMK [—] 4.8.1979 E. Kreissl leg. [—] "13.10.[19]79" [/] "*Campon. herculeanus*" [47°00' N, 15°55' E], ☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [—] "*Camponot. herculeanus*" [47°13' N, 15°48' E], ☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [47°13' N, 15°48' E], ♀ dealate; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] "*Camp. hercul*." [47°08' N, 14°09' E], ☿; Klamm S Stubenberg E-STMK [—] 8.11.1979 E. Kreissl leg. [—] "*Camp. hercul*." [47°14' N, 15°47' E], ☿; Thayabach, NE St. Lambrecht 990 m, OB-STMK [—] 2.6.1980 E. Kreissl leg. [47°04' N, 14°18' E], ☿☿; Dürnstein OB-STMK [—] 23.6.1980 E. Kreissl leg. [47°00' N, 14°23' E], ☿; Pfaffenkogel N Graz STMK, 400 m [—] 31.3.1981 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Donnersbachtal SSE Irdning OB-STMK, 850 m [—] 3.6.1981 E. Kreissl leg. [47°25' N, 14°07' E], ☿☿; Mühlbachgraben b. Rein, 470 m GRAZ-UMG. [—] 24.7.1981 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Weißenbach-St. Gallen OB-STMK [—] 10.6.1985 E. Kreissl leg. [47°42' N, 14°37' E], ☿; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 21.6.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Salzastausee OB-STMK [—] 29.7.1985 E. Kreissl leg. [47°31' N, 13°56' E], ☿; Umg. Rein b. Graz STMK [—] 13.10.1986 E. Kreissl leg. [47°08' N, 15°17' E], ☿; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08' N, 15°25' E], ☿☿; Großwalz 800-900 m, STMK [—] 16.6.1987 E. Kreissl leg. [46°37' N, 15°28' E], ☿☿; Schladming Untertal SSE 1050 m, STMK [—] 28.7.1987 E. Kreissl leg. [47°21' N, 13°43' E], ☿; Pfaffenkogel E-Fuß, Umg. Graz STMK [—] 4.8.1987 E. Kreissl leg. T 33 874 [47°10' N, 15°19' E], ☿; Frohnleiten S-Rabenstein STMK. [—] 15.9.1987 E. Kreissl leg. T 33 912 [47°15' N, 15°18' E], ☿☿; Heuberg STMK. Tyrnauergraben NE Frohnleiten [—] 12.11.1987 E. Kreissl leg. [47°18' N, 15°24' E], ☿☿, ♀ dealate; Pfaffenkogel N Graz [—] 27.10.1988 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿, ♀ dealate [comment: even the 3rd gastral tergite of this ♀ is at the dorsal side half reddish].

**Geographic distribution:** 120 localities. All landscape units. 200-1400 m altitude.
**Relative frequency:** 46.8% of 236 Styrian *Camponotus* records.

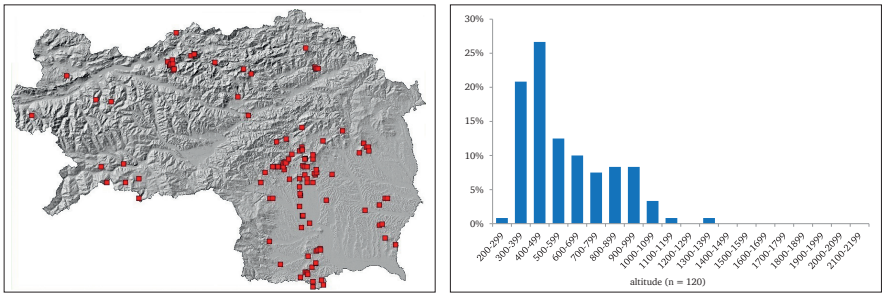


*Fig. 66: Camponotus ligniperda*, horizontal and vertical distribution.

## *Camponotus* (*Camponotus* s. str.) *vagus* (Scopoli, 1763)

**Literature:** Mayr 1855 sub *Formica pubescens*, Hoffer 1890a sub *pubescens*, Hoffer 1890b sub *pubescens*, Franz 1960, Hölzel 1966, Friedl 2000, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** STYRIA Teichgebiet bei Wundschuh [—] E. Bregant leg. 12. April 1959 [—] T 30 342 [46°55' N, 15°26' E], ☿☿; Stübinggraben - Hörgaspauli Pfaffenkogel [—] 23.6.1971 E. Kreissl leg. GRAZ-UMG. [47°09' N, 15°17' E], ☿☿; Heimschuh Sulmtal S-STMK [—] 25.6.1977 E. Kreissl leg. [46°45' N, 15°29' E], ☿☿; Umg. Rein b. Graz STMK [—] 13.10.1986 E. Kreissl leg. [47°08' N, 15°17' E], ☿☿.
**Geographic distribution:** 19 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 6.8% of 236 Styrian *Camponotus* records.

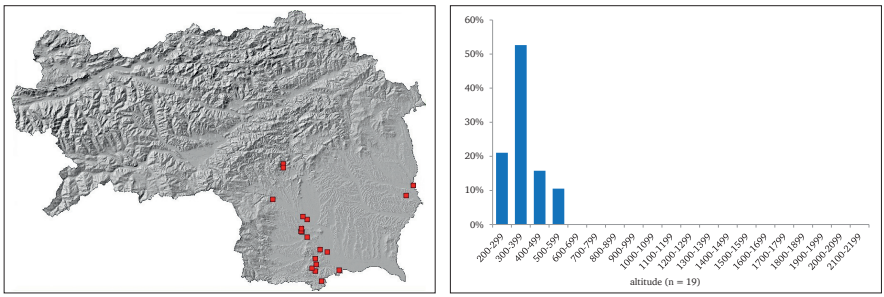


*Fig. 67: Camponotus vagus*, horizontal and vertical distribution.

## *Camponotus* (*Myrmentoma*) *fallax* (Nylander, 1856)

**Literature:** Hoffer 1890b sub *marginatus*, Hölzel 1952 sub *aethiops* v. *marginata*, Bregant 1978, Wagner 2012, Wagner 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Steiner et al. 2017, Wagner 2019a, Wagner 2019b.
**Material Universalmuseum Joanneum:** Graz-Andritz STMK [—] 2.5.1973 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Mitteregg Sausal S-STMK [—] 24.6.1973 E. Kreissl leg. [46°48' N, 15°26' E], ☿.
**Geographic distribution:** 28 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 11.0% of 236 Styrian *Camponotus* records. 24.3% of 107 Styrian records of *Dolichoderus*, *Camponotus fallax*, and *Colobopsis*.
**Status discussion:** Against my subjective estimation, data were insufficient to show any significant population increase in relation to other arboricole species.

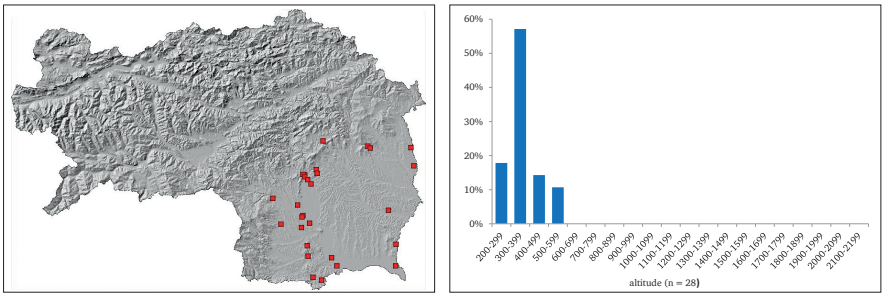


*Fig. 68: Camponotus fallax*, horizontal and vertical distribution.

## *Camponotus* (*Myrmentoma*) *lateralis* (Olivier, 1792)

**Literature:** Hölzel 1952, vgl. Wagner 2014, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 1 locality. West Styrian hilly Foreland. 200-300 m altitude.
**Relative frequency:** < 0.5% of 236 Styrian *Camponotus* records.
**Status discussion:** The occurrence in Styria is possible but doubtful and should be confirmed in future. Hölzel's (1952, p.114) description "*Kopf und Vorderkörper hell kastanienbraun, Hinterleib schwarz … ich kenne sie aus Spielfeld-Straß in Untersteiermark*." convinced me to provoke its inclusion in the Styrian checklist (Steiner et al. 2017), but I have never seen Styrian material of the species. *Camponotus piceus*, the only species with which confusion seems possible, is usually yet black, but rarely has a reddish mesosoma (Seifert 2019). Gregor Bračko (in litt. 2020) saw material of *C.* cf. *lateralis* collected NE of Maribor (i.e., around 15 km S of Hölzels finding) but did not include it into the Slovenian checklist (Bračko 2007).

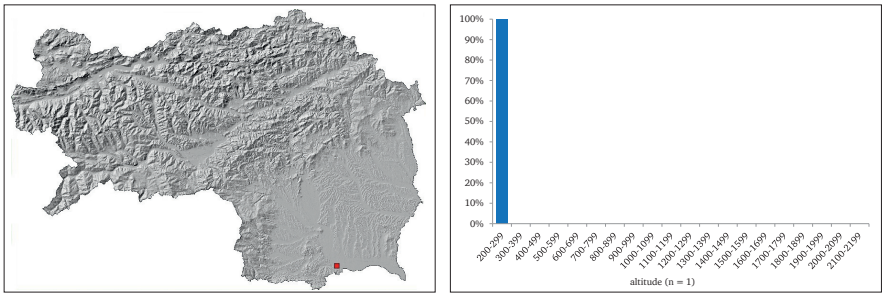


*Fig. 69: Camponotus lateralis*, horizontal and vertical distribution.

## *Camponotus* (*Myrmentoma*) *piceus* (Leach, 1825)

**Literature:** Hölzel 1966 sub *lateralis*, Bregant & Maurer 1993, Bregant 1998a, Wagner et al. 2010, Wagner 2014, Borovsky & Kunz 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Camponot. nigra*“ [46°50’ N, 15°55’ E], ☿.
**Geographic distribution:** 10 localities. West Styrian hilly Foreland and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 1.3% of 236 Styrian *Camponotus* records.

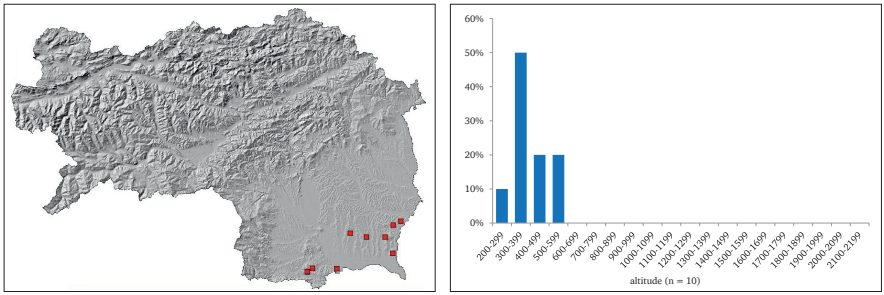


*Fig. 70: Camponotus piceus*, horizontal and vertical distribution.

## *Camponotus* (*Tanaemyrmex*) *aethiops* (Latreille, 1798)

**Literature:** Hölzel 1966, Bregant & Maurer 1993, Wagner et al. 2010, Wagner 2014, Borovsky & Kunz 2016, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09’ N, 15°18’ E], ☿☿; Pfaffenkogel N Graz STMK [—] Juni-

August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ♀; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.[19]72 „80" [47°09' N, 15°18' E], ♀♀; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.[19]72 „680" [—] „*Camponotus vagus*" [47°09' N, 15°18' E], ♀♀.
**Geographic distribution:** 4 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-600 m altitude.
**Relative frequency:** 1.3% of 236 Styrian *Camponotus* records.

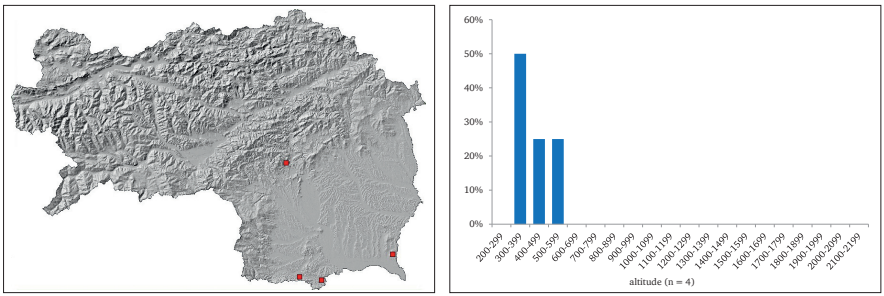


*Fig. 71: Camponotus aethiops*, horizontal and vertical distribution.

## *Colobopsis truncata* (Leach, 1825)

**Literature:** Hölzel 1966 sub *Camponotus truncata*, Bregant 1978 sub *Camponotus truncata*, Wieser & Trummer 2014 sub *Camponotus truncatus*, Wagner et al. 2015 sub *Camponotus truncatus*, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Steiner et al. 2017, Wagner 2019a.
**Material Universalmuseum Joanneum:** Graz, St. "Leechwald" [—] leg. E. Bregant "22.3.1959" [—] Inv. Nr. T 30 352 [47°05' N, 15°28' E], ♀♀; Graz-Andritz STMK [—] 10.5.1973 E. Kreissl leg. [47°06' N, 15°25' E], ♀.
**Geographic distribution:** 18 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-600 m altitude.
**Relative frequency:** 19.8% of 81 Styrian records of *Dolichoderus* and *Colobopsis*. 15.0% of 107 Styrian records of *Dolichoderus*, *Camponotus fallax*, and *Colobopsis*.
**Status discussion:** Against my subjective estimation, data were insufficient to show any significant population increase in relation to other arboricole species.

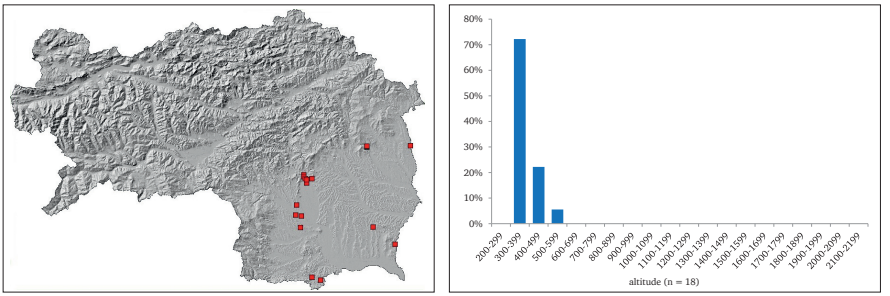


*Fig. 72: Colobopsis truncata*, horizontal and vertical distribution.

## *Lasius* (*Lasius* s. str.) *alienus* (Foerster, 1850)

**Literature:** Mayr 1855 sub *Formica aliena*, Hoffer 1890b, Hölzel 1966, Schlagbauer 1997, Friedl 2000, Wagner et al. 2010, Wagner 2011b, Wagner et al. 2012, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 19.8.1952 F. Wolf leg. [—] E4129 Coll. F. Wolf [47°09' N, 15°17' E], ♀alate; Kulm E-STMK [—] 30.5./1.6.1965 E. Kreissl leg. [47°13' N, 15°45' E], ☿; Klöch SE-STMK [—] 1967 E. Kreissl leg. [46°45' N, 15°57' E], ☿; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Lasius alienus*" [46°50' N, 15°55' E], ☿☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. „*Las. niger*" [47°13' N, 15°48' E], ♂♂.
**Geographic distribution:** 30 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-700 m altitude.
**Relative frequency:** 4.8% of 627 Styrian *Lasius* s. str. records.

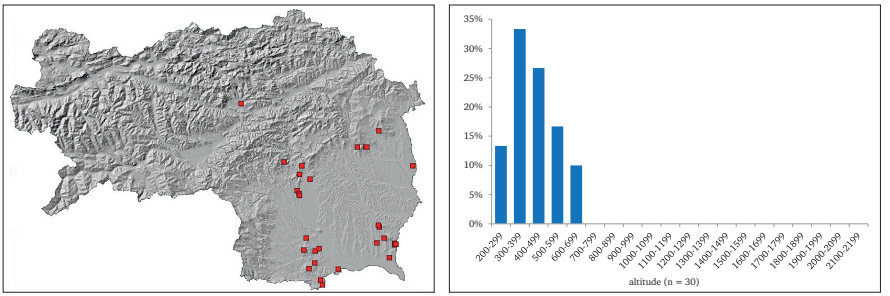


*Fig. 73: Lasius alienus*, horizontal and vertical distribution.

## *Lasius* (*Lasius* s. str.) *psammophilus* Seifert, 1992

**Literature:** Wagner 2009, Wagner et al. 2010, Wagner 2011a, Wagner et al. 2012, Borovsky & Kunz 2016 sub cf. *psammophilus*, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Pfaffenkogel N Graz STMK [—] 20.6.1970 F. Pichler leg. [47°09' N, 15°18' E], ☿☿; Stübinggraben N GRAZ [—] 9.4.1971 E. Kreissl leg. [47°11' N, 15°16' E], ☿☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.[19]72 „6.29" [—] „*Lasius niger* L." [47°09' N, 15°17' E], ☿☿; Gulsen SW Kraubath, 600 m OB-STMK [—] 6.4.1980 E. Kreissl leg. [47°17' N, 14°55' E], ☿; Katsch Steinbruch OB-STMK [—] 22.5.1980 E. Kreissl leg. [47°08' N, 14°16' E], ☿; Stradner Kg. E-STMK [—] 31.5.1983 E. Kreissl leg. [46°50' N, 15°55' E], ☿☿.
**Geographic distribution:** 14 localities. All landscape units. 400-1400 m altitude.
**Relative frequency:** 2.2% of 627 Styrian *Lasius* s. str. records.

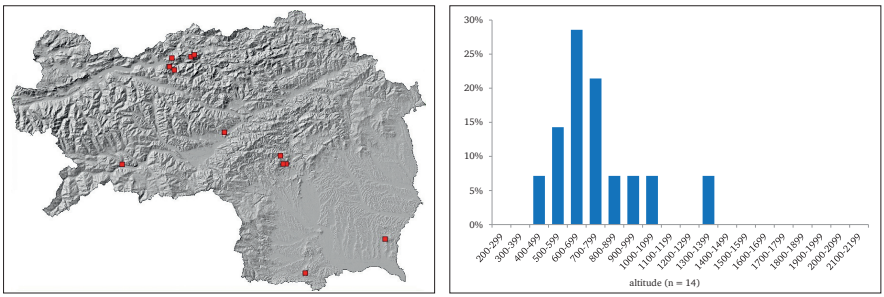


*Fig. 74: Lasius psammophilus*, horizontal and vertical distribution.

## *Lasius* (*Lasius* s. str.) *paralienus* Seifert, 1992

**Literature:** Friedl 2000, Wagner et al. 2010, Ebermann & Krisper 2014, Wieser & Trummer 2014, Kirchmair et al. 2017 sub cf. *paralienus* and cf. *psammophilus*, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Lasius alienus*" [46°50' N, 15°58' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 1.10.1977 E. Kreissl leg. [47°08' N, 15°15' E], ♀alate; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿.
**Geographic distribution:** 29 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1000 m altitude.
**Relative frequency:** 4.6% of 627 Styrian *Lasius* s. str. records.

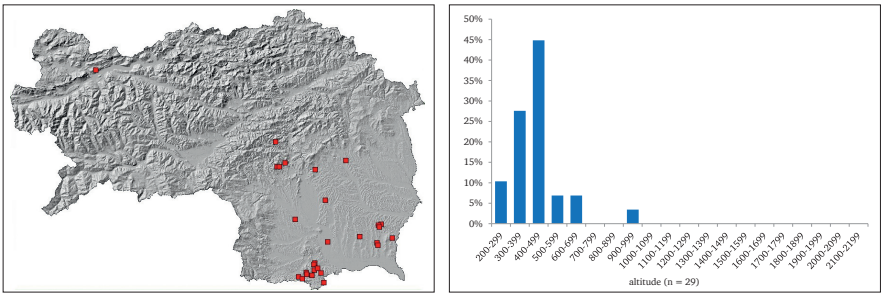


*Fig. 75: Lasius paralienus*, horizontal and vertical distribution.

### *Lasius* (*Lasius* s. str.) *niger* (Linnaeus, 1758)

**Literature:** Mayr 1855 sub *Formica nigra*, Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Hölzel 1966, Bregant 1978, Ebermann 1979, Ebermann 1980, Ebermann 1982, Kaiser 1986, Friedrich & Winder 1993, Neuhäuser 1993, Neuhäuser 1996, Neuhäuser-Happe 1996b, Schlagbauer 1997, Neuhäuser-Happe & Fritz 1998, Friedl 2000, Schlick-Steiner & Steiner 2004, Wagner 2008, Frieß et al. 2010, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Ebermann & Krisper 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner et al. 2018, Wagner 2019a.
**Material Universalmuseum Joanneum:** Graz „24.VII 1906“ [—] „*Lasius niger* ♂“ Hölzel det. [—] Inv. Nr. T 30 354 [47°04’ N, 15°26’ E], ♂♂; Umg. Leibnitz STMK [—] - 1958 E. Kreissl leg. [46°47’ N, 15°32’ E], ♀♀ alate; Furtnerteich OB-STMK [—] 27.7.1968 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿; Gollersattel E-STMK [—] 6.7.1969 E. Kreissl leg. [47°14’ N, 15°32’ E], ☿; Zetzgebiet Pommesberg E-STMK [—] 24.8.1970 E. Kreissl leg. [47°18’ N, 15°36’ E], ☿; Stübinggraben - Hörgaspauli Pfaffenkogel [—] 23.6.1971 E. Kreissl leg. GRAZ-UMG. [47°09’ N, 15°17’ E], ☿☿; Furtnerteich OB-STMK [—] 15.7.1975 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿☿; Oberschöcklbach GRAZ-UMG. [—] 30.7.1975 E. Kreissl leg. „*Leptothorax nylanderi*“ [47°08’ N, 15°28’ E], ☿☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50’ N, 15°58’ E], ☿☿; STYRIA Laßnitzh. [—] 600 m H Westlich [—] 22.9.[19]76 [—] leg. Bruckman [47°04’ N, 15°34’ E], ☿☿; Anna-Teiche b. Rein GRAZ-UMG. [—] 1.4.1977 E. Kreissl leg. [47°07’ N, 15°17’ E], ☿; Ennsauen b. Irdning OB-STMK [—] 6.6.1977 E. Kreiss leg. [47°30’ N, 14°05’ E], ☿; Heimschuh Sulmtal S-STMK [—] 25.6.1977 E. Kreissl leg. [46°45’ N, 15°29’ E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 18.7.1977 E. Kreissl leg. [—] „*Lasius niger*“ [47°08’ N, 15°15’ E], ☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 18.7.1977 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿; Karlstein STMK [—] 9.9.1978 E. Kreissl leg. [47°12’ N, 15°23’ E], ☿☿; Gleinalmstraße W-STMK [—] 12.9.1978 E. Kreissl leg. [—] „*Lasius niger*“ [47°12’ N, 15°02’ E], ☿☿, ♀♀ alate; Stradnerkogel E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Lasius niger*“ [46°50’ N,

15°55’ E], ☿; Annateich b. Gratwein GRAZ-UMG. [—] 18.9.1978 E. Kreissl leg. [—] „*Lasius niger*“ [47°07’ N, 15°17’ E], ☿; Graz-St Veit 408 m STMK [—] 15.7.1979 E. Kreissl leg. [47°06’ N, 15°24’ E], ☿; Graz-Andritz STMK [—] 29.7.1979 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿☿; Stadl a. d. Mur, 890 m OB-STMK [—] 15.9.1979 E. Kreissl leg. [—] „*Lasius niger*“ [47°05’ N, 13°58’ E], ☿☿; Pichl NE Predlitz, 910 m OB-STMK [—] 15.9.1979 E. Kreissl leg. [—] „*Las. niger*“ [47°04’ N, 13°55’ E], ☿☿; Klamm S Stubenberg E-STMK [—] 8.11.1979 E. Kreissl leg. [—] „*Las. niger*“ [47°14’ N, 15°47’ E], ☿☿; Fallgraben NNE Mühlen, 1020 m OB-STMK [—] 13.6.1980 E. Kreissl leg. [47°02’ N, 14°30’ E], ☿☿; Blaubruchhöhle Zösenberg, 450 m NNE Graz [—] 28.8.1980 E. Kreissl leg. [47°08’ N, 15°27’ E], ☿☿; Zösenberg, 440 m SE-Fuß NNE Graz [—] 2.10.1980 E. Kreissl leg. [47°08’ N, 15°27’ E], ☿☿; W Thalerhof 330 m GRAZ-UMG. [—] 9.7.1981 E. Kreissl leg. [46°58’ N, 15°25’ E], ☿☿; Annengraben 420 m NNE Graz [—] 25.4.1982 E. Kreissl leg. [47°07’ N, 15°26’ E], ☿☿; Annengraben NNE Graz 420 m, STMK [—] 29.7.1982 E. Kreissl leg. [47°07’ N, 15°26’ E], ☿; Patschaberg NNW Weiz 1020 m, E-STMK [—] 30.6.1983 E. Kreissl leg. [47°16’ N, 15°36’ E], ☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42’ N, 15°37’ E], ☿☿; Ruine Stubegg Arzberg E-STMK [—] 19.4.1985 E. Kreissl leg. [47°14’ N, 15°30’ E], ☿; Salzkammergut Krippau OB-STMK [—] 18.7.1985 E. Kreissl leg. [47°41’ N, 14°42’ E], ☿☿; Kastengraben b. Rein GRAZ-UMG. [—] 22.7.1985 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿; Annengraben NNE Graz 420 m, STMK [—] 29.7.1985 E. Kreissl leg. [47°07’ N, 15°26’ E], ☿☿; Badlgraben N Graz STMK [—] 31.7.1985 E. Kreissl leg. [47°13’ N, 15°21’ E], ☿; Badendorfberg STMK? [—] 11.6.1986 E. Kreissl leg. [46°51’ N, 15°36’ E], ☿☿; Graz-Andritz STMK [—] 30.6.1986 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿☿; Mitterdorf a. d. Raab, 420 m E-STMK [—] 20.8.1986 E. Kreissl leg. [47°10’ N, 15°36’ E], ☿☿; Schlossberg b. Wildon NW-Hang STMK [—] 14.5.1987 E. Kreissl leg. T 33.801 [46°53’ N, 15°30’ E], ☿☿; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08’ N, 15°25’ E], ☿☿; Sulm SW Leibnitz a. d. Altenmarkter-Brücke 266 m, STMK [—] 3.7.1987 E. Kreissl leg. [46°46’ N, 15°32’ E], ☿☿; Graz-Andritz Schöcklbach STMK [—] 8.8.1987 E. Kreissl leg. T 33 875 [47°08’ N, 15°28’ E], ☿☿, ♀alate; Sulm SW-Leibnitz b. d. Brücke 266 m, STMK [—] 25.8.1987 E. Kreissl leg. [46°46’ N, 15°32’ E], ☿☿; Eichfeld N-Mureck STMK [—] 30.9.1987 E. Kreissl leg. T 33 925 [46°43’ N, 15°46’ E], ☿☿; Schl. Ottersbach

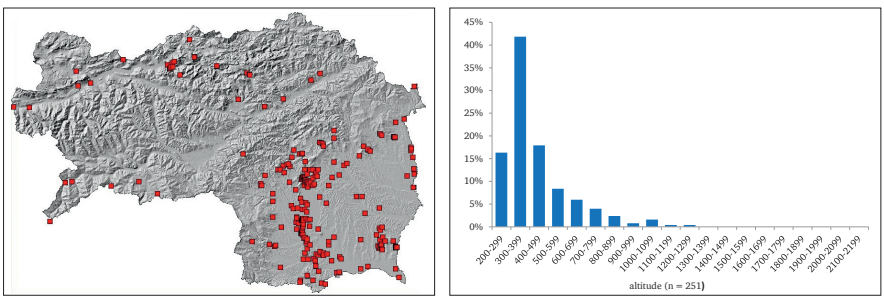


*Fig. 76: Lasius niger*, horizontal and vertical distribution.

im Sulmtal W-STMK, 290 m [—] 21.4.1988 E. Kreissl leg. [46°45' N, 15°24' E], ☿; Graz, Andritz, St. leg. E. Kreissl [—] Wasserwerkschonung [47°06' N, 15°24' E], ☿.
**Geographic distribution:** 251 localities. All landscape units. 200-1300 m altitude.
**Relative frequency:** 37.8% of 627 Styrian *Lasius* s. str. records.

### *Lasius* (*Lasius* s. str.) *platythorax* Seifert, 1991

**Literature:** Franz & Klimesch 1947 sub *niger*, Neuhäuser-Happe 1996b sub *niger*, Friedl 2000, Wagner 2008, Wagner 2009, Wagner 2010, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** „Sonnberg 1200 m St. Erhard/Br. 20.8.[19]51," [—] „*Lasius niger* ☿" Hölzel det. [—] Inv. Nr. T [47°23' N, 15°27' E], ☿; nördl. Umgb. Graz St., leg. E. Bregant [—] Weinitzen „19.3.1959" [—] Inv. Nr. T 30 352 [47°08' N, 15°29' E], ☿; Umg. Neumarkt OB-STMK [—] 12.-28.6.1963 E. Kreissl leg. [47°04' N, 14°25' E], ☿; Wildonerberg STMK [—] 25.6.1965 E. Kreissl leg. [46°53' N, 15°30' E], ☿☿; Dürnberger Moor, OB-STMK [—] 25.7.1965 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿; Kugelstein N Graz, STMK [—] 9.4.1966 E. Kreissl leg. [47°13' N, 15°20' E], ☿; Wundschuher Teiche, Graz-Umg. STMK [—] 23.4.1966 E. Kreissl leg. [46°55' N, 15°26' E], ☿☿; Klöch E-STMK [—] 1967 E. Kreissl leg. [46°45' N, 15°57' E], ☿; Soboth Koralpengebiet SW-STMK [—] 5.-8.6.1967 E. Kreissl leg. [—] „*Lasius niger*" [46°40' N, 15°04' E], ☿☿; Murau S Graz, STMK [—] 28.5.1968 E. Kreissl leg. [47°00' N, 15°28' E], ☿☿; Ingeringsee OB-STMK [—] 20.10.1968 E. Kreissl leg. [—] „♂ *F. polyctena* […] II.1969" [47°20' N, 14°39' E], ♀alate; Plattengebiet-Oberweizbach Graz, STMK [—] 18.4.1970 E. Kreissl leg. [47°06' N, 15°28' E], ☿☿; Pfaffenkogel N Graz STMK [—] 20.6.1970 F. Pichler leg. [47°09' N, 15°18' E], ☿; Furtnerteich Bez. Murau OB-STMK [—] 5.-8.7.1970 E. Kreissl leg. [47°05' N, 14°23' E], ☿☿; Eibisberg NW Anger E-STMK [—] 17.8.1970 E. Kreissl leg. [47°18' N, 15°36' E], ♀ alate; Zetzgebiet Pommesberg E-STMK [—] 24.8.1970 E. Kreissl leg. [47°18' N, 15°36' E], ♀ dealate; Pfaffenkogel über Enzenbach GRAZ-UMG [—] 9.4.1971 E. Kreissl leg. [47°09' N, 15°18' E], ☿; Graz-Andritz STMK [—] 8.5.1971 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.72 „631" [—] „*Lasius niger* L." [47°09' N, 15°17' E], ☿☿; Weniggleinz SW Waldschach W-STMK [—] 24.5.1973 E. Kreissl leg. [46°48' N, 15°23' E], ☿☿; Bockernteiche SW Gratkorn GRAZ-UMG. [—] 1.11.1973 E. Kreissl leg. [47°06' N, 15°16' E], ☿☿; Mitteregg Sausal W-STMK [—] 31.5.1974 E. Kreissl leg. [46°48' N, 15°26' E], ☿☿; Sallagraben Stubalpengeb. W-STMK [—] 24.4.1975 E. Kreissl leg. [47°05' N, 15°01' E], ☿; Dürnberger Moor SW Mariahof OB-STMK [—] 24.4.1975 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿; Kalkofen Karriegel E-STMK [—] 1.5.1975 E. Kreissl leg. [—] „*Myr. laevinod. Las. niger*" [47°17' N, 15°36' E], ☿; Auerlingsee Grebenzengebiet OB-STMK [—] 23.7.1975 E. Kreissl leg. [47°01' N, 14°18' E], ♀♀ alate; Auerlingsee Grebenzengebiet OB-STMK [—] 23.7.1975 E. Kreissl leg. [—] „*Lasius flavus*" [47°01' N, 14°18' E], ♀♀ alate; Furtnerteich

OB-STMK [—] 12.4.1976 E. Kreissl leg. [47°05' N, 14°23' E], ☿☿; Frieskogel Gipfelbereich E-STMK [—] 20.4.1976 E. Kreissl leg. [—] „*Lasius umbratus*" [47°21' N, 15°28' E], ♀dealate; Kreuzeckgeb. OB-STMK [—] 10.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Dürnberger Moor, SE OB-STMK [—] 11.8.1976 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 20.9.1976 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; STYRIA Laßnitzh. [—] 600 m H Westlich [—] 22.9.1976 [—] leg. Bruckman [47°04' N, 15°34' E], ☿☿; Kehrergraben b. Rein GRAZ-UMG. [—] 20.3.1977 E. Kreissl leg. [47°07' N, 15°15' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 25.4.1977 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Pürgschachen Moor b. Ardning OB-STMK [—] 11.6.1977 E. Kreissl leg. [47°35' N, 14°21' E], ☿☿; Johnsbachtal OB-STMK [—] 11.6.1977 E. Kreissl leg. [47°34' N, 14°35' E], ☿; Paalgraben S Stadl a. d. Mur OB-STMK [—] 11.9.1977 E. Kreissl leg. [47°02' N, 14°00' E], ☿☿; Kastengraben Rein 520-540 m, STMK. Mischwald [—] 25.3.1978 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Kapfenberg Burgberg 640 m, STMK. felsige Wegböschung [—] 28.3.1978 E. Kreissl leg. [47°26' N, 15°17' E], ☿☿; Graz-Andritz STMK [—] 8.4.1978 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; SW Althofen Katschtal OB-STMK [—] 19.6.1978 E. Kreissl leg. [—] „*Las. niger*" [47°09' N, 14°14' E], ☿☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Lasius niger*" [47°01' N, 14°24' E], ☿; Dürnberger Moor OB-STMK [—] 22.6.1978 E. Kreissl leg. [—] „*Las. niger*" [47°05' N, 14°21' E], ☿☿; Ob. Grasluppteich OB-STMK [—] 26.6.1978 E. Kreissl leg. [47°04' N, 14°22' E], ☿☿; Dürnberger Moor OB-STMK [—] 29.7.1978 E. Kreissl leg. [—] „*Lasius niger*" [47°05' N, 14°21' E], ☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [—] „*Lasius niger*" [47°09' N, 15°18' E], ☿☿; Mühlbachgraben b. Rein, 580 m GRAZ-UMG. [—] Juni 1979 E. Kreissl leg. [47°09' N, 15°15' E], ☿; S Neumarkt, St. Veiter Bach OB-STMK [—] 760 m 15.9.1979 E. Kreissl leg. [—] „*Lasius niger*" [47°02' N, 14°26' E], ☿; SSE Niederwölz 740 m, OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] „*Lasius niger Form. fusca*" [47°08' N, 14°22' E], ☿; Dürnberger Moor, 990 m OB-STMK [—] 18.9.1979 E. Kreissl leg. [—] „*Lasius niger*" [47°05' N, 14°21' E], ☿☿; Riegersburg 460 m E-STMK [—] 14.4.1980 E. Kreissl leg. [47°00' N, 15°56' E], ☿; Thayagraben NE St. Lambrecht 940 m, OB-STMK [—] 23.5.1980 E. Kreissl leg. [47°05' N, 14°19' E], ☿☿; Adelsberg N Neumarkt, 1020 m OB-STMK [—] 2.6.1980 E. Kreissl leg. [47°06' N, 14°22' E], ☿☿; NNW Mühlen, SW Neumarkt, 1070 m OB-STMK [—] 11.6.1980 E. Kreissl leg. [47°03' N, 14°29' E], ☿☿; Mühlbachgraben b. Rein, 510 m GRAZ-UMG. [—] 1.7.1981 E. Kreissl leg. [47°08' N, 15°15' E], ☿☿; Hörgasgraben b. Rein, 600 m GRAZ-UMG. [—] 6.4.1982 E. Kreissl leg. [47°09' N, 15°16' E], ☿☿; Packer Stausee 850 m, W-STMK [—] 1.6.1982 F. Wolf leg. [—] 4129 Coll. F. Wolf [46°58' N, 15°01' E], ☿☿; Kehrerwald SW Rein, 650 m GRAZ-UMG. [—] 24.6.1982 E. Kreissl leg. [47°07' N, 15°16' E], ☿☿; Schlossberg b. Wildon, 400 m STMK [—] 22.5.1983 E. Kreissl leg. [46°53' N, 15°30' E], ☿; Greiml WSW Stainach OB-STMK [—] 23.6.1983 E. Kreissl leg. [47°31' N, 14°03' E], ☿☿; Ruine Peggau GRAZ-UMG. [—] 4.4.1985 E. Kreissl leg. [47°12' N, 15°21' E], ☿☿; Fantsch, N Gleinstätten W-STMK [—] 25.4.1985 E. Kreissl leg. [46°47' N, 15°21' E], ☿☿; Weißenbach-St. Gallen OB-STMK [—] 10.6.1985 E. Kreissl leg. [47°42' N, 14°37' E], ☿☿; Graz-Andritz STMK [—] 5.4.1986 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Graz-Andritz Schöcklbach

STMK [—] 8.8.1987 E. Kreissl leg. T 33 875 [47°08' N, 15°28' E], ☿☿; Stanzbachgraben SSE Stanz im Mürztal 680 m, STMK. [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°27' N, 15°30' E], ☿☿; Mühlbachgraben b. Rein, 560 m GRAZ-UMG. [—] Juni 1979 E. Kreissl leg. [47°09' N, 15°15' E], ☿☿; Mühlbachgraben b. Rein, 580 m GRAZ-UMG. [—] Juni 1979 E. Kreissl leg. [—] Okt. 1970 [/] „*Las. niger*" [47°09' N, 15°15' E], ☿.
**Geographic distribution:** 153 localities. All landscape units. 200-1400 m altitude.
**Relative frequency:** 23.4% of 627 Styrian *Lasius* s. str. records.

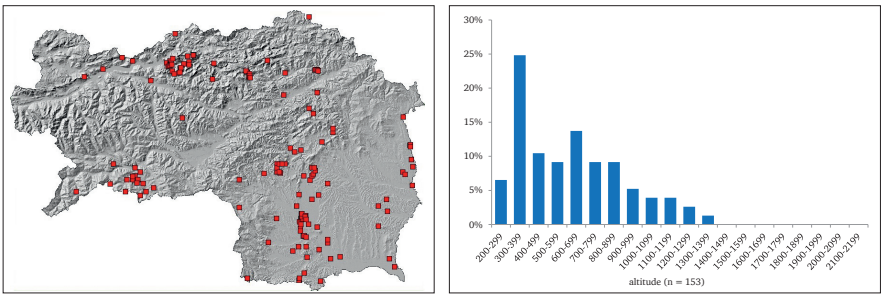


*Fig. 77: Lasius platythorax*, horizontal and vertical distribution.

## *Lasius* (*Lasius* s. str.) *emarginatus* (Olivier, 1792)

**Literature:** Hölzel 1966 partly sub *Liometopum microcephalum*, Bregant 1978, Friedrich & Winder 1993, Neuhäuser 1996, Neuhäuser-Happe 1996b, Neuhäuser-Happe & Fritz 1998, Friedl 2000, Schlick-Steiner & Steiner 2004, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Ebermann & Krisper 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** „Gösting St. 3.4.[19]27" [—] „*Liometopum microcephalum* ☿" Hölzel det.; [—] Inv. Nr. T 30 354 [47°06' N, 15°24' E], ☿ [comment: head missing]; Leibnitz, Stmk. „Kreuzkogl" [sic; Kreuzkogel is meant] [/] „6.IX.1949" [—] 1299 [46°47' N, 15°30' E], ☿; Buchkogel W Graz STMK [—] 19.6.1965 E. Kreissl leg. [—] „*Lasius emarginatu*" [47°02' N, 15°22' E], ☿☿; Pfaffenkogel Graz-Umg. STMK [—] 7.4.1968 E. Kreissl leg. [—] „*Lasius emarginatus* 11.1968" [47°09' N, 15°18' E], ☿☿; Peggauer Wand Graz-Umg. STMK [—] 7.4.1968 E. Kreissl leg. [47°12' N, 15°20' E], ☿☿, ♀ dealate [comment: the ☿☿ are scarcely haired nanitics] [47°12' N, 15°20' E], ☿☿; Graz-Andritz STMK [—] 1.7.1969 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Pfaffenkogel N Graz STMK [—] 18.5.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Graz-Andritz STMK [—] 24.5.1970 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Enzenbachgraben Graz-Umg. STMK [—] 15.9.1970 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Schöcklgebiet Klammgr.-Novystein GRAZ-UMG. [—] Okt. 1970 E. Kreissl leg. [47°10' N, 15°28' E], ☿; Burgau E-STMK [—] 4.4.1971 E. Kreissl leg. [47°08' N, 16°05' E], ☿; Pfaffenkogel E-Seite GRAZ-UMG.

[—] 4.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ♀; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 1.4.1972 E. Kreissl leg. [47°10' N, 15°19' E], ♀♀; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 10.4.1972 E. Kreissl leg. [47°09' N, 15°17' E], ♀; Kapfenstein E-STMK [—] 1.6.1972 E. Kreissl leg. [46°53' N, 15°58' E], ♀♀; Eibiswald-St. Lorenzen KORALPENGEBIET [—] 3.6.1973 E. Kreissl leg. [46°39' N, 15°10' E], ♀; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.3.1974 E. Kreissl leg. [47°10' N, 15°19' E], ♀; Wildpark Herberstein E-STMK [—] 16.6.1974 E. Kreissl leg. [47°13' N, 15°48' E], ♀; Pfaffenkogel NE-Abfall GRAZ-UMG. [—] 8.3.1975 E. Kreissl leg. [47°10' N, 15°18' E], ♀; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] "*Tetram. caespit. Las. emarginat. Stenam. westwoodi*" [46°39' N, 15°28' E], ♀; Dürnberger Moor OB-STMK [—] 14.4.1976 E. Kreissl leg. [47°05' N, 14°21' E], ♀♀; Adelsberg OB-STMK [—] 14.4.1976 E. Kreissl leg. [47°06' N, 14°22' E], ♀; Frieskogel Gipfelbereich E-STMK [—] 20.4.1976 E. Kreissl leg. [47°21' N, 15°28' E], ♀♀; Ruine Gleichenberg E-STMK [—] 8. 5. 1976 E. Kreissl leg. [—] "*Lasius emarginatus*" [46°53' N, 15°53' E], ♀; Olsaklamm S Neumarkt OB-STMK [—] 21.7.1976 E. Kreissl leg. [—] "*Lasius emarginatus*" [47°02' N, 14°25' E], ♀; Mitteregg Sausal W-STMK [—] 23.4.1977 E. Kreissl leg. [—] "*Lasius emarginatus*" [46°48' N, 15°26' E], ♀♀; Wildonerberg S Graz STMK [—] 23.4.1977 E. Kreissl leg. [46°53' N, 15°30' E], ♀♀; Weizklamm GRAZ-UMG. [—] 6.7.1977 E. Kreissl leg. [47°16' N, 15°34' E], ♀♀; Schl. Kapfenberg E-Hang, 650 m E-STMK [—] 28.3.1978 E. Kreissl leg. [47°26' N, 15°17' E], ♀♀; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [—] "*Leptoth. nigriceps*" [47°21' N, 15°04' E], ♀; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09' N, 15°18' E], ♀♀; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Lasius emarginatus*" [47°00' N, 15°56' E], ♀♀; Kapfenstein E-STMK [—] 14.9.1978 E. Kreissl leg. [—] "*Lasius emarginatus*" [46°53' N, 15°58' E], ♀♀; Schloß Herberstein E-STMK, 410 m [—] 19.5.1979 E. Kreissl leg. 19.5.1979 [sic; date is given twice] [—] "*Lasius emarginat*" [47°12' N, 15°48' E], ♀♀; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [47°00' N, 15°56' E], ♀♀; Fuß d. Peggauer Wand GRAZ-UMG., 420 m [—] 7.8.1979 E. Kreissl leg. [47°12' N, 15°20' E], ♀♀; Badlgalerie N Peggau, 410 m [—] 7.8.1979 E. Kreissl leg. [—] "*Lasius emarginatus*" [47°13' N, 15°20' E], ♀; Fuß d. Peggauer Wand, 430 m GRAZ-UMG. [—] 7.8.1979 E. Kreissl leg. [—] "*Las. emarginatus*" [47°12' N, 15°20' E], ♀; Dürnstein OB-STMK [—] 23.6.1980 E. Kreissl leg. [47°00' N, 14°23' E], ♀♀; Zenzlwand N Eggenfeld GRAZ-UMG. [—] 15.6.1981 E. Kreissl leg. [47°09' N, 15°19' E], ♀♀; Graz-Andritz STMK [—] 27.9.1981 E. Kreissl leg. [47°06' N, 15°25' E], ♀; Bruck a. d. Mur STMK, 530 m [—] 18.6.1982 E. Kreissl leg. [47°24' N, 15°16' E], ♀♀; Rötz, 400 m S Gratwein GRAZ-UMG [—] 5.8.1982 E. Kreissl leg. [47°06' N, 15°19' E], ♀♀; Kalkleiten N Graz, 700 m [—] STMK [—] 11.8.1982 E. Kreissl leg. [47°08' N, 15°26' E], ♀♀, ♀♀ alate; Hohenberg, 700 m Schöcklgebiet GRAZ-UMG. [—] 13.5.1983 E. Kreissl leg. [47°09' N, 15°27' E], ♀♀; Stradner Kg. E-STMK [—] 31.5.1983 E. Kreissl leg. [46°50' N, 15°55' E], ♀♀; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42' N, 15°37' E], ♀♀; Mur bei Teufenbach OB-STMK [—] 8.8.1984 E. Kreissl leg. [47°08' N, 14°21' E], ♀; Ruine Peggau GRAZ-UMG. [—] 4.4.1985 E. Kreissl leg. [47°12' N, 15°21' E], ♀♀; Annengraben NNE Graz 420 m, STMK [—] 29.7.1985 E. Kreissl leg. [47°07' N, 15°26' E], ♀♀; S Mahorko S

STMK [—] 31.5.1986 E. Kreissl leg. [46°40' N, 15°32' E], ☿☿; Ruine Sturmberg N Weiz E-STMK [—] 1.6.1986 E. Kreissl leg. [47°14' N, 15°36' E], ☿; Gsollerkogel N Gratwein STMK. [—] 28.4.1987 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Schlossberg b. Wildon NW-Hang STMK [—] 14.5.1987 E. Kreissl leg. T 33.801 [46°53' N, 15°30' E], ☿; Ruine Schmirnberg STMK [—] 16.6.1987 E. Kreissl leg. [46°37' N, 15°29' E], ☿☿; Frohnleiten E-Rabenstein STMK. [—] 15.9.1987 E. Kreissl leg. T 33 912 [47°15' N, 15°18' E], ☿☿; Schl. Ottersbach im Sulmtal W-STMK, 290 m [—] 21.4.1988 E. Kreissl leg. [46°45' N, 15°24' E], ☿☿.

**Geographic distribution:** 109 localities. All landscape units. 200-1500 m altitude.

**Relative frequency:** 16.7% of 627 Styrian *Lasius* s. str. records.

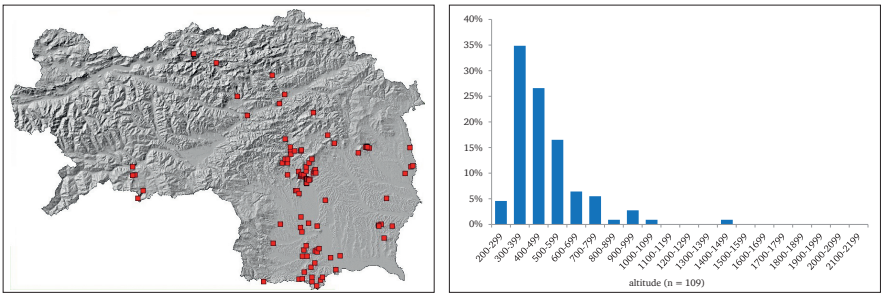


*Fig. 78: Lasius emarginatus*, horizontal and vertical distribution.

## *Lasius* (*Lasius* s. str.) *brunneus* (Latreille, 1798)

**Literature:** Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Hölzel 1966, Bregant 1978, Neuhäuser 1996, Neuhäuser-Happe 1996b, Glaser 1997, Neuhäuser-Happe & Fritz 1998, Neuhäuser-Happe 1999, Wagner 2008, Wagner 2011b, Ebermann & Krisper 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** Umg. Graz („Süd") Styr. „14.4.[19]27" [—] Inv. Nr. T 30 354 [47°00' N, 15°26' E], ☿; St. Veit o. Graz Styr. „26.4.[19]27" [—] Inv. Nr. T 30 354 [47°06' N, 15°24' E], ☿; St. Veit o. Graz Styr. „26.4.[19]27" [—] „*Lasius brunneus* ☿" Hölzel det. [—] Inv. Nr. T 30 354 [47°06' N, 15°24' E], ☿; STYRIA Umgeb. Peggau [—] Badlgraben Umg. Badlhöhle [—] E. Bregant leg. 22.IV.1962 [—] Inv. Nr. T 30 352 [47°13' N, 15°21' E], ☿☿; Kulm Stubenberg E-STMK [—] 29.5.1965 E. Kreissl leg. [47°13' N, 15°46' E], ☿☿; Kugelstein N Graz, STMK [—] 9.4.1966 E. Kreissl leg. [47°13' N, 15°20' E], ☿☿; Schöcklgebiet Klammgraben GRAZ-UMG. [—] 30.11.1970 E. Kreissl leg. [47°23' N, 15°29' E], ☿; Blumau E-STMK [—] 4.4.1971 E. Kreissl leg. [47°07' N, 16°02' E], ☿☿; Wildonerberg Buchkogelgebiet STMK [—] 27.6.1971 E. Kreissl leg. [46°52' N, 15°30' E], ☿☿; Reiteregg STMK [—] 6.-8.12.1971 E. Kreissl leg. [47°03' N, 15°16' E], ☿☿; Demmer-

kogel Sausal S-STMK [—] 24.6.1973 E. Kreissl leg. [46°47' N, 15°25' E], ☿; W St. Radegund GRAZ-UMG. [—] 14.10.1973 E. Kreissl leg. [47°10' N, 15°28' E], ☿☿; Rannach GRAZ-UMG. [—] 23.1.1974 E. Kreissl leg. [47°08' N, 15°23' E], ☿☿; Pichling b. Rassach W-STMK [—] 27.11.1974 E. Kreissl leg. [—] „*Lasius brunneus*" [46°54' N, 15°16' E], ☿; Klamm Stubenberg Hartberg STMK. Mischwald gesiebt [—] 3.5.1978 E. Kreissl leg. [47°14' N, 15°47' E], ☿; Annateich S Rein, 410 m GRAZ-UMG [—] 24.6.1982 E. Kreissl leg. [47°07' N, 15°17' E], ♀; Fantsch, N Gleinstätten W-STMK [—] 25.4.1985 E. Kreissl leg. [46°47' N, 15°21' E], ☿☿; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 21.6.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Graz-Andritz STMK [—] 29.5.1986 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿, ♀♀alate; Graz, STMK Neue Welt-Höhe [—] 29.5.1986 T 33.558 E. Kreissl leg. [47°03' N, 15°29' E], ☿☿, ♀♀alate [comment: legs and antennae have been partly cut off before the ☿☿ have been collected]; Graz-Andritz STMK [—] 30.6.1986 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Edelsdorf im Stanzertal STMK [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°28' N, 15°27' E], ☿; Schloß Trautenfels OB-STMK 670 m [—] 18.7.2016, Nest in gefälltem Baumstamm K. Krenn leg. E 8054 [47°31' N, 14°04' E], ☿☿.
**Geographic distribution:** 89 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1200 m altitude.
**Relative frequency:** 10.4% of 627 Styrian *Lasius* s. str. records.

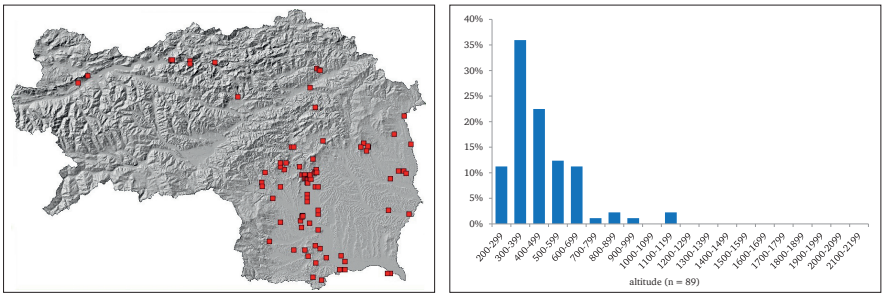


*Fig. 79: Lasius brunneus*, horizontal and vertical distribution.

## *Lasius* (*Cautolasius*) *flavus* (Fabricius, 1782)

**Literature:** Mayr 1855 sub *Formica flava*, Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Hölzel 1966, Bregant 1978, Ebermann 1979, Ebermann 1981, Ebermann 1982, Kaiser 1986, Neuhäuser 1993, Neuhäuser-Happe 1996b, Neuhäuser-Happe 1996a, Glaser 1997, Schlagbauer 1997, Neuhäuser-Happe & Fritz 1998, Friedl 2000, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Frieß et al. 2010, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Wagner 2012, Ebermann & Krisper 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a.

**Material Universalmuseum Joanneum:** STYRIA Graz-Andritz [—] Schutzgebiet d. Wasserwerkes [—] E. Bregant leg. 6. Mai 1962 [—] Inv. Nr. T 30 352 [47°06' N, 15°24' E], ☿☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Pfaffenkogel über Hörgaspauli GRAZ-UMG. [—] 10.4.1972 E. Kreissl leg. [47°09' N, 15°17' E], ☿☿; Austria Styria Pfaffenkogel ES bei Kleinstübing leg. Kreissl 1.6.[19]72 „685" [—] „*Las. flavus*" [47°09' N, 15°18' E], ☿☿; Furtnerteich OB-STMK [—] 15.7.1975 E. Kreissl leg. [47°05' N, 14°23' E], ☿; Dürnberger Moor, SE OB-STMK [—] 11.8.1976 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿; Sattental b. Pruggern OB-STMK [—] 6.6.1977 E. Kreissl leg. [47°24' N, 13°52' E], ☿☿; am St. Veiter Bach OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Lasius flavus*" [47°02' N, 14°26' E], ☿☿; Umg. Niederwölz OB-STMK [—] 30.6.1978 E. Kreissl leg. [47°09' N, 14°22' E], ☿☿; Station Furtnerteich OB-STMK [—] 3.8.1978 E. Kreissl leg. [—] „*Lasius umbratus*" [47°05' N, 14°23' E], ♀♀alate; Graz-Andritz STMK [—] 10.9.1978 E. Kreissl leg. [—] „*Lasius alienus*" [47°06' N, 15°25' E], ♀♀ alate; Schloß Herberstein E-STMK, 390 m [—] 12.5.1979 E. Kreissl leg. [47°12' N, 15°48' E], ☿☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿, ♂♂; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [—] „*Lasius emarginatus*" [47°13' N, 15°48' E], ♂♂; Oberwölz, 850 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12' N, 14°17' E], ☿☿; Graz-Andritz STMK [—] 27.4.1981 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 3.4.1985 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Graz-Andritz STMK [—] 30.6.1986 E. Kreissl leg. [47°06' N, 15°25' E], ☿; Gsollerkogel N Gratwein STMK. [—] 28.4.1987 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Graz-Andritz Schöcklbach STMK [—] 8.8.1987 E. Kreissl leg. T 33 875 [47°08' N, 15°28' E], ☿; Frohnleiten E-Rabenstein STMK. [—] 15.9.1987 E. Kreissl leg. T 33 912 [47°15' N, 15°18' E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 26.2.1990 E. Kreissl leg. [47°09' N, 15°18' E], ☿.

**Geographic distribution:** 108 localities. All landscape units. 200-1400 m altitude.

**Relative frequency:** 96.9% of 97 Styrian *Cautolasius* records.

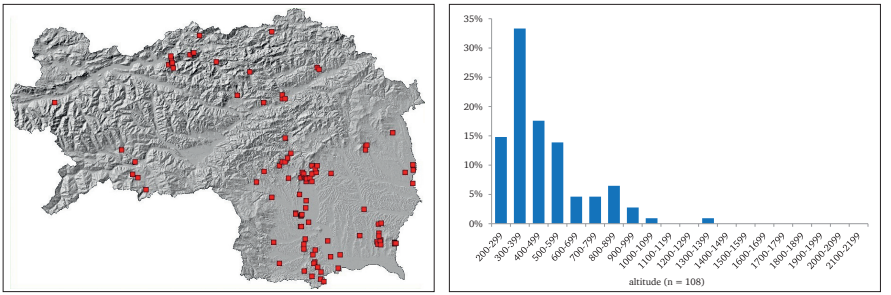


*Fig. 80: Lasius flavus*, horizontal and vertical distribution.

## *Lasius* (*Cautolasius*) *myops* Forel, 1894

**Literature:** Kinzner & Wagner 2014, Wieser & Trummer 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 3 localities. East Styrian hilly Foreland. 200-400 m altitude.
**Relative frequency:** 3.1% of 97 Styrian *Cautolasius* records.

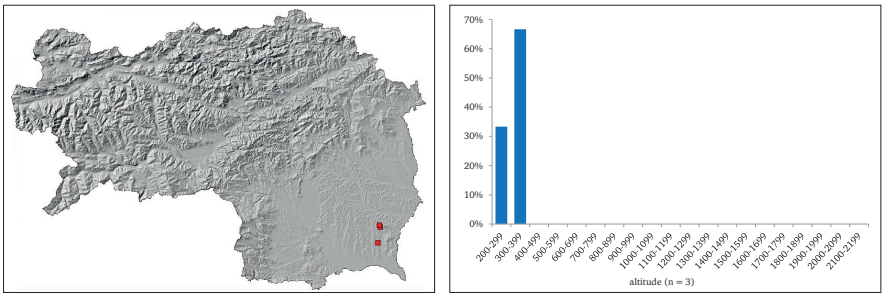


*Fig. 81: Lasius myops*, horizontal and vertical distribution.

## *Lasius* (*Chthonolasius*) *mixtus* (Nylander, 1846)

**Literature:** Hoffer 1890a, Hoffer 1890b, Hölzel 1966, Glaser 1997, Schlagbauer 1997, Schlick-Steiner & Steiner 2004, Wagner 2011a, Wagner 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Dürnberger Moor, OB-STMK [—] 25.7.1965 E. Kreissl leg. [47°05' N, 14°21' E], ☿; Teufenbach Umg., OB-STMK [—] 30.7.1970 E. Kreissl leg. [47°07' N, 14°21' E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 1.10.1977 E. Kreissl leg. [47°08' N, 15°15' E], ♀♀ alate; Peggau, 405 m Ortsmitte STMK [—] 19.10.1982 E. Kreissl leg. [47°12' N, 15°20' E], ♀ alate; Neuberg a. d. Mürz OB-STMK [—] 29.10.1985 E. Kreissl leg. [47°39' N, 15°34' E], ♀♀dealate; Heuberg STMK. Tyrnauergraben NE Frohnleiten [—] 12.11.1987 E. Kreissl leg. [47°18' N, 15°24' E], ♀dealate.
**Geographic distribution:** 20 localities. All landscape units. 300-1000 m altitude.
**Relative frequency:** 20.9% of 91 Styrian *Chthonolasius* records.

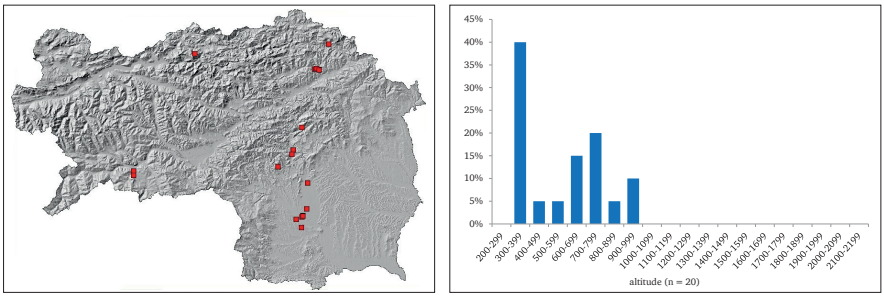


*Fig. 82: Lasius mixtus*, horizontal and vertical distribution.

### *Lasius* (*Chthonolasius*) *umbratus* (Nylander, 1846)

**Literature:** Mayr 1855 sub *Formica umbrata*, Hoffer 1890a, Hölzel 1936, Hölzel 1966, Bregant 1978, Glaser 1997, Neuhäuser-Happe 1997, Schlagbauer 1997, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2009, Frieß et al. 2010, Wagner 2010, Wagner 2011b, Wagner 2012, Jäger 2014 sub cf. *umbratus*, Wagner 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Kirchmair et al. 2017 sub *umbratus* und cf. *meridionalis*, Steiner et al. 2017, Wagner 2019a.

**Material Universalmuseum Joanneum:** DACHSTEIN S-SEITE LEG. P. [1940-1952] GUNHOLD [47°27' N, 13°36' E], ♀ alate; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 30.6.1952 Lichtfang F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°09' N, 15°17' E], ♀ alate; Muhrerteich Neumarkter Sattel, OB-STMK [—] 1964 E. Kreissl leg. [47°05' N, 14°21' E], ☿; Kulm Stubenberg E-STMK [—] 29.5.1965 E. Kreissl leg. [—] „*Lasius flavus*" [47°13' N, 15°46' E], ☿☿; Umg. Neumarkt OB-STMK [—] 30.7.1968 E. Kreissl leg. [47°04' N, 14°25' E], ☿☿; Furtnerteich OB-STMK [—] 30.07.1968 E. Kreissl leg. [47°05' N, 14°23' E], ☿☿; Murau Rantenbachgr. OB-STMK [—] 27.7.1970 E. Kreissl leg. [47°08' N, 14°09' E], ☿; Eibiswald-St. Lorenzen KORALPENGEBIET [—] 3.6.1973 E. Kreissl leg. [46°39' N, 15°10' E], ☿☿; Demmerkogel Sausal S-STMK [—] 24.6.1973 E. Kreissl leg. [46°47' N, 15°25' E], ☿; Wildpark Herberstein E-STMK [—] 30.7.1973 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿; Graz-Andritz STMK [—] 5.8.1973 E. Kreissl leg. [47°06' N, 15°25' E], ♀ dealate; Hammerwald W Katsch, Murauer Bergland, OB-STMK [—] 28.7.1974 E. Kreissl leg. [47°08' N, 14°15' E], ☿; W Schöder Niedere Tauern OB-STMK [—] 31.7.1974 E. Kreissl leg. [47°10' N, 14°06' E], ☿☿; Wildpark Herberstein E-STMK [—] 25.10.1974 E. Kreissl leg. [47°13' N, 15°48' E], ☿☿; Furtnerteich OB-STMK [—] 15.7.1975 E. Kreissl leg. [—] „*Lasius mixtus*" [47°05' N, 14°23' E], ♀ alate; Karchauereck SE Murau OB-STMK [—] 16.7.1975 E. Kreissl leg. [47°05' N, 14°15' E], ☿☿; Klammgraben Schöcklgebiet GRAZ-UMG. [—] 24.9.1976 E. Kreissl leg. [47°23' N, 15°29' E], ☿☿; Pleschkogelgebiet GRAZ-UMG. [—] 22.7.1977 E. Kreissl leg. [47°08' N, 15°13' E], ☿☿, ♀ alate [commt: the ♀ is a micro-♀ with CS = 1.272 mm!]; Pleschkogelgebiet GRAZ-UMG. [—] 22.7.1977 E. Kreissl leg. [—] 15. Okt. 1979 [/] „*Lasius umbratus* [47°08' N, 15°13' E], ☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] „*Las. niger*" [47°13' N, 15°30' E], ♀ alate; Oberwölz Stadtmauer OB-STMK [—] 19.6.1978 E. Kreissl leg. [47°12' N, 14°17' E], ☿☿; Mühlen-Aich OB-STMK [—] 2.7.1978 E. Kreissl leg. [47°01' N, 14°29' E], ☿☿; Hörgasgraben b. Rein GRAZ-UMG. [—] 17.7.1978 E. Kreissl leg. [47°10' N, 15°16' E], ☿☿; Packer Stausee W-STMK [—] 23.7.1978 E. Kreissl leg. [—] 31. Jan. 1980 [/] „*Las. umbrat*." [46°58' N, 15°01' E], ☿☿; Rein GRAZ-UMG. [—] 17.10.1978 E. Kreissl leg. [—] „*Lasius flavus*" [47°08' N, 15°17' E], ☿☿; Hörgasgraben GRAZ-UMG. [—] 17.10.1978 E. Kreissl leg. [—] „*Lasius flavus*" [47°10' N, 15°16' E], ☿☿; Graz-Andritz STMK [—] 18.7.1979 E. Kreissl leg. [—] „*Las. umbratus*" [47°06' N, 15°25' E], ♀ alate; Oberwölz, 850 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12' N, 14°17' E], ☿☿; Kehrergraben b. Rein, 520 m GRAZ-UMG. [—] 7.7.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿ [comment: compacta morph sensu Seifert (2018)]; Pleschkogel W Rein, 1015 m GRAZ-

UMG. [—] 19.7.1980 E. Kreissl leg. [47°08' N, 15°13' E], ☿☿; Blaubruchhöhle Zösenberg, 450 m NNE Graz [—] 28.8.1980 E. Kreissl leg. [47°08' N, 15°27' E], ♀♀ alate; ***Lasius* cf. *umbratus*:** Rötz, 400 m S Gratwein GRAZ-UMG [—] 5.8.1982 E. Kreissl leg. [47°06' N, 15°19' E], ☿☿ [comment: While 4 of 22 ☿☿ of this sample are typically haired ☿☿, 18 have strongly reduced hairs (nest mean of nHT = 1.5, n = 7), resembling the situation in weakly haired *L. distinguendus*. Since several ☿☿ of both forms have an asymmetric petiole, I consider them as nest sample. However, I cannot exclude the possibility of hybridization, particularly since asymmetric petiole shapes are typical for *Chthonolasius* hybrids (Seifert 2006a)].

**Geographic distribution:** 54 localities. All landscape units. 200-1300 m altitude.

**Relative frequency:** 56.0% of 91 Styrian *Chthonolasius* records.

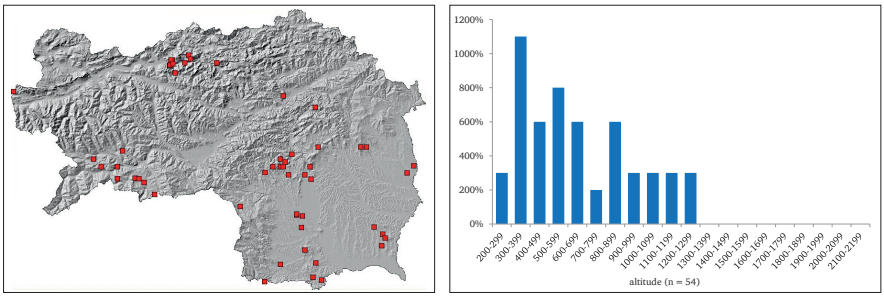


*Fig. 83: Lasius umbratus*, horizontal and vertical distribution.

## *Lasius* (*Chthonolasius*) *distinguendus* (Emery, 1916)

**Literature:** Schlick-Steiner & Steiner 2004 partly sub *sabularum*, Wagner et al. 2015, Kirchmair et al. 2017 sub *sabularum*, Steiner et al. 2017 partly sub *sabularum*.

**Material Universalmuseum Joanneum:** None. For putative hybrids see the last sample under *Lasius umbratus*.

**Geographic distribution:** 8 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-600 m altitude.

**Relative frequency:** 8.8% of 91 Styrian *Chthonolasius* records.

**Status discussion:** In the frame of an ecological study in Friesach, a list of 18 species including *L. sabularum* was presented (Schlick-Steiner & Steiner 2004). I prepared two sparsely haired *Chthonlasius* ♀♀ determined as *L. sabularum* and came to the following result: The shape of the petiole in both ♀♀ accords – for my subjective impression – better with drawings of *L. umbratus*, *L. distinguendus*, and *L. balcanicus* than with *L. sabularum* (Seifert 2018: 130). The new discriminant of Seifert (2018: 131, 13a) to determine *L. sabularum* produced the positive values 0.80 and 0.34 refering to *L. distinguendus/umbratus* and not to *L. sabularum*. I guess that also another Styrian record of *L. sabularum* (Kirchmair et al. 2017) refers to another species (the material was not available for determination) and do not know any Styrian material.

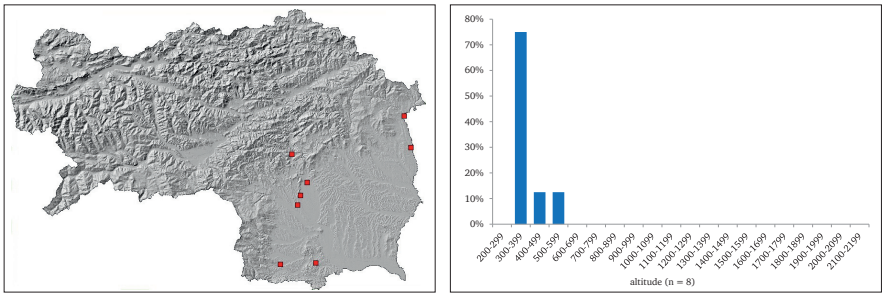


*Fig. 84: Lasius distinguendus*, horizontal and vertical distribution.

### *Lasius* (*Chthonolasius*) *meridionalis* (Bondroit, 1920)

**Literature:** Wagner 2009, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 4 localities. Northern Alps. 600-1300 m altitude.
**Relative frequency:** 4.4% of 91 Styrian *Chthonolasius* records.

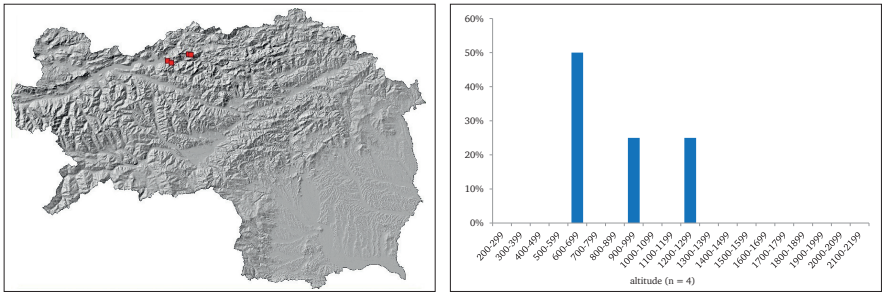


*Fig. 85: Lasius meridionalis*, horizontal and vertical distribution.

### *Lasius* (*Chthonolasius*) *jensi* (Seifert, 1982)

**Literature:** Kinzner & Wagner 2014, Wagner 2014, Wieser & Trummer 2014, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 2 localities. East Styrian hilly Foreland. 300-400 m altitude.
**Relative frequency:** 2.2% of 91 Styrian *Chthonolasius* records.

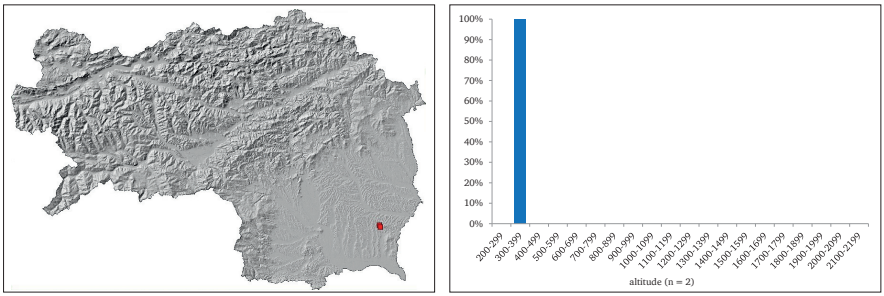


*Fig. 86: Lasius jensi*, horizontal and vertical distribution.

## *Lasius* (*Chthonolasius*) *citrinus* (Emery, 1922)

**Literature:** Wagner et al. 2010, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Kehrergraben b. Rein, 520 m GRAZ-UMG. [—] 7.7.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿.
**Geographic distribution:** 3 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 2.2% of 91 Styrian *Chthonolasius* records.

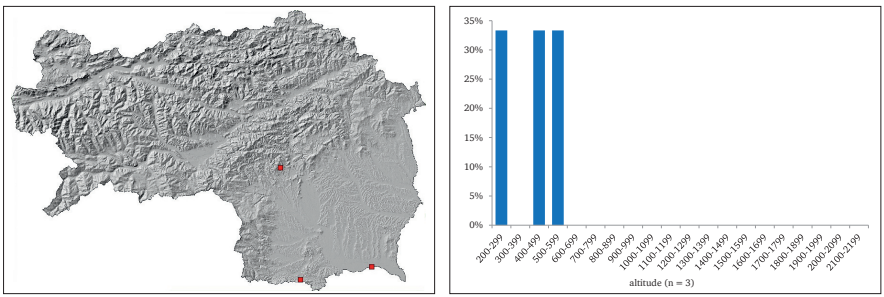


*Fig. 87: Lasius citrinus*, horizontal and vertical distribution.

## *Lasius* (*Chthonolasius*) *bicornis* (Foerster, 1850)

**Literature:** Bregant 1998a, Wagner et al. 2010, Kirchmair et al. 2017, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** STYRIA; südl. Koralpengebiet leg. E. Kreissl [—] Umgebung von St. Oswald o. E. 14. Sept. 1961 [—] 68-Hym z oo4, [46°42' N, 15°08' E], ☿ [comment: To my knowledge, this is the first ☿ of *Lasius bicornis* ever found in Austria (but see Kühnelt 1953, cf. Wagner 2014)].

**Geographic distribution:** 8 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-800 m altitude.
**Relative frequency:** 5.5% of 91 Styrian *Chthonolasius* records.

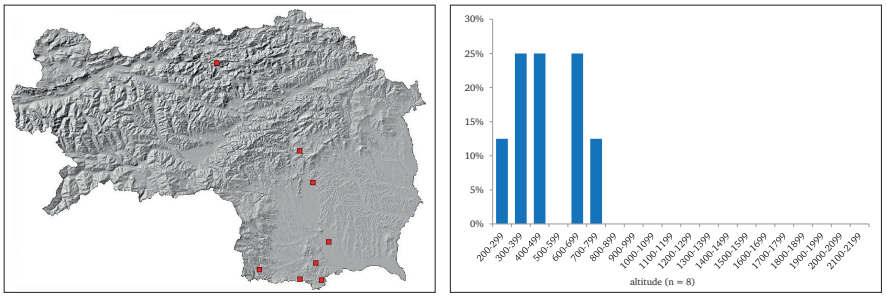


*Fig. 88: Lasius bicornis*, horizontal and vertical distribution.

## *Lasius* (*Dendrolasius*) *fuliginosus* (Latreille, 1798)

**Literature:** Mayr 1855 sub *Formica fuliginosa*, Brancsik 1871 sub *Formica fuliginosa*, Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Fossel 1963, Hölzel 1966, Bregant 1978, Ebermann 1980, Neuhäuser 1996, Neuhäuser-Happe 1996b, Glaser 1997, Neuhäuser-Happe 1999, Schlick-Steiner & Steiner 2004, Wagner 2008, Wagner 2011a, Wagner 2011b, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Borovsky & Wagner 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a.
**Material Universalmuseum Joanneum:** „Umg. Graz NW Judendorf Sty. 22.4.[19]27“ [—] „*Lasius fuliginosus* ☿“ Hölzel det. [—] Inv. Nr. 30 354 [47°06’ N, 15°20’ E], ☿☿; „2.V.[19]46 Leibnitz“ [46°47’ N, 15°32’ E], ♂; „8.5.[19]46 Seggauberg Leibnitz am […]“ [—] „749“ [46°46’ N, 15°31’ E], ☿; Furtnerteich OB-STMK [—] 27.7.1968 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿☿; Furtnerteich OB-STMK [—] 16.7.1970 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿; Enzenbachgraben Pfaffenkogel GRAZ-UMG. [—] 15.9.1970 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿☿, ♂♂; Stübinggraben - Hörgaspauli Pfaffenkogel [—] 23.6.1971 E. Kreissl leg. GRAZ-UMG. [47°09’ N, 15°17’ E], ☿☿; Wildonerberg Buchkogelgebiet STMK [—] 27.6.1971 E. Kreissl leg. [46°52’ N, 15°30’ E], ☿☿; Bockernteiche SW Gratkorn GRAZ-UMG. [—] 1.11.1973 E. Kreissl leg. [47°06’ N, 15°16’ E], ☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Lasius fuliginosus*“ [46°50’ N, 15°58’ E], ☿☿; Erhardhöhe Schöcklgebiet GRAZ-UMG. [—] 31.5.1976 E. Kreissl leg. [47°09’ N, 15°26’ E], ☿☿; Kreuzeck E-Teufenbach OB-STMK [—] 29.7.1976 E. Kreissl leg. [—] „*Lasius fuliginosus*“ [47°07’ N, 14°24’ E], ☿☿; Predlitz ? Murau OB-STMK [—] 10.9.1977 E. Kreissl leg. [—] 15. Okt. 1979 [/] „*Lasius fuliginosus*“ [47°04’ N, 13°54’ E], ☿; Karchauereckgeb. ESE Laßnitzbach OB-STMK [—] 13.9.1977 E. Kreissl leg. [—] „*Lasius fuliginosus*“

[47°06’ N, 14°12’ E], ☿; Mixnitzbach-Zechner Hube E-STMK [—] 30.5.1978 E. Kreissl leg. [47°20’ N, 15°25’ E], ☿☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Las. fuligin*.“ [47°01’ N, 14°24’ E], ☿☿; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] „*Las. fuliginos*.“ [47°09’ N, 15°18’ E], ☿; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] „*Myrm. laevin*.“ [47°09’ N, 15°18’ E], ☿; Graz-St Veit 408 m STMK [—] 15.7.1979 E. Kreissl leg. [47°06’ N, 15°24’ E], ♀alate; Fuß d. Peggauer Wand GRAZ-UMG., 420 m [—] 7.8.1979 E. Kreissl leg. [—] „*Las. alienus*“ [47°12’ N, 15°20’ E], ♀alate; „Eichen-Kiefern Mischwald W Flughafen Thalerhof, Baumstumpf 25.10.[19]79“ [46°59’ N, 15°25’ E], ☿☿; Mühlbachgraben b. Rein, 460 m GRAZ-UMG. [—] 23.4.1980 E. Kreissl leg. [47°08’ N, 15°16’ E], ☿☿; N Mühlen, SW Neumarkt, 1000 m OB-STMK [—] 10.6.1980 E. Kreissl leg. [47°01’ N, 14°30’ E], ☿☿; ENE Rein, 430 m GRAZ-UMG. [—] 20.3.1981 E. Kreissl leg. [47°08’ N, 15°18’ E], ☿☿; Annateich S Rein, 410 m GRAZ-UMG [—] 24.6.1982 E. Kreissl leg. [47°07’ N, 15°17’ E], ☿☿, ♀alate; Mühlbachgraben b. Rein GRAZ-UMG. [—] 21.4.1983 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿; Tieschen E-STMK [—] 31.5.1983 E. Kreissl leg. [46°47’ N, 15°56’ E], ♀dealate; Annengraben NNE Graz, 420 m GRAZ-UMG. [—] 4.6.1983 E. Kreissl leg. [47°07’ N, 15°26’ E], ♀♀alate; Pürgg W Stainach, 790 m OB-STMK [—] 22.6.1983 E. Kreissl leg. [47°31’ N, 14°04’ E], ☿☿, ♂♂; Hohenberg, 700 m Schöcklgebiet GRAZ-UMG. [—] 9.8.1983 E. Kreissl leg. [47°09’ N, 15°27’ E], ♀dealate; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42’ N, 15°37’ E], ☿☿; Pailgraben 420 m, NNW Graz, SE-Hang STMK. [—] 17.4.1987 E. Kreissl leg. T 33 780 [47°07’ N, 15°23’ E], ☿☿; Graz-Andritz Andritzbach 360 m, STMK: [—] 20.4.1987 E. Kreissl leg. T 33 783 [47°06’ N, 15°24’ E], ☿☿; Graz-Andritz Schöcklbach STMK [—] 8.7.1987 E. Kreissl leg. T 33 845 [47°08’ N, 15°28’ E], ☿☿, ♀♀alate ♂♂; Seggauberg b. Leibnitz S-STMK, 340 m [—] 19.4.1988 E. Kreissl leg. [46°46’ N, 15°31’ E], ☿☿; Aflenz a. d. Sulm, 300 m S-STMK [—] 10.6.1988 E. Kreissl leg. [46°45’ N, 15°32’ E], ☿☿.
**Geographic distribution:** 112 localities. All landscape units. 200-1200 m altitude.

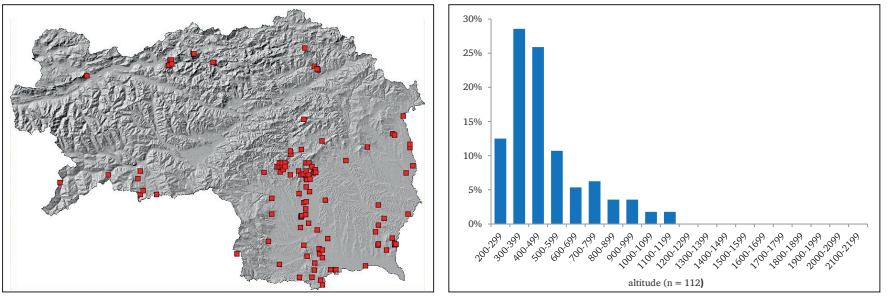


*Fig. 89 Lasius fuliginosus*, horizontal and vertical distribution.

### *Formica* (*Serviformica*) *fusca* Linnaeus, 1758

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Hoffer 1907, Hölzel 1936, Kühnelt 1962, Hölzel 1966, Eichhorn 1971, Bregant 1978, Friedrich & Winder 1993, Glaser 1997, Friedl 2000, Wagner 2008, Wagner 2009, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Wagner 2012, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Kirchmair et al. 2017, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** „3.4.[19]41 Wiesberg b. Leibnitz“ [46°47’ N, 15°31’ E], ☿☿; Leibnitz, Stmk. „Kreuzkogl“ [sic; Kreuzkogel is meant] [/] „6.IX.1949“ [—] 1302 [—] „719“ [46°47’ N, 15°30’ E], ☿; Häuselberg, Leoben Stmk., [1950-1975] leg. R. Plass [—] „*lemani*“ [47°21’ N, 15°04’ E], ☿; Furtnerteich OB-STMK [—] 14.7.1968 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿☿; Pfaffenkogel N Graz STMK [—] 20.6.1970 F. Pichler leg. [47°09’ N, 15°18’ E], ☿☿; Pfaffenkogel N Graz STMK [—] Juni-August 1970 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿☿, ♀♀ dealate; Pfaffenkogel E GRAZ-UMG. [—] 5.8.1970 E. Kreissl u. H. Hamann leg. [47°09’ N, 15°18’ E], ☿☿; Enzenbachgraben Graz-Umg. STMK [—] 15.9.1970 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿☿, ♀♀ dealate; Gleinalpengeb. SE Walzkogel W-STMK [—] 20.9.1970 E. Kreissl leg. [47°12’ N, 15°08’ E], ☿; Burgstallerhöhe - Schöcklkreuz GRAZ-UMG. [—] 17.4.1971 E. Kreissl leg. [47°12’ N, 15°29’ E], ☿; Graz-Andritz STMK [—] 8.5.1971 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿; Stübinggraben - Hörgaspauli Pfaffenkogel [—] 23.6.1971 E. Kreissl leg. GRAZ-UMG. [47°09’ N, 15°17’ E], ☿☿; Weniggleinz SW Waldschach W-STMK [—] 24.5.1973 E. Kreissl leg. [46°48’ N, 15°23’ E], ☿☿; Wildpark Herberstein E-STMK [—] 16.6.1974 E. Kreissl leg. [47°13’ N, 15°48’ E], ☿; Dürnberger Moor SW Mariahof OB-STMK [—] 24.4.1975 E. Kreissl leg. [—] „*Las. niger Form. fusca*“ [47°05’ N, 14°21’ E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] „*Tetram. caespit. Las. emarginat. Stenam. westwoodi*“ [46°39’ N, 15°28’ E], ☿; Furtnerteich OB-STMK [—] 15.7.1975 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿; Kalkberg Grebenzen OB-STMK [—] 23.7.1975 E. Kreissl leg. [—] „*Formica fusca*“ [47°04’ N, 14°20’ E], ♀ dealate; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Formica gagates*“ [46°50’ N, 15°55’ E], ☿☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50’ N, 15°58’ E], ☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 24.3.1977 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 25.4.1977 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [47°21’ N, 15°04’ E], ☿; Wölzertal E Knappsäge OB-STMK [—] 19.6.1978 E. Kreissl leg. [—] „*Form. fusca*“ [47°11’ N, 14°13’ E], ☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Myrm. laevinod.*“ [47°01’ N, 14°24’ E], ☿☿; N Wildbad Einöd OB-STMK [—] 21.6.1978 E. Kreissl leg. [—] „*Myrm. gagates*“ [47°01’ N, 14°24’ E], ☿☿; Dürnberger Moor OB-STMK [—] 22.6.1978 E. Kreissl leg. [47°05’ N, 14°21’ E], ☿; Zirbitzkogel W-Seite OB-STMK [—] 24.7.1978 E. Kreissl leg. [47°03’ N, 14°33’ E], ☿; Dürnberger Moor OB-STMK [—] 29.7.1978 E. Kreissl leg. [47°05’ N, 14°21’ E], ☿☿; Pfaffenkogel N-Graz STMK [—] 24.8.1978 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Formica fusca*“ [47°00’ N, 15°56’

E], ☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Formica gagates*“ [47°00’ N, 15°56’ E], ☿; Stradnerkogel E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Formica gagates*“ [46°50’ N, 15°55’ E], ☿; Mühlbachgraben b. Rein GRAZ-UMG. [—] 1.11.1978 E. Kreissl leg. [47°08’ N, 15°15’ E], ☿☿; Schloß Herberstein E-STMK, 410 m [—] 19.5.1979 E. Kreissl leg. 19.5.1979 [—] „*Lasius emarginat*“ [47°12’ N, 15°48’ E], ☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [—] „*Form. fusca*“ [47°09’ N, 15°18’ E], ☿☿; S Kugelstein N Peggau, 410 m GRAZ-UMG [—] 18.7.1979 E. Kreissl leg. [47°13’ N, 15°20’ E], ♂♂; Badlwand N Peggau, 420 m GRAZ-UMG. [—] 18.7.1979 E. Kreissl leg. [—] „13.10.[19]79“ [/] „*Form. fusca*“ [47°12’ N, 15°20’ E], ☿☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] „*Las. emarginat.*“ [47°00’ N, 15°56’ E], ☿☿; Fuß d. Peggauer Wand, 430 m GRAZ-UMG. [—] 7.8.1979 E. Kreissl leg. [—] „*Manica rubida*“ [47°12’ N, 15°20’ E], ☿☿; Fuß d. Peggauer Wand, 430 m GRAZ-UMG. [—] 7.8.1979 E. Kreissl leg. [—] „*Form. fusca*“ [47°12’ N, 15°20’ E], ☿☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [—] „*Form. gagates*“ [47°13’ N, 15°48’ E], ☿☿; Fuß d. Peggauer Wand GRAZ-UMG. [—] 16.10.1979 E. Kreissl leg. [47°12’ N, 15°20’ E], ☿☿; Fuß d. Peggauer Wand GRAZ-UMG. [—] 16.10.1979 E. Kreissl leg. [—] „*Form. fusca*“ [47°12’ N, 15°20’ E], ♀ dealate; Klamm S Stubenberg E-STMK [—] 8.11.1979 E. Kreissl leg. [—] „*Form. fusca*“ [47°14’ N, 15°47’ E], ☿☿; Oberwölz, 850 m OB-STMK [—] 5.6.1980 E. Kreissl leg. [47°12’ N, 14°17’ E], ☿☿; Dürnstein OB-STMK [—] 23.6.1980 E. Kreissl leg. [47°00’ N, 14°23’ E], ☿; Wallersbachgraben W Unzmarkt, 820 m OB-STMK [—] 25.6.1980 E. Kreissl leg. [47°11’ N, 14°25’ E], ☿; Mühlbachgraben b. Rein, 470 m GRAZ-UMG. [—] 16.5.1981 E. Kreissl leg. [47°08’ N, 15°16’ E], ☿☿; Zenzlwand N Eggenfeld GRAZ-UMG. [—] 15.6.1981 E. Kreissl leg. [47°09’ N, 15°19’ E], ☿☿; Graz-Andritz STMK [—] 27.9.1981 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿☿; Hörgasgraben b. Rein, 600 m GRAZ-UMG. [—] 6.4.1982 E. Kreissl leg. [47°09’ N, 15°16’ E], ☿☿; Bruck a. d. Mur STMK, 530 m [—] 18.6.1982 E. Kreissl leg. [47°24’ N, 15°16’ E], ☿; St. Anna a. Aigen E-STMK [—] 31.5.1983 E. Kreissl leg. [46°50’ N, 15°58’ E], ☿☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42’ N, 15°37’ E], ☿☿; Mur bei Teufenbach OB-STMK [—] 8.8.1984 E. Kreissl leg. [47°08’ N, 14°21’ E], ☿☿; Pfaffenkogel b. Stübing GRAZ-UMG. [—] 3.4.1985 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿; Ruine Peggau GRAZ-UMG. [—] 4.4.1985 E. Kreissl leg. [47°12’ N, 15°21’ E], ☿☿; Weißenbach-St. Gallen OB-STMK [—] 10.6.1985 E. Kreissl leg. [47°42’ N, 14°37’ E], ☿☿; Gsollerkogel N Gratwein STMK. [—] 28.4.1987 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿☿, ♀ dealate; Stattegg 440 m, N-Graz, STMK, Steinbruch [—] 15.6.1987 E. Kreissl leg. T 33 821 [47°08’ N, 15°25’ E], ☿☿; Gratwein NW Graz STMK [—] 18.6.1987 E. Kreissl leg. [47°07’ N, 15°19’ E], ☿, ♀ dealate; Schladming Untertal SSE 1070 m, STMK [—] 28.7.1987 E. Kreissl leg. [47°19’ N, 13°45’ E], ☿☿; Stanzbachgraben SSE Stanz im Mürztal 680 m, STMK. [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°27’ N, 15°30’ E], ☿☿; Edelsdorf im Stanzertal STMK [—] 13.8.1987 E. Kreissl leg. T 33 883 [47°28’ N, 15°27’ E], ☿☿; Pfaffenkogel b. Stübing, 400 m GRAZ-UMG. [—] 26.2.1990 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿.

**Geographic distribution:** 204 localities. All landscape units. 200-1400 m altitude.

**Relative frequency:** 35.8% of 531 Styrian *Serviformica* records.

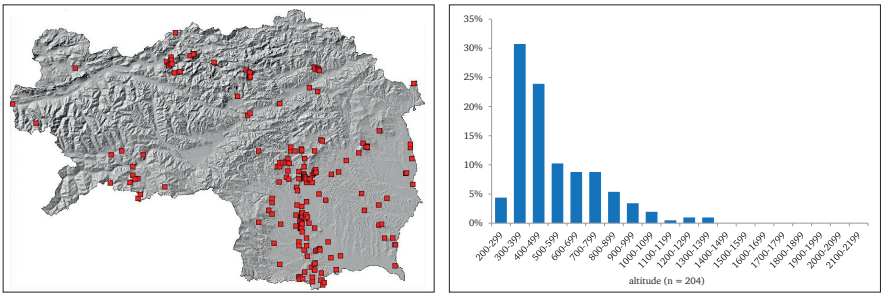


*Fig. 90: Formica fusca*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *lemani* Bondroit, 1917

**Literature:** Hölzel 1966 partly sub gagates, Eichhorn 1971, Wagner 2009, Wagner 2010, Wagner et al. 2011, Wagner 2012, Wagner 2014, Wagner et al. 2016, Steiner et al. 2017, Wagner et al. 2018.

**Material Universalmuseum Joanneum:** "Admont" [—] "*Formica fusca* ☿☿ […] [1887-1910] Strobl l." [47°34' N, 14°27' E], ☿; Umg. Admont, Stmk [1940-1952] leg. P. Gunhold [—] "*Formica lemani* Bond. ☿" Hölzel det. [47°34' N, 14°27' E], ☿☿; DACHSTEIN S-SEITE LEG. [1940-1952] P. GUNHOLD [—] "*lemani*" [47°27' N, 13°36' E], ☿☿; MAUTERN, STYR. [1940-1952] LEG. P. GUNHOLD [—] "*lemani*" [47°24' N, 14°49' E], ☿☿; Gasenbachgr. Grazer Bgld. STMK [—] 7.6.1970 E. Kreissl leg. [47°21' N, 15°40' E], ☿☿; Zetzgebiet Bendlerhöhe-Schönes Kreuz [—] 21.6.1970 E. Kreissl leg. E-STMK [47°18' N, 15°36' E], ☿, ♀♀ dealate; Eibisberg Zetzgebiet E-STMK [—] 31.10.1971 E. Kreissl leg. [47°18' N, 15°36' E], ☿☿; Burgstallerhöhe NNE GRAZ, STMK [—] 30.5.1972 E. Kreissl leg. [47°13' N, 15°30' E], ☿; Teichalpe Mixnitzbach E-STMK [—] 10.5.1974 E. Kreissl leg. [47°21' N, 15°26' E], ☿☿; Teichalmgeb. Osser E-STMK [—] 24.6.1975 E. Kreissl leg. [47°20' N, 15°30' E], ☿☿; Karchauereck SE Murau OB-STMK [—] 13.7.1975 E. Kreissl leg. [47°05' N, 14°15' E], ☿; Thomabachgraben OB-STMK [—] 20.7.1975 [—] "*Camp. herculean. Leptoth. acervorum Formica fusca aquilonia*" [47°02' N, 14°19' E], ☿, ♀ dealate; Frieskogel Gipfelbereich E-STMK [—] 20.4.1976 E. Kreissl leg. [—] "*Formica gagates*" [47°21' N, 15°28' E], ☿☿; Schöcklplateau S-Seite GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [47°11' N, 15°27' E], ☿; Grebenzengeb. b. Kalkofen OB-STMK [—] 28.7.1976 E. Kreissl leg. [—] "*Formica gagates*" [47°04' N, 14°21' E], ☿☿; Oberer Grasluppteich OB-STMK, 900 m [—] 30.7.1976 E. Kreissl leg. [—] "*Formica gagates*" [47°04' N, 14°22' E], ♀ dealate; Oberer Grasluppteich OB-STMK, 900 m [—] 30.7.1976 E. Kreissl leg. [47°04' N, 14°22' E], ☿; Kreuzeckgeb. OB-STMK [—] 10.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Sattental b. Pruggern OB-STMK [—] 6.6.1977 E. Kreissl leg. [47°24' N, 13°52' E], ☿☿; Über Großem Sölktal OB-STMK [—] 10.6.1977 E. Kreissl leg. [47°24' N, 13°57' E], ♀ dealate; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] "*Form. fusca*"

[47°13’ N, 15°30’ E], ☿☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] “*Camp. hercul.*” [47°13’ N, 15°30’ E], ☿☿; Tyrnauer Alpe Einschnitt E-STMK [—] 30.5.1978 E. Kreissl leg. [—] “*Form. aquilonia*” [47°20’ N, 15°25’ E], ☿☿; Grebenzengebiet ehem. Kalkofen OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] “*Form. fusca*” [47°04’ N, 14°21’ E], ☿☿; Grebenzengeb. OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] “*Form. gagates*” [47°02’ N, 14°20’ E], ☿☿, intermorph; Ob. Grasluppteich OB-STMK [—] 26.6.1978 E. Kreissl leg. [47°04’ N, 14°22’ E], ☿☿; Zirbitzkogel W-Seite OB-STMK [—] 24.7.1978 E. Kreissl leg. [47°03’ N, 14°33’ E], ☿; Station Furtnerteich OB-STMK [—] 3.8.1978 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿; Gleinalm b. Schutzhaus W-STMK [—] 12.9.1978 E. Kreissl leg. [47°12’ N, 15°03’ E], ☿☿; Mixnitz, 1170 m Teichalpe S BRUCK/Mur [—] 26.6.1979 E. Kreissl leg. [47°20’ N, 15°25’ E], ☿☿; Turracherhöhe, 1775 m Ob-STMK [—] 15.9.1979 E. Kreissl leg. [—] “*Form. fusca*” [46°55’ N, 13°52’ E], ☿; Kornock W Turracherhöhe 2025 m [—] 16.9.1979 E. Kreissl leg. [—] “*Form. fusca*” [46°55’ N, 13°51’ E], ☿☿, ♂♂; Gipfelbereich Schöckl b. Graz, STMK [—] 10.10.1979 E. Kreissl leg. [—] “*Form. fusca*” [47°11’ N, 15°27’ E], ☿; Gschieskogel, WNW Passail, 980 m E-STMK [—] 9.8.1980 E- Kreissl leg. [47°17’ N, 15°24’ E], ♀alate; Gleinalpe SE-Hang 1660 m, W-STMK [—] 14.8.1980 E. Kreissl leg. [47°11’ N, 15°01’ E], ☿☿; Burgstallerhöhe NNE Graz, STMK, 1020-1140 m [—] 23.9.1981 E. Kreissl leg. [47°13’ N, 15°30’ E], ♀ dealate; Streberkogel NNW Weiz E-STMK, 1330 m [—] 17.9.1982 E. Kreissl leg. [47°21’ N, 15°34’ E], ☿; Plankogel, 1520 m NNW Weiz E-STMK [—] 17.9.1982 E. Kreissl leg. [47°21’ N, 15°33’ E], ☿; Schöckl SE-Abfall GRAZ-UMG. [—] 1.4.1985 E. Kreissl leg. [47°11’ N, 15°28’ E], ☿☿; Reitinggebiet Hohenegg-Gr. STMK [—] 3.7.1985 E. Kreissl leg. [47°26’ N, 14°51’ E], ☿☿; Salzastausee OB-STMK [—] 29.7.1985 E. Kreissl leg. [47°31’ N, 13°56’ E], ☿; Schladming Untertal SSE 1050 m, STMK [—] 28.7.1987 E. Kreissl leg. [47°21’ N, 13°43’ E], ☿☿; Schladming S Obertal 1200 m, Eschachboden STMK [—] 30.7.1987 E. Kreissl leg. [47°18’ N, 13°42’ E], ☿☿.

**Geographic distribution:** 105 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 600-2100 m altitude.

**Relative frequency:** 19.8% of 531 Styrian *Serviformica* records.

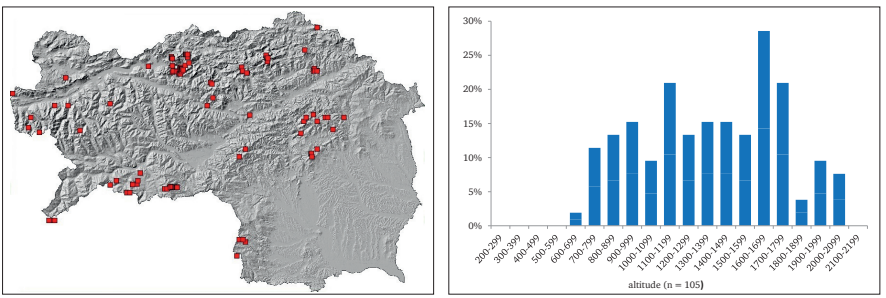


*Fig. 91: Formica lemani*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *picea* Nylander, 1846

**Literature:** Franz & Klimesch 1947, Hölzel 1966 sub *transkaucasica*, Bregant 1998a sub *transkaucasica*, Wagner 2012, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** „Admont St.“ [1887-1910] [—] „*F. gagates* Latr. Strobl l.“ [—] „*Formica gagates* Latr.“ E. Hölzel det. [47°34’ N, 14°27’ E], ☿.
**Geographic distribution:** 5 localities. Northern Alps and Central Alps. 600-1000 altitude.
**Relative frequency:** 0.6% of 531 Styrian *Serviformica* records.

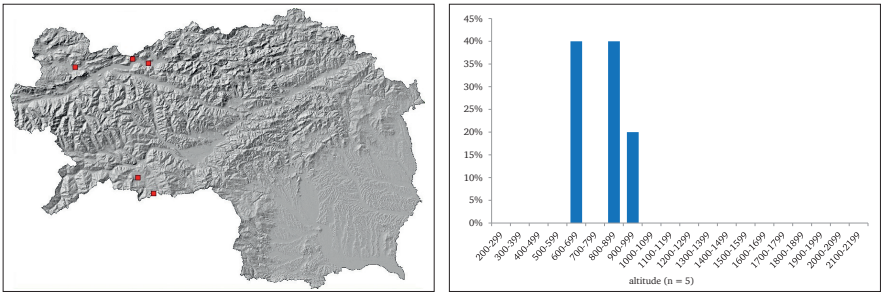


*Fig. 92: Formica picea*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *gagates* Latreille, 1846

**Literature:** Hoffer 1890a, Hoffer 1890b, Bregant 1998a, Wagner 2012, Ebermann & Krisper 2014, Wagner 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019a, Wagner 2019b.
**Material Universalmuseum Joanneum:** „Ruine Gösting b. Graz [1940-1952] leg. P. Gunhold“ [—] „*Formica gagates* Latr.“ E. Hölzel det. [47°06’ N, 15°22’ E], ☿; Bad Gleichenberg E-STMK [—] 17.6.1958 Kurpark [46°52’ N, 15°54’ E], ☿☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Formica gagates*“ [47°00’ N, 15°56’ E], ☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Form. fusca*“ [47°00’ N, 15°56’ E], ☿☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] „*Form. gagates*” [47°00’ N, 15°56’ E], ☿☿.
**Geographic distribution:** 20 localities. Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-600 m altitude.
**Relative frequency:** 3.4% of 531 Styrian *Serviformica* records.

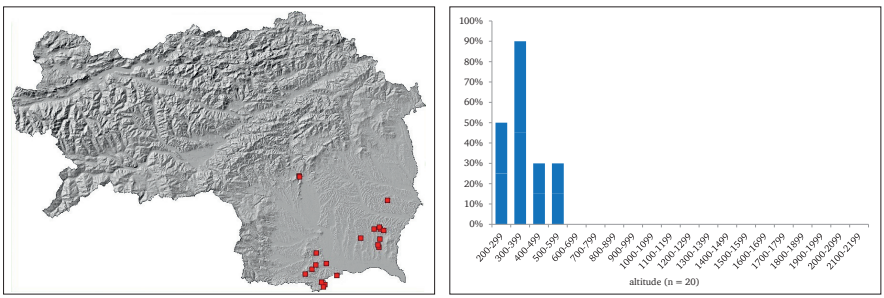


*Fig. 93: Formica gagates*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *cunicularia* Latreille, 1798

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Hoffer 1906, Hölzel 1936 sub *fuscorufibarbis*, Hölzel 1966, Glaser 1997, Schlagbauer 1997, Friedl 2000, Wagner 2008, Wagner 2009, Frieß et al. 2010, Wagner et al. 2010, Wagner 2011a, Wagner 2011b, Wagner et al. 2012, Ebermann & Krisper 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019b.

**Material Universalmuseum Joanneum:** MAUTERN, STYR. [1940-1952] LEG. P. GUNHOLD [—] „*Formica cunicularia* Latr.“ Hölzel det. [47°24’ N, 14°49’ E], ☿☿; Umg. Admont, Stmk leg. P. Gunhold [1940-1952] [—] Inv. Nr. 30 320 [47°34’ N, 14°27’ E], ☿☿; Stattegg Steinbruch Graz-Umg. [—] 30.6.1968 E. Kreissl leg. [47°08’ N, 15°25’ E], ♀ alate; Enzenbachgraben Graz-Umg. STMK [—] 15.9.1970 E. Kreissl leg. [47°09’ N, 15°18’ E], ☿; Pfaffenkogel E-Hang GRAZ-UMG. [—] 24.9.1971 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 19.3.1974 E. Kreissl leg. [47°10’ N, 15°19’ E], ☿; Oberschöcklbach GRAZ-UMG. [—] 30.7.1975 E. Kreissl leg. [47°08’ N, 15°28’ E], ☿☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50’ N, 15°58’ E], ☿; Riegersburg E-STMK [—] 14.9.1978 E. Kreissl leg. [—] „*Formica fusca*“ [47°00’ N, 15°56’ E], ☿; Hohenbergweg Schöcklgebiet GRAZ-UMG. [—] 1.11.1978 E. Kreissl leg. [—] „*Formica polyctena*“ [47°09’ N, 15°27’ E], ☿; W. Stubenberg Feistritztal E-STMK, 400 m [—] 12.4.1979 E. Kreissl leg. [—] „*Form. rufibarbis*“ [47°14’ N, 15°46’ E], ☿☿; Graz-St Veit 408 m STMK [—] 15.7.1979 E. Kreissl leg. [47°06’ N, 15°24’ E], ☿☿; Riegersburg S-Seite, 400 m E-STMK [—] 4.8.1979 E. Kreissl leg. [—] „*Form. rufibarbis*“ [47°00’ N, 15°56’ E], ☿☿; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] „*Form. fusca*“ [47°08’ N, 14°09’ E], ☿☿; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] „*Myrm. scabrinod.*“ [47°08’ N, 14°09’ E], ☿☿; Zösenberg, 440 m SE-Fuß NNE Graz [—] 2.10.1980 E. Kreissl leg. [47°08’ N, 15°27’ E], ☿; Graz-Andritz STMK [—] 27.9.1981 E. Kreissl leg. [47°06’ N, 15°25’ E], ☿; Bruck a. d. Mur STMK, 530 m [—] 18.6.1982 E. Kreissl leg. [47°24’ N, 15°16’ E], ☿; Annengraben NNE Graz 420 m, STMK [—] 29.7.1985 E. Kreissl leg. [47°07’ N, 15°26’ E], ☿.

**Geographic distribution:** 112 localities. All landscape units. 200-1000 m altitude.
**Relative frequency:** 19.6% of 531 Styrian *Serviformica* records.

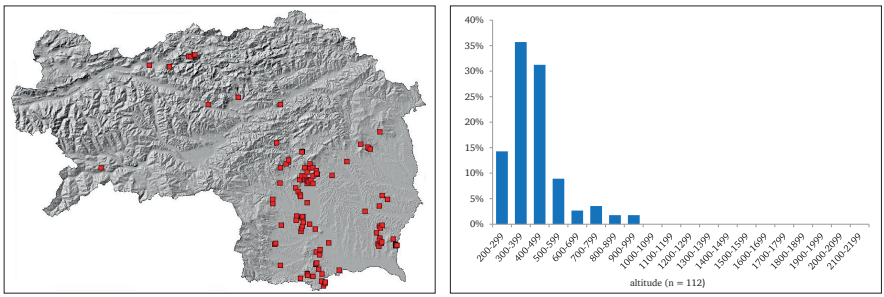


*Fig. 94: Formica cunicularia*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *clara* Forel, 1886

**Literature:** Wagner et al. 2010, Wagner 2014, Steiner et al. 2017, Wagner 2019a, Wagner 2019b.
**Material Universalmuseum Joanneum:** None.
**Geographic distribution:** 3 localities. West Styrian hilly Foreland and East Styrian hilly Foreland. 300-500 m altitude.
**Relative frequency:** 0.6% of 531 Styrian *Serviformica* records.

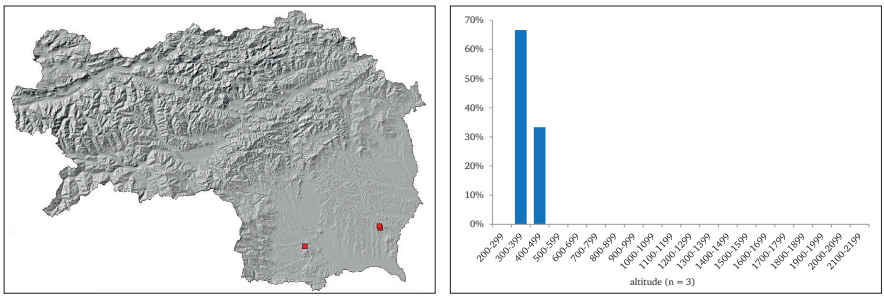


*Fig. 95: Formica clara*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *rufibarbis* Fabricius, 1793

**Literature:** Kühnelt 1962, Hölzel 1966, Bregant 1978, Glaser 1997, Schlagbauer 1997, Friedl 2000, Schlick-Steiner & Steiner 2004 sub cf. *rufibarbis*, Frieß et al. 2010, Wagner

et al. 2010, Wagner 2011b, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** Pfaffenkogel N Graz STMK [—] 20.6.1970 F. Pichler leg. [47°09' N, 15°18' E], ☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Formica polyctena*" [46°50' N, 15°58' E], ☿; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [—] „*Form. polyctena*" [46°50' N, 15°55' E], ☿; Häuselberg b. Leoben, 620 m OB-STMK [—] 3.6.1978 E. Kreissl leg. [—] „*Form. polyct.*" [47°21' N, 15°04' E], ☿☿; Graz-St Veit 408 m STMK [—] 15.7.1979 E. Kreissl leg. [—] „*Form. rufibarbis*" [47°06' N, 15°24' E], ☿☿; Graz-Andritz STMK [—] 27.9.1981 E. Kreissl leg. [47°06' N, 15°25' E], ☿.
**Geographic distribution:** 82 localities. Northern Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1000 m altitude.
**Relative frequency:** 15.3% of 531 Styrian *Serviformica* records.

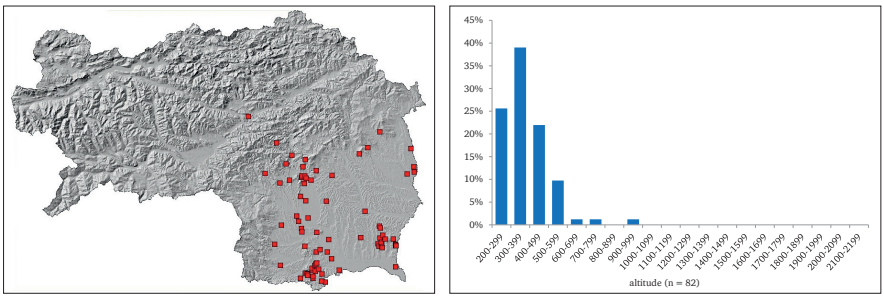


*Fig. 96: Formica rufibarbis*, horizontal and vertical distribution.

## *Formica* (*Serviformica*) *fuscocinerea* Forel, 1874

**Literature:** Hoffer 1890a sub *cinerea*, Hoffer 1890b sub *cinerea*, Hölzel 1966 sub *cinerea*, Friedrich & Winder 1993 sub *cinerea*, Schlick-Steiner & Steiner 2004, Wagner 2008, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Borovsky & Wagner 2016, Wagner et al. 2016, Steiner et al. 2017, Wagner 2019b.
**Material Universalmuseum Joanneum:** Heimschuh Sulmtal S-STMK [—] 25.6.1977 E. Kreissl leg. [46°45' N, 15°29' E], ☿☿, ♀♀alate, ♂; W Thalerhof 330 m GRAZ-UMG. [—] 9.7.1981 E. Kreissl leg. [46°58' N, 15°25' E], ☿☿; Grimming W Stainach, 730 m OB-STMK [—] 23.6.1983 E. Kreissl leg. [47°31' N, 14°03' E], ☿☿; Schwarzl Teich S GRAZ [—] 18.8.1986 E. Kreissl leg. [46°59' N, 15°25' E], ☿☿; Eichfeld N-Mureck STMK [—] 30.9.1987 E. Kreissl leg. T 33 925 [46°43' N, 15°46' E], ☿☿; Kainach b. Wildon S-STMK [—] 3.5.1989 E. Kreissl leg. [46°53' N, 15°29' E], ☿☿.
**Geographic distribution:** 29 localities. All landscape units. 200-900 m altitude.
**Relative frequency:** 5.1% of 531 Styrian *Serviformica* records.

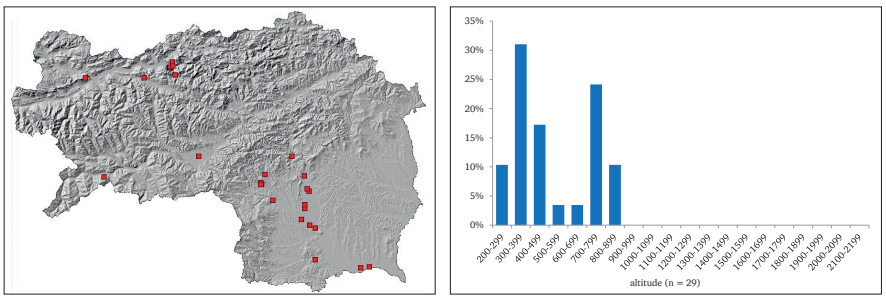


*Fig. 97: Formica fuscocinerea*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *pratensis* Retzius, 1783

**Literature:** Hoffer 1890a, Hoffer 1890b, Hölzel 1936 sub *rufopratensis*, Eichhorn 1964 sub *nigricans* and *cordieri*, Gösswald et al. 1965, Hölzel 1966, Gösswald et al. 1968, Kreissl 1976 sub *nigricans*, Ronchetti 1978, Gepp et al. 1988, Friedl 2000, Schlick-Steiner & Steiner 2004, Frieß et al. 2010, Wagner et al. 2010, Wieser & Trummer 2014, Borovsky & Kunz 2016, Kirchmair et al. 2017, Steiner et al. 2017. I published a ♀ of *Formica lugubris* with untypical dense gastral pubescence after Seifert (2007) as *F. pratensis* (Wagner et al. 2016) – a determination error. *Formica pratensis* is not known for the Gesäuse National Park.

**Material Universalmuseum Joanneum: *pratensis*-morph:** Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 21.9.1952 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°09' N, 15°17' E], ♀ alate; Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 10.6.1953 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°09' N, 15°17' E], ☿, ♀♀ alate; Murufer unter Rabenstein STMK [—] 22.5.1966 E. Kreissl leg. [47°15' N, 15°18' E], ☿☿; Graz-Andritz STMK [—] 30.8.1970 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; STYRIA, Murauen bei Lebring [—] E. Bregant leg. 10. Jänner 1971 [—] "*F. rufa*" [—] Inv.-Nr. T30.671 Coll. E. Bregant, [46°51' N, 15°32' E], ☿☿ [comment: 2 red-headed ☿☿ resemble the typical color scheme of *F. truncorum*]; Graz-Andritz STMK [—] 8.5.1971 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] "*Formica polyctena*" [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz STMK [—] 24.8.1978 E. Kreissl leg. [—] "*Form. lugubris*" [47°09' N, 15°18' E], ☿☿; Pfaffenkogel N Graz, STMK [—] 31.5.1979 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Kehr WSW Rein GRAZ-UMG, 650 m [—] 24.6.1982 E. Kreissl leg. [47°07' N, 15°14' E], ☿☿; Rötz, 400 m S Gratwein GRAZ-UMG [—] 5.8.1982 E. Kreissl leg. [47°06' N, 15°19' E], ☿☿; Kastengraben b. Rein GRAZ-UMG. [—] 22.7.1985 E. Kreissl leg. [47°08' N, 15°15' E], ☿; ***nigricans*-morph:** Leibnitz, Stmk. [—] leg. Sattler "12.III.[19]50" [—] ex Coll. Sattler [—] "755" [46°47' N, 15°32' E], ☿; Leibnitz, Stmk. [—] leg. Sattler "12.III.[19]50" [—] ex Coll. Sattler [—] "756" [46°47' N, 15°32' E], ☿;

Leibnitz, Stmk. [—] leg. Sattler “12.III.[19]50” [—] ex Coll. Sattler [—] “757” [46°47’ N, 15°32’ E], ☿; Leibnitz, Stmk. [—] leg. Sattler “12.III.[19]50” [—] ex Coll. Sattler [—] “758” [46°47’ N, 15°32’ E], ☿; Leibnitz, Stmk. [—] leg. Sattler “12.III.[19]50” [—] ex Coll. Sattler [—] “759” [46°47’ N, 15°32’ E], ☿; Leibnitz, Stmk. [—] leg. Sattler “12.III.[19]50” [—] ex Coll. Sattler [—] “760” [46°47’ N, 15°32’ E], ☿; St. Nikolai SW-STMK [—] 22.4.1957 E. Kreissl leg. [46°49’ N, 15°27’ E], ☿☿; Adelsberg OB-STMK [—] 13.4.1976 E. Kreissl leg. [—] “*Formica pratensis*” [47°06’ N, 14°22’ E], ☿☿; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50’ N, 15°55’ E], ☿; St. Anna a. Aigen E-STMK [—] 8.5.1976 E. Kreissl leg. [46°50’ N, 15°58’ E], ☿; Stradner Kg. E-STMK [—] 8.5.1976 E. Kreissl leg. [—] “*Formica nigricans*” [46°50’ N, 15°55’ E], ☿.

**Geographic distribution:** 48 localities. Central Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 200-1100 m altitude.

**Relative frequency:** 13.0% of 326 Styrian *Formica* s. str. records.

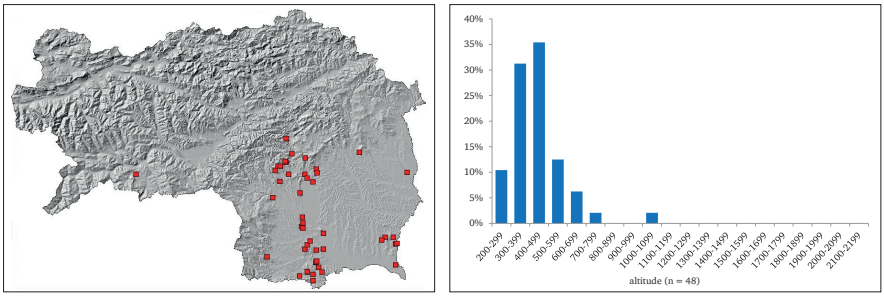


*Fig. 98: Formica pratensis*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *rufa* Linnaeus, 1761

**Literature:** Mayr 1855, Brancsik 1871, Hoffer 1890a, Hoffer 1890b, Hölzel 1936, Kiefer & Moosbrugger 1941a, Kiefer & Moosbrugger 1941b, Franz & Klimesch 1947, Kühnelt 1962, Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966, Gösswald et al. 1968, Kreissl 1976, Kreissl 1978 sub Rote Waldameise, Ronchetti 1978, Gepp et al. 1988, Schlagbauer 1997, Friedl 2000, Wagner 2009, Wagner 2011a, Wagner 2012, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Borovsky & Kunz 2016, Wagner et al. 2016, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** Mautern, Styr. [1940-1952] leg. P. Gunhold [47°24’ N, 14°49’ E], ☿☿; “Sonnberg, 1200 m St. Erhart[sic; St. Erhard is meant]/Br. 20.8.[19]51” [—] Inv. Nr. 30 320 [47°23’ N, 15°27’ E], ☿; Umg. Freiland Koralmgeb. W-STMK [—] 24.4.1966 E. Kreissl leg. [46°50’ N, 15°08’ E], ☿☿; Murau S Graz, STMK [—] 28.5.1968 E. Kreissl leg. [47°00’ N, 15°28’ E], ☿☿; Furtnerteich Bez. Murau OB-STMK [—] 5.-8.7.1970 E. Kreissl leg. [47°05’ N, 14°23’ E], ☿; Arnfels-Leutschach S-STMK [—] 28.11.1970 E. Kreissl leg. [46°40’ N, 15°26’ E], ☿; Burgstallerhöhe - Schöcklkreuz GRAZ-

UMG. [—] 17.4.1971 E. Kreissl leg. [47°12' N, 15°29' E], ☿☿; Pfaffenkogel N-Seite GRAZ-UMG. [—] 12.12.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Mitteregg STMK [—] 24.9.1972 E. Kreissl leg. [46°48' N, 15°26' E], ☿☿; Stmk. Pfaffenkog. Klemm, 4.[19]75 [—] *Form. polyctena* FOERST. [47°09' N, 15°18' E], ☿☿; Stmk. Kehrgraben b. St. Rein Klemm, 8.[19]76 [—] *Formica polyctena* FOERST. [—] T36.129 [47°07' N, 15°15' E], ☿☿; Heiggerkogel Rein 760-780 m, STMK. *Formica*-Nest [—] 22.3.1978 E. Kreissl leg. [47°09' N, 14°15' E], ☿☿; Walzkogel Rein 750 m, STMK. nähe *Formica*-Hügelnest [—] 25.4.1978 E. Kreissl leg. [47°09' N, 15°14' E], ☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] "*Form. rufa*" [47°13' N, 15°30' E], ☿☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] "*Las fuligin*." [47°13' N, 15°30' E], ☿☿; Mixnitzbach-Zechner Hube E-STMK [—] 30.5.1978 E. Kreissl leg. [—] "*Form. rufa*" [47°20' N, 15°25' E], ☿; Annateich b. Gratwein GRAZ-UMG. [—] 18.9.1978 E. Kreissl leg. [47°07' N, 15°17' E], ☿☿; Schloß Herberstein E-STMK, 390 m [—] 12.5.1979 E. Kreissl leg. [—] "*Form. polyctena*" [47°12' N, 15°48' E], ☿; Tierpark Herberstein E-STMK [—] 15.8.1979 E. Kreissl leg. [—] "*Form. polyctena*" [47°13' N, 15°48' E], ☿; Arnfels-Leutschach S-STMK [—] 31.5.1986 E. Kreissl leg. [46°40' N, 15°26' E], ☿☿; Pfaffenkogel N-Fuß, Umg. Graz STMK [—] 4.8.1987 E. Kreissl leg. T 33 874 [47°10' N, 15°19' E], ☿☿.

**Geographic distribution:** 82 localities. All landscape units. 200-1400 m altitude.

**Relative frequency:** 22.0% of 323 Styrian *Formica* s. str. records.

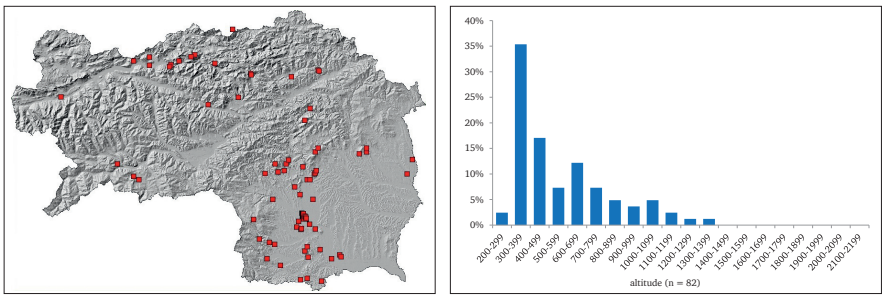


*Fig. 99: Formica rufa*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *polyctena* x *rufa*

**Literature:** None. New hybrid for Styria!

**Material Universalmuseum Joanneum:** Schöcklgebiet E Erhardhöhe 700 m, STMK [—] 13.12.1970 E. Kreissl leg. [47°09' N, 15°26' E], ☿☿ [comment: close to the samples I found the labels: "392-397 *rufa-polyctena* BASTARDE" [—] "Mischnest: *F. rufa* + *F. polyctena*" [—] "1909-1914 halte ich für *F. rufa*-Bastarde"]; Erhardhöhe Schöcklgebiet GRAZ-UMG. [—] 31.5.1976 E. Kreissl leg. [—] "*Formica polyctena*" [47°09' N, 15°26' E], ☿☿.

**Geographic distribution:** 2 localities. Styrian Border Mountains and West Styrian hilly Foreland. 300-800 m altitude.
**Relative frequency:** 0.6% of 323 Styrian *Formica* s. str. records. 1.4% of 139 Styrian *Formica-rufa*-complex sensu Seifert (under review) nests. *Formica polyctena* x *rufa* is in Styria distinct less common than in other investigated parts of Central Europe (cf. Seifert et al. 2010), but seems to be also rare in Carinthia from where no hybrid records were published so far (Wagner 2014).

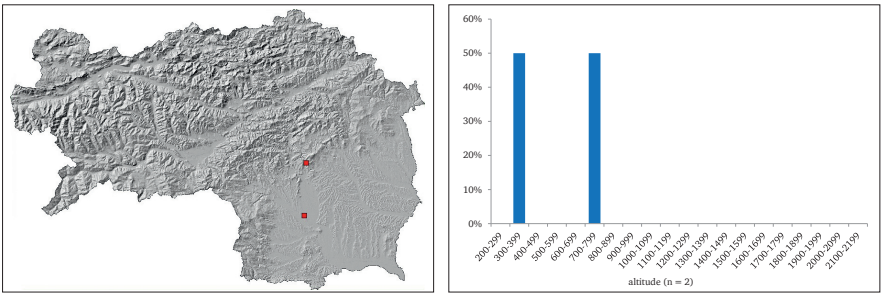


*Fig. 100: Formica polyctena* x *rufa*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *polyctena* Foerster, 1850

**Literature:** Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966, Gösswald et al. 1968, Fossel 1972, Kreissl 1976, Ronchetti 1978, Gepp et al. 1988, Ebermann & Krisper 2014, Wagner 2014, Wieser & Trummer 2014, Wagner et al. 2015, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Umg. Admont, Stmk [1940-1952] leg. P. Gunhold [—] Inv. Nr. 30 320 [47°34' N, 14°27' E], ☿; „*F. rufa rufa* L. Stiftingtal / Ries 27.4.[19]57 Dr. Stelzer" [47°05' N, 15°30' E], ☿☿; Plesch Graz-Umg. STMK [—] 13.6.1965 E. Kreissl leg. [—] „*Form. polyctena*" [47°08' N, 15°13' E], ☿☿; Pfaffenkogel N-Seite GRAZ-UMG. [—] 12.12.1971 E. Kreissl leg. [47°10' N, 15°19' E], ☿; Stmk. Leutschach Klemm, 6.[19]75 [—] *Formica polyctena* Foerst. [—] T36.129 [46°39' N, 15°28' E], ☿☿; Leutschach S-STMK [—] 9.6.1975 E. Kreissl leg. [—] „*Tetram. caespit. Las. emarginat. Stenam. westwoodi*" [46°39' N, 15°28' E], ☿☿; Kalkberg Grebenzen OB-STMK [—] 23.7.1975 E. Kreissl leg. [—] „*Formica polyctena*" [47°04' N, 14°20' E], ☿☿; Pfaffenkogel E-Fuß GRAZ-UMG. [—] 24.3.1977 E. Kreissl leg. [47°10' N, 15°19' E], ☿☿; Graz-Andritz STMK [—] 18.4.1977 E. Kreissl leg. [47°06' N, 15°25' E], ♀alate; Pledlitz [sic; Predlitz is meant] ? Murau OB-STMK [—] 10.9.1977 E. Kreissl leg. [47°04' N, 13°54' E], ☿☿; Predlitz ? Murau OB-STMK [—] 10.9.1977 E. Kreissl leg. [47°04' N, 13°54' E], ☿; Pfaffenkogel Stübing 400 m, STMK. *Formica* Hügelnest Waldrand [—] 22.3.1978 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; Walzkogel Rein 750 m, STMK. nähe *Formica*-Hügelnest [—] 25.4.1978 E. Kreissl leg. [47°09' N, 15°14' E], ☿☿; W St. Radegund GRAZ-UMG. [—] 29.5.1978 E. Kreissl leg. [47°10' N, 15°28' E], ☿☿; Althofen Katschtal OB-STMK [—]

27.7.1978 E. Kreissl leg. [—] "*Formica polyctena*" [47°09' N, 14°14' E], ☿☿; E. Schloß Herberstein E-STMK, 370 m [—] 13.4.1979 E. Kreissl leg. [—] "*Form. polyctena*" [47°12' N, 15°49' E], ☿☿; E. Schloß Herberstein E-STMK, 370 m [—] 23.5.1979 E. Kreissl leg. [—] "*Form. polyctena*" [47°12' N, 15°49' E], ☿; Pfaffenkogel N Graz STMK [—] 31.5.1979 E. Kreissl leg. [—] "*Form. polyctena*" [47°09' N, 15°18' E], ☿☿; Stadl a. d. Mur, 890 m OB-STMK [—] 15.9.1979 E. Kreissl leg. [—] "*Form. polyctena*" [47°05' N, 13°58' E], ☿☿ [comment: this is not a typical hybrid colony, but since about 5 of > 150 ☿☿ have hairs like pure *F. rufa*, it might be a mixed colony]; Stadl a. d. Mur, 890 m OB-STMK [—] 15.9.1979 E. Kreissl leg. [47°05' N, 13°58' E], ☿☿; Kreuzeck N Neumarkt, 760 m OB-STMK [—] 1.6.1980 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Mühlbachgraben b. Rein, 450 m GRAZ-UMG. [—] 22.7.1980 E. Kreissl leg. [47°08' N, 15°16' E], ☿☿; Graz-Andritz STMK [—] 22.3.1981 E. Kreissl leg. [47°06' N, 15°25' E], ☿☿; Pfaffenkogel N Graz STMK, 400 m [—] 31.3.1981 E. Kreissl leg. [47°09' N, 15°18' E], ☿☿; SSW Spielfeld S-STMK [—] 15.5.1984 E. Kreissl leg. [46°42' N, 15°37' E], ☿; ***Formica* cf. *polyctena*:** Enzenbach NE Rein Umg. Lungenheilstätte STMK [—] 16.5.1953 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°09' N, 15°17' E], ♀alate; Waldschach Sausal W-STMK [—] 23.4.1973 E. Kreissl leg. [46°49' N, 15°26' E], ♀♀alate; Walzkogel b. Rein GRAZ-UMG. [—] 24.4.1978 E. Kreissl leg. [—] "*Form. polycten*" [47°09' N, 15°14' E], ♀dealate; Walzkogel Rein 750 m, STMK. nähe *Formica*-Hügelnest [—] 25.4.1978 E. Kreissl leg. [47°09' N, 15°14' E], ♀♀alate; Kreuzeck N Neumarkt, 760 m OB-STMK [—] 1.6.1980 E. Kreissl leg. [47°07' N, 14°24' E], ♂♂; Graz-Andritz STMK [—] 27.4.1981 E. Kreissl leg. [47°06' N, 15°25' E], ♀alate.
**Geographic distribution:** 47 localities. All landscape units. 200-1300 m altitude.
**Relative frequency:** 11.5% of 323 Styrian *Formica* s. str. records.

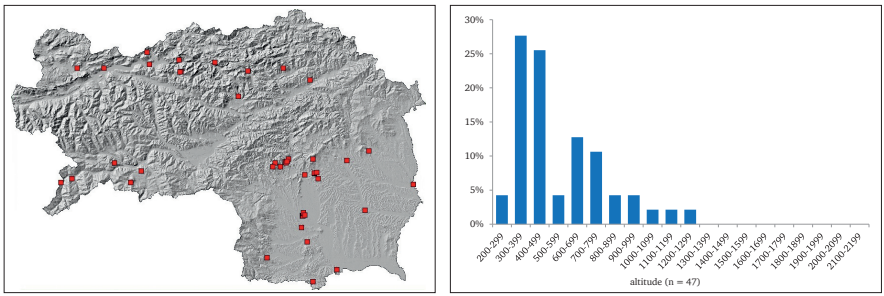


*Fig. 101: Formica polyctena*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *aquilonia* Yarrow, 1955

**Literature:** Hölzel 1936 sub *rufa*, Fossel 1963, Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966, Gösswald et al. 1968, Fossel 1972, Kreissl 1976, Ronchetti 1978, Gepp et al. 1988 Schlagbauer 1997, Wagner 2009, Wagner 2010, Steiner et al. 2017, Wagner et al. 2018.

**Material Universalmuseum Joanneum:** Auerlingsee OB-STMK [—] 25.7.1970 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Murau Rantenbachgr. OB-STMK [—] 27.7.1970 E. Kreissl leg. [47°08' N, 14°09' E], ☿☿; Gleinalpengeb. SE Walzkogel W-STMK [—] 20.9.1970 E. Kreissl leg. [47°12' N, 15°08' E], ☿☿; Burgstallerhöhe - Schöcklkreuz GRAZ-UMG. [—] 17.4.1971 E. Kreissl leg. [47°12' N, 15°29' E], ☿☿; Tyrnauer Alpe S Hochlantsch 1350 m, STMK [—] 23.5.1972 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; Rantengraben NNW Murau OB-STMK [—] 13.7.1974 E. Kreissl leg. [47°08' N, 14°09' E], ☿; Kalkberg Grebenzengeb. OB-STMK [—] 27.7.1974 1560 m E. Kreissl leg. [47°04' N, 14°20' E], ☿☿; Katschbachtal b. Althofen OB-STMK [—] 31.7.1974 E. Kreissl leg. [47°09' N, 14°14' E], ☿☿; Rote Wand GRAZ-UMG. [—] 6.9.1974 E. Kreissl leg. [—] „*Form. polyctena*" [47°19' N, 15°24' E], ☿; Zirbitzkogel W-Seite OB-STMK [—] 10.7.1975 E. Kreissl leg. [47°03' N, 14°33' E], ☿; Thomabachgraben OB-STMK [—] 20.7.1975 [—] „*Camp. herculean. Leptoth. acervorum Formica fusca aquilonia*" [47°02' N, 14°19' E], ☿; Grebenzengeb. b. Kalkofen OB-STMK [—] 28.7.1976 E. Kreissl leg. [—] „*Formica aquilonia*" [47°04' N, 14°21' E], ☿☿; Tyrnauer Alpe GRAZ-UMG. [—] 2.5.1977 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; Schweinegg Tyrnauer Alpe GRAZ-UMG. [—] 2.5.1977 E. Kreissl leg. [47°15' N, 15°28' E], ☿☿; Auerlingsee Grebenzengebiet OB-STMK [—] 11.9.1977 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Rantengraben N Murau OB-STMK [—] 12.9.1977 E. Kreissl leg. [47°08' N, 14°09' E], ☿☿; Tyrnauer Alpe Einschnitt E-STMK [—] 30.5.1978 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; Schweinegg W-Hang STMK [—] 30.5.1978 E. Kreissl leg. [—] „*Form. polyctena*" [47°15' N, 15°28' E], ☿☿; Grebenzengebiet ob. Thomabachgraben OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] „*Form. aquilonia*" [47°01' N, 14°19' E], ☿☿; Grebenzengebiet ehem. Kalkofen OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] „*Form. polyctena*" [47°04' N, 14°21' E], ☿☿; Grebenzengeb. OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] „*Form. polyctena*" [47°02' N, 14°20' E], ☿☿; Grebenzengebiet ob. Thomabachgraben OB-STMK [—] 20.6.1978 E. Kreissl leg. [—] „*Leptothor. acervorum*" [47°01' N, 14°19' E], ☿☿; Rantengraben NNW Murau OB-STMK [—] 23.6.1978 E. Kreissl leg. [47°08' N, 14°09' E], ☿☿; „Zirbensee" OB-STMK [—] 28.6.1978 E. Kreissl leg. [47°04' N, 14°02' E], ☿☿, ♀alate; b. Esbeckhütte [sic; Esebeckhütte is meant] 1750 m OB-STMK [—] 28.6.1978 E. Kreissl leg. [47°04' N, 14°02' E], ☿☿; Zirbitzkogel W-Seite OB-STMK [—] 24.7.1978 E. Kreissl leg. [47°03' N, 14°33' E], ☿☿; Auerlingsee OB-STMK [—] 24.7.1978 E. Kreissl leg. [—] „*Form. aquilon.*" [47°01' N, 14°18' E], ☿☿; Pöllauer Graben Grebenzengeb. OB-STMK [—] 25.7.1978 E. Kreissl leg. [—] „*Form. polyctena*" [47°01' N, 14°22' E], ☿☿; Turracherhöhe, 1775 m Ob-STMK [—] 15.9.1979 E. Kreissl leg. [—] „*Form. polyct.*" [46°55' N, 13°52' E], ☿; Rantental NW Murau OB-STMK [—] 17.9.1979 E. Kreissl leg. [—] „*Formica aquilonia*" [47°08' N, 14°09' E], ☿☿; Schöckl N-Seite, 1370 m GRAZ-UMG. [—] 23.10.1979 E. Kreissl leg. [—] „*Form. polyct.*" [47°12' N, 15°27' E], ☿☿; Tyrnauer Alm S Hochlantsch 1450 m, STMK [—] 13.5.1980 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿, intermorph; SW Althofen im Katschtal, 840 m OB-STMK [—] 22.5.1980 E. Kreissl leg. [47°09' N, 14°14' E], ☿☿; Zirbitzkogel W-Seite, 1220 m OB-STMK [—] 24.5.1980 E. Kreissl leg. [47°04' N, 14°30' E], ☿☿; Adelsberg NW Neumarkt OB-STMK [—] 25.5.1980 E. Kreissl leg. [47°06' N, 14°22' E], ☿☿; Steiberhöhe, SE Predlitz, 1530 m OB-STMK [—]

3.6.1980 E. Kreissl leg. [47°02' N, 13°56' E], ☿☿; Zirbitzkogel W-Seite, 1280 m OB-STMK [—] 25.6.1980 E. Kreissl leg. [47°03' N, 14°30' E], ☿☿; Wallersbachgraben W Unzmarkt, 820 m OB-STMK [—] 25.6.1980 E. Kreissl leg. [47°11' N, 14°25' E], ☿☿; Auerlingsee S St. Lambrecht OB-STMK, 1320 m [—] 26.6.1980 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Gschieskogel, WNW Passail, 980 m E-STMK [—] 9.8.1980 E- Kreissl leg. [47°17' N, 15°24' E], ☿☿; Patschaberg NNW Weiz 1020 m, E-STMK [—] 30.6.1983 E. Kreissl leg. [47°16' N, 15°36' E], ☿☿; Auerlingsee OB-STMK [—] 8.8.1984 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Salzkammergut Blaa-Alm OB-STMK [—] 17.7.1985 E. Kreissl leg. [47°40' N, 13°44' E], ☿☿; Salzkammergut Blaa-Alm OB-STMK [—] 19.7.1985 E. Kreissl leg. [47°40' N, 13°44' E], ☿☿; Schladming S Obertal 1200 m, Eschachboden STMK [—] 30.7.1987 E. Kreissl leg. [47°18' N, 13°42' E], ☿☿, intermorph; Stoderzinken OB-STMK [—] 19.8.1988 E. Kreissl leg. [47°27' N, 13°49' E], ☿☿.

**Geographic distribution:** 64 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 700-2000 m altitude.

**Relative frequency:** 17.6% of 323 Styrian *Formica* s. str. records.

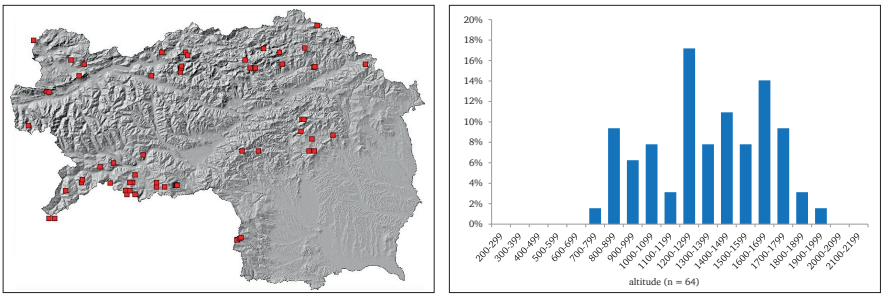


*Fig. 102: Formica aquilonia*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *lugubris* Zetterstedt, 1838

**Literature:** Mayr 1855 sub *congerens*, Hölzel 1936 sub *rufa*, Fossel 1963 sub *lugubris* und *pratensis*, Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966 partly sub *nigricans*, Gösswald et al. 1968, Fossel 1972, Kreissl 1976, Ronchetti 1978, Gepp et al. 1988, Wagner 2008, Wagner 2009, Wagner 2010, Wagner 2012, Wagner 2014, Wagner et al. 2016 sub *lugubris* und *pratensis*, Steiner et al. 2017.

**Material Universalmuseum Joanneum:** MAUTERN, STYR. [1940-1952] LEG. P. GUNHOLD [—] „*Formica nigricans* Em." Hölzel det. [—] Inv. Nr. 30 320 [47°24' N, 14°49' E], ☿; „Schöckl Hütte 19.5.[19]57 Dr. Stelzer" [—] „*Form. lugubris* Zett." Hölzel det. [47°11' N, 15°27' E], ☿☿; „Mariazeller Bürgeralm 1.6.[19]57 Dr. Stelzer" [—] „*Formica lugubris* Zett." Hölzel det. [47°47' N, 15°19' E], ☿; „Stubalm Gaberl-Steinplan 9.6.[19]57 Dr. Stelzer" [47°08' N, 14°54' E], ☿☿; Reinischkogel W-STMK [—] 12.4.1964 E. Kreissl leg.

[46°55' N, 15°06' E], ☿☿; Gleinalmgeb. oberh. Hojer W-STMK [—] 26.6.1966 E. Kreissl leg. [47°07' N, 14°53' E], ☿☿; Ingeringsee OB-STMK [—] 20.10.1968 E. Kreissl leg. [47°20' N, 14°39' E], ☿☿; Hochschwabgebiet, Klausen OB-STMK [—] 26.10.1968 E. Kreissl leg. [47°33' N, 15°04' E], ☿☿; Zetzgebiet Bendlerhöhe-Schönes Kreuz [—] 21.6.1970 E. Kreissl leg. E-STMK [47°18' N, 15°36' E], ☿☿; Grebenze OB-STMK [—] 20.7.1970 E. Kreissl leg. [47°02' N, 14°20' E], ☿☿; Stmk. Eibisberg Klemm, 5.[19]75 [—] *Formica pratensis* Retz. [—] T36.129 [47°18' N, 15°36' E], ☿☿; Stmk. Mixnitzgr. Klemm, 5.[19]75 [—] *Formica lugubris* Zett. [—] T36.129 [47°21' N, 15°26' E], ☿☿; Adelsberg OB-STMK [—] 14.4.1976 E. Kreissl leg. [47°06' N, 14°22' E], ☿☿; Schweinegg E-Hang STMK [—] 9.5.1976 E. Kreissl leg. [47°15' N, 15°28' E], ☿☿; Schöckl GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [—] „*Formica aquilonia*" [47°11' N, 15°27' E], ☿☿; Auerlingsee 1330 m OB-STMK [—] 20.7.1976 E. Kreissl leg. [—] „*Formica lugubris*" [47°01' N, 14°18' E], ☿☿; Kreuzeckgeb. OB-STMK [—] 10.8.1976 E. Kreissl leg. [47°07' N, 14°24' E], ☿☿; Burgstallerhöhe NNE Graz STMK [—] 23.10.1976 E. Kreissl leg. [47°13' N, 15°30' E], ☿☿; Schweinegg Tyrnauer Alpe GRAZ-UMG. [—] 2.5.1977 E. Kreissl leg. [47°15' N, 15°28' E], ☿☿; Wolfstein Schöcklgebiet GRAZ-UMG. [—] 19.5.1977 E. Kreissl leg. [47°10' N, 15°26' E], ☿☿; Sattental b. Pruggern OB-STMK [—] 6.6.1977 E. Kreissl leg. [47°24' N, 13°52' E], ☿☿, ♀dealate; Salza Stausee Paß Stein OB-STMK [—] 9.6.1977 E. Kreissl leg. [47°31' N, 13°56' E], ☿☿; Über Großem Sölktal OB-STMK [—] 10.6.1977 E. Kreissl leg. [47°24' N, 13°57' E], ☿☿; Windhofkogel ENE Semriach GRAZ-UMG. [—] 7.7.1977 E. Kreissl leg. [47°13' N, 15°26' E], ☿☿; Schöckl Gipfelbereich GRAZ-UMG. [—] 14.7.1977 E. Kreissl leg. [—] „*Formica pratensis*" [47°11' N, 15°27' E], ☿☿; Schöcklstraße GRAZ-UMG. [—] 28.10.1977 E. Kreissl leg. [47°11' N, 15°28' E], ☿☿; Burgstallerhöhe NNE Graz, E-STMK [—] 26.5.1978 E. Kreissl leg. [—] „*Form. pratens*." [47°13' N, 15°30' E], ☿☿; Gleinalm b. Schutzhaus W-STMK [—] 12.9.1978 E. Kreissl leg. [—] „*Form. pratensis*" [47°12' N, 15°03' E], ☿☿; Gleinalm b. Schutzhaus W-STMK [—] 12.9.1978 E. Kreissl leg. [—] „*Form. lugubris*, *pratensis*" [47°12' N, 15°03' E], ☿☿; Mixnitz, 1170 m Teichalpe S BRUCK/Mur [—] 26.6.1979 E. Kreissl leg. [47°20' N, 15°25' E], ♀alate; Mixnitz, 1170 m Teichalpe S BRUCK/Mur [—] 26.6.1979 E. Kreissl leg. [—] „*Form. pratensis*" [47°20' N, 15°25' E], ☿; Kornock W Turracherhöhe 2025 m [—] 16.9.1979 E. Kreissl leg. [—] „*Form. aquilonia*" [46°55' N, 13°51' E], ☿☿; Kornock W Turracherhöhe 2025 m [—] 16.9.1979 E. Kreissl leg. [—] „*Form. pratens*." [46°55' N, 13°51' E], ☿☿; Hochlantsch, 1140 m Mixnitzbachgraben ..... STMK [—] 13.5.1980 E. Kreissl leg. [47°21' N, 15°25' E], ☿☿; Zirbitzkogel W-Seite, 1220 m OB-STMK [—] 24.5.1980 E. Kreissl leg. [47°04' N, 14°30' E], ☿☿; Lorenzengraben SW Murau, 1150 m, OB-STMK [—] 4.6.1980 E. Kreissl leg. [47°03' N, 14°05' E], ☿; Feichter Kogel SW Neumarkt OB-STMK [—] 8.6.1980 1160 m E. Kreissl leg. [47°02' N, 14°22' E], ☿☿; Gleinalpe SSE-Hang 1640 m, W-STMK [47°11' N, 15°01' E], ☿☿; Schöckl, N-Seite, 1040 m GRAZ-UMG. [—] 10.12.1980 E. Kreissl leg. [47°12' N, 15°27' E], ☿☿; Burgstallerhöhe NNE Graz, STMK, 1020-1140 m [—] 23.9.1981 E. Kreissl leg. [47°13' N, 15°30' E], ☿☿; Lambachgraben W St. Kathrein a. Offenegg, 820 m [—] 29.4.1982 E. Kreissl leg. E-STMK [47°18' N, 15°34' E], ☿; Reitinggebiet Hohenegg-Gr. STMK [—] 3.7.1985 E. Kreissl leg. [47°26' N, 14°51' E], ♀dealate; Salzastausee OB-

STMK [—] 29.7.1985 E. Kreissl leg. [47°31' N, 13°56' E], ☿; Ursprungalm SW Schladming OB-STMK [—] 7.7.1988 E. Kreissl leg. [47°17' N, 13°37' E], ☿☿; Prenneggtal [sic; Preuneggtal is meant] SW Schladming 1200 m, OB-STMK [—] 7.7.1988 E. Kreissl leg. [47°19' N, 13°37' E], ☿☿; Stoderzinken OB-STMK [—] 19.8.1988 E. Kreissl leg. [47°27' N, 13°49' E], ☿☿; Styria-Stupalpe [sic; Stubalpe is meant] Hirscheggersattel 1560 m STMK [—] 19.9.1992 E. Kreissl leg. [—] „92-248 Stubalpe 19.9.1992" [47°04' N, 14°52' E], ☿☿.
**Geographic distribution:** 107 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 600-2100 m altitude.
**Relative frequency:** 26.3% of 323 Styrian *Formica* s. str. records.

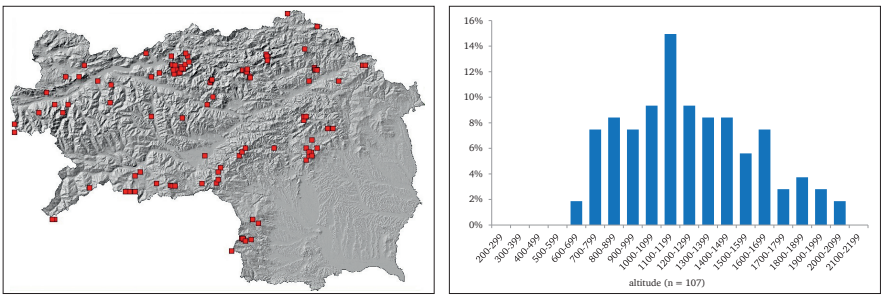


*Fig. 103: Formica lugubris*, horizontal and vertical distribution.

## *Formica* (*Formica* s. str.) *truncorum* Fabricius, 1804

**Literature:** Mayr 1855 sub *truncicola*, Hoffer 1890a sub *truncicola*, Hoffer 1890b sub *truncicola*, Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966, Gösswald et al. 1968, Kreissl 1976, Wagner 2011a, Wagner 2012, Wagner et al. 2016, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** „Trahütten St. 18.4.[19]26." [—] „*Formica* ☿ *truncorum*" Hölzel det. [46°49' N, 15°09' E], ☿; Umg. Admont, Stmk [1940-1952] leg. P. Gunhold [47°34' N, 14°27' E], ☿; MAUTERN, STYR. LEG. P. GUNHOLD [47°24' N, 14°49' E], ☿☿; St. Wolfgang NW Obdach, OB-STMK 1230 m [—] 18.8.1955 F. Wolf leg. [—] E 4129 Coll. F. Wolf [47°05' N, 14°38' E], ♀alate; Ingeringsee OB-STMK [—] 20.10.1968 E. Kreissl leg. [—] „nicht […] *Formica*! *polyctena* ♀" [47°20' N, 14°39' E], ♀alate; Zetzgebiet im Sattel E-STMK [—] 23.8.1970 E. Kreissl leg. [47°16' N, 15°39' E], ♀dealate; Eibisberg Zetzgebiet E-STMK [—] 31.10.1971 E. Kreissl leg. [47°18' N, 15°36' E], ☿☿; Tyrnauer Alpe S Hochlantsch 1350, STMK [—] 23.5.1972 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; Furtnerteich Station OB-STMK [—] 3.8.1978 E. Kreissl leg. [—] „*Form. fusca*" [47°05' N, 14°23' E], ☿☿; Furtnerteich Station OB-STMK [—] 3.8.1978 E. Kreissl leg. [—] „*Form. pratensis*" [47°05' N, 14°23' E], ☿☿; Reitinggebiet Hohenegg-Gr. STMK [—] 3.7.1985 E. Kreissl leg. [47°26' N, 14°51' E], ☿☿.

**Geographic distribution:** 49 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 400-1700 m altitude.
**Relative frequency:** 8.7% of 323 Styrian *Formica* s. str. records (much higher percentage than given in Seifert 2018!).

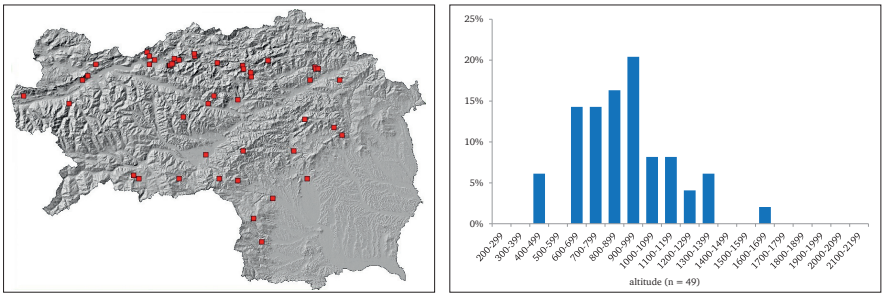


*Fig. 104: Formica truncorum*, horizontal and vertical distribution.

## *Formica* (*Raptiformica*) *sanguinea* Latreille, 1798

**Literature:** Mayr 1855, Hoffer 1890a, Hoffer 1890b, Hoffer 1907, Hölzel 1936 sub *sanquinea*, Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966, Gösswald et al. 1968, Bregant 1978, Glaser 1997, Friedl 2000, Wagner 2008, Wagner et al. 2010, Wagner 2011a, Wagner 2014, Wagner et al. 2016, Kirchmair et al. 2017 sub *Raptiformica sanguinea*, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Umg. Admont, Stmk [1940-1952] leg. P. Gunhold [47°34' N, 14°27' E], ☿☿, ♀dealate; Häuselberg, Leoben Stmk., leg. R. Plass [/] „H [19]69" [47°21' N, 15°04' E], ☿☿; Alpl Fischbacher A. STMK [—] 7.6.1970 E. Kreissl leg. [47°30' N, 15°38' E], ☿☿; Stübinggraben - Hörgaspauli Pfaffenkogel [—] 23.6.1971 E. Kreissl leg. GRAZ-UMG. [47°09' N, 15°17' E], ☿☿; Austria Styria Pfaffenkogel über Hörgas leg. Kreissl 10.4.[19]72 „629" [—] „*Formica polyctena* FÖRSTER" [47°09' N, 15°17' E], ☿☿; Furtnerteich OB-STMK [—] 15.7.1975 E. Kreissl leg. [47°05' N, 14°23' E], ☿☿; Häuselberg, Leoben Stmk., leg. R. Plass [/] „H [19]75" [47°21' N, 15°04' E], ☿; Heiggerkogel b. Rein, 950 m GRAZ-UMG. [—] 22.4.1981 E. Kreissl leg. [47°09' N, 14°15' E], ☿; Kehrerwald SW Rein, 650 m GRAZ-UMG. [—] 24.6.1982 E. Kreissl leg. [47°07' N, 15°16' E], ☿.
**Geographic distribution:** 66 localities. All landscape units. 200-1400 m altitude.
**Relative frequency:** 12.4% of 410 Styrian *Formica* s. str., *Raptiformica*, and *Coptoformica* records.

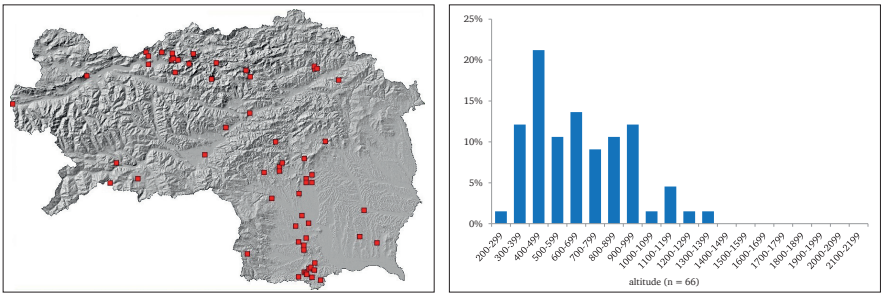


*Fig. 105: Formica sanguinea*, horizontal and vertical distribution.

## *Formica* (*Coptoformica*) *exsecta* Nylander, 1846

**Literature:** Mayr 1855, Hoffer 1890b, Hölzel 1936, Gunhold 1949 sub *suecica*, Eichhorn 1964, Gösswald et al. 1965, Hölzel 1966 partly sub *pressilabris*, Gösswald et al. 1968, Glaser 1999, Friedl 2000, Wagner 2008, Wagner 2009, Glaser et al. 2010, Wagner 2010, Wagner et al. 2011, Wagner et al. 2016, Steiner et al. 2017, Wagner et al. 2018, Wagner 2019b.

**Material Universalmuseum Joanneum:** DACHSTEIN S-SEITE [1940-1952] LEG. P. GUNHOLD [47°27' N, 13°36' E], ☿☿, ♀alate „*truncorum* Schöckl-Plateau 19.5.[19]57 Dr. Stelzer“ [—] „*Formica pressilabris* Nyl.“ Hölzel det. [—] Inv. Nr. T 30 320 [47°11' N, 15°27' E], ☿☿; „Stubalm Gaberl-Steinplan 9.6.[19]57 Dr. Stelzer“ [—] „*Formica pressilabris* Nyl.“ Hölzel det. [47°08' N, 14°54' E], ☿☿; Lobminggraben Gleinalpengeb. OB-STMK [—] 11.8.1970 E. Kreissl leg. [47°08' N, 14°52' E], ☿☿; Gleinalpengeb. SE Walzkogel W-STMK [—] 20.9.1970 E. Kreissl leg. [47°12' N, 15°08' E], ☿☿; Tyrnauer Alpe S Hochlantsch 1350, STMK [—] 23.5.1972 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; Schöckl GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [47°11' N, 15°27' E], ☿☿; Schöckl GRAZ-UMG. [—] 19.6.1976 E. Kreissl leg. [—] „*Formica exsecta*“ [47°11' N, 15°27' E], ☿☿; Auerlingsee 1320 m OB-STMK [—] 21.7.1976 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Auerlingsee Grebenzengeb. OB-STMK [—] 2.8.1976 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Dürnberger Moor, SE OB-STMK [—] 11.8.1976 E. Kreissl leg. [47°05' N, 14°21' E], ☿☿, ♀alate; Auerlingsee Grebenzengebiet OB-STMK [—] 11.9.1977 E. Kreissl leg. [47°01' N, 14°18' E], ☿; Tyrnauer Alpe GRAZ-UMG. [—] 31.10.1977 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; Mixnitzbach-Zechner Hube E-STMK [—] 30.5.1978 E. Kreissl leg. [47°20' N, 15°25' E], ☿☿; „Zirbensee“, 1660 m OB-STMK [—] 28.6.1978 E. Kreissl leg. [47°04' N, 14°02' E], ☿☿; Auerlingsee OB-STMK [—] 24.7.1978 E. Kreissl leg. [—] „*Form. exsecta*“ [47°01' N, 14°18' E], ☿☿; Gleinalm b. Schutzhaus W-STMK [—] 12.9.1978 E. Kreissl leg. [47°12' N, 15°03' E], ☿☿; Auerlingsee S St. Lambrecht OB-STMK, 1320 m [—] 26.6.1980 E. Kreissl leg. [47°01' N, 14°18' E], ☿☿; Gleinalpe SE-Hang 1660 m, W-STMK [—] 14.8.1980 E.

Kreissl leg. [47°11' N, 15°01' E], ☿☿; Burgstallerhöhe NNE Graz, STMK, 1020-1140 m [—] 23.9.1981 E. Kreissl leg. [47°13' N, 15°30' E], ☿☿; Pfaffenbachsattel E-STMK (?) [—] 24.7.1984 E. Kreissl leg. [47°34' N, 15°48' E], ☿☿.
**Geographic distribution:** 69 localities. Northern Alps, Central Alps, and Styrian Border Mountains. 600-2100 m altitude.
**Relative frequency:** 8.8% of 410 Styrian *Formica* s. str., *Raptiformica*, and *Coptoformica* records.

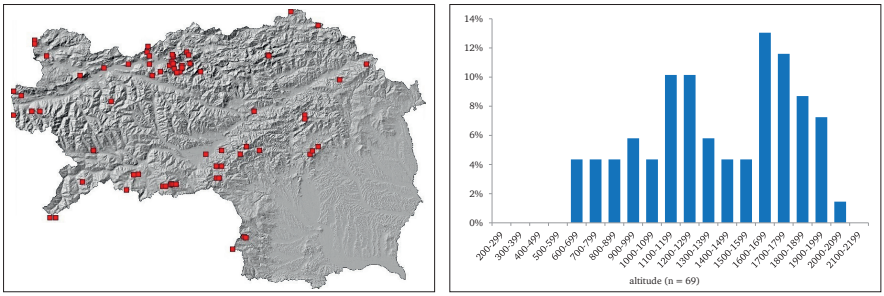


*Fig. 106: Formica exsecta*, horizontal and vertical distribution.

## *Polyergus rufescens* Latreille, 1804

**Literature:** Hoffer 1890a, Hoffer 1890b, Hoffer 1906, Hoffer 1907, Kühnelt 1962, Hölzel 1966, Bregant 1978, Bregant 1998a, Steiner et al. 2017.
**Material Universalmuseum Joanneum:** Hofstätten a. d. Raab E-STMK, 350 m E 8740 [—] 28.7.-9.8.2010 W. Paill leg. Barberfalle [—] *Polyergus rufescens* (LATR.) J. P. Fladerer det. [47°04' N, 15°44' E], ☿.
**Geographic distribution:** 13 localities. Central Alps, Styrian Border Mountains, West Styrian hilly Foreland, and East Styrian hilly Foreland. 300-700 m altitude.
**Relative frequency:** Found at 0.6% of 531 Styrian *Serviformica* records.

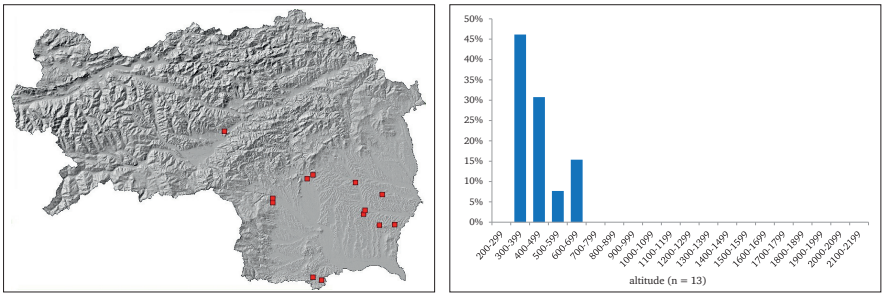


*Fig. 107: Polyergus rufescens*, horizontal and vertical distribution.

## 5. Acknowledgement

I thank Mag. Wolfgang Paill (Graz) for the allocation of funds from the Universalmuseum Joanneum! He also proofread the manuscript. Dr. Bernhard Seifert (Görlitz) provided a microscope used for this study, identified ambiguous ant material, and shared unpublished Styrian data. Dr. Christian Komposch (Graz) made the Arthropoda data base for the data management and the compilation of distribution maps available. He gave also some tips how to improve the manuscript. Dr. Florian Glaser (Absam in Tyrol) shared unpublished Styrian data. Mag. Johann Ambach and Mag. Esther Ockermüller (both Linz) enabled loans of interesting old *Tetramorium* material from Graz housed the Biologiezentrum Linz. Prof. Dr. Birgit C. Schlick-Steiner and Prof. Dr. Florian M. Steiner (both Innsbruck) sent interesting *Myrmica* and *Chthonolasius* material to me. Mag. Fritz Gusenleitner (Linz) und Dr. Ulrike Hausl-Hofstätter (Graz) provided information about Peter Gunhold, Dr. Erich Kreissl, and Alfred Mauerhofer. Dipl.-Biol. Gregor Bračko (Ljubljana) shared information about the distribution of *Messor* spp., *Liometopum microcephalum*, and *Camponotus lateralis* in Slovenia. Dr. Volker Borovsky (Klagenfurt) told me interesting observations on *Pheidole*. Pictures were provided by Fritz Gusenleitner, Roman Borovsky, BSc (St. Kathrein am Offenegg), Dr. Gernot Kunz (Graz), and Bernhard Seifert.

## 6. Invitation to collaboration

I ask the reader to please contact me if she or he should become aware of a Styrian record of *Messor* sp. (Fig. 6), *Pheidole* sp. (Fig. 26), *Liometopum microcephalum*, or *Camponotus lateralis* – all these taxa can usually easily be determined after figures in this publication or my easy-to-use field determination key to Austrian ant workers (Wagner 2019b).

## 7. Literature

Ambach, J. (2009a): Kommentierte Checkliste der Ameisen Oberösterreichs mit einer Einstufung ihrer Gefährdung (Hymenoptera, Formicidae). – Beiträge zur Naturkunde Oberösterreichs 19: 3-48.

Ambach, J. (2009b): Zur Geschichte und Entwicklung der Myrmekologie in Österreich. – Denisia 25: 37-52.

Bolton, B. (1977): The ant tribe Tetramoriini (Hymenoptera: Formicidae). The genus *Tetramorium* Mayr in the Oriental and Indo-Australian regions, and in Australia. – Bulletin of the British Museum (Natural History) Entomology 36: 67-151.

Borovsky, R. & Kunz, G. (2016): Untersuchungen zur Ameisenfauna auf ausgewählten Naturschutzbundflächen in der Steiermark (Hymenoptera, Formicidae). – Bachelor thesis, Karl-Franzenz-Universität, Graz, 1-19.

Borovsky, R. & Wagner, H.C. (2016): Ameisen in den Mur-Auen von Graz. In: Die Mur in Graz Das grüne Band unserer Stadt. – Freya Verlag GmbH, 250-251.

Borowiec, L. & Salata, S. (2018): *Tetramorium immigrans* Santschi, 1927 (Hymenoptera: Formicidae) nowy gatunek potencjalnie inwazyjnej mrówki w Polsce. – Acta entomologica silesiana 26: 1-5.

Bračko, G. (2007): Checklist of the ants of Slovenia (Hymenoptera: Formicidae). – Natura Sloveniae 9: 15-24.

Brancsik, C. (1871): Die Käfer der Steiermark. – Verlag von Paul Cieslar, Graz, 1-114.

Bregant, E. (1973): Zum Vorkommen von *Strongylognathus testaceus* Schenck, der kleinen Säbelameise, in Österreich (Hym., Formicidae). – Mitteilungen der Abteilung für Zoologie am Landesmuseum Joanneum Graz 2: 135-136.

Bregant, E. (1978): Eine interessante Hymenopterenfaunula aus den Windischen Büheln (Vespidae, Eumenidae, Chrysididae und Formicidae). – Jahresberichte des Landesmuseums Joanneum 7: 173-180.

Bregant, E. (1998a): Bemerkenswerte Ameisenfunde aus Österreich (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 2: 1-6.

Bregant, E. (1998b): Zur Biologie und Verbreitung der Honigameise *Prenolepis nitens* (Mayr, 1852) in Österreich (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 2: 14-18.

Bregant, E. & Maurer, W. (1993): Nachträge zur Flora von Klöch und St. Anna am Aigen. – Mitteilungen der Abteilung für Botanik am Landesmuseum Joanneum Graz 21/22: 1-20.

Buschinger, A. (1966): Untersuchungen an *Harpagoxenus sublaevis* Nyl. (Hym., Formicidae) I. Freilandbeobachtungen zu Verbreitung und Lebensweise. – Insectes Sociaux 13: 5-16.

Buschinger, A. (1971): Zur Verbreitung der Sozialparasiten von *Leptothorax acervorum* (Fabr.) (Hym., Formicidae). – Bonner zoologische Beiträge 22: 322-331.

Buschinger, A., Schlick-Steiner, B.C., Steiner, F.M. & Espadaler, X. (2003): On the geographic distribution of queen polymorphism in *Myrmecina graminicola* (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 5: 37-41.

Buschinger, A. & Schreiber, M. (2002): Queen polymorphism and queen-morph related facultative polygyny in the ant, *Myrmecina graminicola* (Hymenoptera, Formicidae). – Insectes Sociaux 49: 344-353.

Castracani, C., Spotti, F.A., Schifani, E., Giannetti, D., Ghizzoni, M., Grasso, D.A. & Mori, A. (2020): Public engagement provides first insights on Po Plain ant communities and reveals the ubiquity of the cryptic species *Tetramorium immigrans* (Hymenoptera, Formicidae). – Insects 11: 678.

Cordonnier, M., Bellec, A., Dumet, A., Escarguel, G. & Kaufmann, B. (2018): Range limits in sympatric cryptic species: a case study in *Tetramorium* pavement ants (Hymenoptera: Formicidae) across a biogeographical boundary. – Insect Conservation and Diversity 12: 109-120.

Cordonnier, M., Bellec, A., Escarguel, G. & Kaufmann, B. (2020): Effects of urbanization-climate interactions on range expansion in the invasive European pavement ant. – Basic and Applied Ecology 44: 46-54.

Csősz, S., Heinze, J. & Mikó, I. (2015): Taxonomic synopsis of the Ponto-Mediterranean ants of *Temnothorax nylanderi* species-group. – Public Library of Science One 10: e0140000.

Ebermann, E. (1979): Ein Beitrag zur Erforschung der Milben-Familie Scutacaridae (Acari-Trombidiformes) in Österreich und angrenzenden Gebieten. – Carinthia II 169/89: 259-280.

Ebermann, E. (1980): Zur Kenntnis der ostalpinen Milbenfauna (Acari, Fam. Scutacaridae). – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 110: 143-149.

Ebermann, E. (1981): *Imparipes* (*Imparipes*) *brevitarsus* n. sp. (Acari, Scutacaridae), eine mit Ameisen vergesellschaftete neue Milbenart aus Österreich. – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 111: 183-192.

Ebermann, E. (1982): Zuchtversuche und morphologische Untersuchungen an heimischen Milben (Acari, Scutacaridae). – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 112: 155-165.

Ebermann, E. & Krisper, G. (2014): Milben als Mitbewohner in Ameisennestern. In: Die Ameisen Kärntens. – Natur Kärnten. Naturwissenschaftlicher Verein für Kärnten, Klagenfurt am Wörthersee, 329-342.

Eichhorn, O. (1964): Zur Verbreitung und Ökologie der hügelbauenden Waldameisen in den Ostalpen. – Zeitschrift für Angewandte Entomologie 54: 253-289.

Eichhorn, O. (1971): Zur Verbreitung und Ökologie von *Formica fusca* L. und *Formica lemani* Bondroit in den Hauptwaldtypen der mitteleuropäischen Gebirgswälder (zugleich in Beitrag zum „Weißtannenproblem" im Thüringer Wald). – Zeitschrift für Angewandte Entomologie 68: 337-344.

Elmes, G.W. (1991): Mating strategy and isolation between the two forms, macrogyna and microgyna, of *Myrmica ruginodis* (Hym. Formicidae). – Ecological Entomology 16: 411-423.

Fossel, A. (1963): Die wichtigsten Honigtauerzeuger des steirischen Ennstales. – Mitteilungen der Abteilung für Zoologie und Botanik am Landesmuseum "Joanneum" Graz 16: 1-21.

Fossel, A. (1972): Die Populationsdichte einiger Honigtauerzeuger und ihre Abhängigkeit von der Betreuung durch Ameisen. – Waldhygiene 9: 185-191.

Franz, H. (1960): X. Die beiden großen Alpenexkursionen a) Niederösterreich, Steiermark und Oberösterreich. In: Exkursionsführer zum XI. Internationalen Entomologenkongreß. – Organisations-Komitee des XI. Internationalen Entomologenkongresses Wien 1960, Wien, 83-89.

Franz, H. & Klimesch, J. (1947): Das Pürgschachenmoor im steirischen Ennstal. – Natur und Land 33/34: 129-136.

Friedl, A. (2000): Heimische Ameisenarten als Wirte/ Phoresiewirte von bodenbewohnenden Milben der Familie Scutacaridae (Acari, Heterostigmata, Tarsonemina). – Master thesis, Karl-Franzenz-Universität, Graz, 1-54.

Friedrich, C. & Winder, O. (1993): Lebensraum Grazer Murböschungen. Zoologisch-botanische Untersuchungen einschließlich Planungsvorschläge. In: Schriftenreihe zur Wasserwirtschaft. Technische Universität, Graz, 1-61.

Frieß, T., Holzer, E., Koschuh, A., Platz, A., Wagner, H.C. & Wieser, B. (2010): Tierökologische Untersuchung zur Bedeutung von Altgrasstreifen im Europaschutzgebiet Südoststeirisches Hügelland. – Unpublished project report for the society Lebende Erde im Vulkanland: 1-104.

Gepp, J., Zorn, S. & Baumann, N. (1988): Katalog publizierter Verbreitungskarten steirischer Tiere. – Verlag des Österreichischen Naturschutzbundes Landesgruppe Steiermark, Graz, 1-256.

Gippet, J.M.W., Mondy, N., Diallo-Dudek, J., Bellec, A., Dumet, A., Mistler, L. & Kaufmann, B. (2017): I'm not like everybody else: urbanization factors shaping spatial distribution of native and invasive ants are species-specific. – Urban Ecosystems 20: 157-169.

Glaser, F. (1997): Die Ameisenfauna des Arzler Kalvarienberges (Nordtirol): Artenspektrum, Habitatbindung, Siedlungsdichte und Gefährdung. – Diplomarbeit, Universität Innsbruck, Innsbruck, 1-167.

Glaser, F. (1999): Verbreitung, Habitatbindung und Gefährdung der Untergattung *Coptoformica* (Hymenoptera: Formicidae) in Österreich. – Myrmecologische Nachrichten 3: 55-62.

Glaser, F. (2005): Rote Liste gefährdeter Ameisen Vorarlbergs. – Inatura, Dornbirn, 1-127.

Glaser, F., Ambach, J., Müller, J., Schlick-Steiner, B.C., Steiner, F.M. & Wagner, H.C. (2010): Die Große Kerbameise *Formica exsecta* Nylander, 1846 (Hymenoptera, Formicidae). Verbreitung, Ökologie und Gefährdung des Insekts des Jahres 2011 in Österreich. – Beiträge zur Entomofaunistik 11: 107-119.

Goetsch, W. (1950): Beiträge zur Biologie und Verbreitung der Ameisen in Kärnten und in den Nachbargebieten. – Österreichische Zoologische Zeitschrift 2: 39-69.

Gösswald, K., Kneitz, G. & Pirnke, F.-R. (1968): Zur Verbreitung der Waldameisen (Formicidae, *Formica*) in einem Gebirgsmassiv der Steiermark. – Waldhygiene 7: 166-189.

Gösswald, K., Kneitz, G. & Schirmer, G. (1965): Die geografische Verbreitung der hügelbauenden *Formica*-Arten (Hym., Formicidae) in Europa. – Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere 92: 369-404.

Gunhold, P. (1949): *Formica* (*Coptoformica*) *suecica* Adlerz und *Myrmica schencki* Emery in Oesterreich. – Zeitschrift der Wiener Entomologischen Gesellschaft 34: 131-133.

Heller, G. & Bretz, D. (2019): *Pheidole pallidula* (Nylander 1849) – Erstnachweis für Hessen und ein Update zur Kolonie in Neustadt a. d. Weinstraße. – Ameisenschutz aktuell 33: 53-67.

Hita Garcia, F. & Fisher, B.L. (2011): The ant genus *Tetramorium* Mayr (Hymenoptera: Formicidae) in the Malagasy region – introduction, definition of species groups, and revision of the *T. bicarinatum*, *T. obesum*, *T. sericeiventre* and *T. tosii* species groups. – Zootaxa 3039: 1-72.

Hoffer, E. (1890a): Skizzen aus dem Leben unserer heimischen Ameisen. – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 26: 149-171.

Hoffer, E. (1890b): Zur Hymenopterenfauna von St. Johann ob Hochenburg (mittleres Kainachthal) nebst verschiedenen biologischen Angaben. – Jahresbericht der Steiermärkischen Landes-Oberrealschule Graz 39: 1-28.

Hoffer, E. (1906): Bericht der entomologischen Sektion über ihre Tätigkeit im Jahre 1905. – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 42: 43-100.

Hoffer, E. (1907): Bericht der entomologischen Sektion über ihre Tätigkeit im Jahre 1906. – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 43: 417-440.

Hölzel, E. (1936): Die myrmekophilen Koleopteren der Steiermark und ihre Wirtsameisen. – Entomologisches Jahrbuch 45: 120-130.

Hölzel, E. (1952): Ameisen Kärntens. – Carinthia II 142/62: 89-132.

Hölzel, E. (1966): Hymenoptera – Heterogyna: Formicidae. In: Catalogus Faunae Austriae. Wien, 1-11.

Huber, E., Aurenhammer, S., Bauer, H., Becker, J., Borovsky, R., Bruggraber, N., Degasperi, G., Elsasser, H., Frieß, T., Fröhlich, D., Gladitsch, J., Gorfer, B., Gunczy, J., Gunczy, L.W., Heimburg, H., Holzer, E., Kirchmair, G., Komposch, C., Körner, A., Kunz, G., Lorber, L., Moser, A., Paill, W., Schattanek, P., Volkmer, J., Wagner, H.C., Wiesmair, B., Wolf, A., Zangl, L., Zechmeister, T. & Zweidick, O. (2020): Bericht über das sechste ÖEG-Insektencamp: Wirbellose Artenvielfalt rund um Güssing (Südburgenland). – Entomologica Austriaca 27: 137-210.

Jäger, I. (2014): Bekämpfung von Ameisen in menschlichen Behausungen. In: Die Ameisen Kärntens Verbreitung, Biologie, Ökologie und Gefährdung. – Natur Kärnten. Naturwissenschaftlicher Verein für Kärnten, Klagenfurt am Wörthersee, 356-368.

Kaiser, H. (1986): Morphologische Analyse des Ameisen-Parasitoiden *Pheromermis vilhsa* n. sp. (Nematoda, Mermitbidae). – Mitteilungen des Naturwissenschaftlichen Vereines für Steiermark 116: 269-294.

Kiefer, H. & Moosbrugger, J. (1941a): Beitrag zur Coleopterenfauna des steirischen Ennstales und der angrenzenden Gebiete. (Fortsetzung). – Mitteilungen der Münchner Entomologischen Gesellschaft 31: 93-110.

Kiefer, H. & Moosbrugger, J. (1941b): Beitrag zur Coleopterenfauna des steirischen Ennstales und der angrenzenden Gebiete. (Fortsetzung). – Mitteilungen der Münchner Entomologischen Gesellschaft 31: 681-701.

Kinzner, M.-C. & Wagner, H.C. (2014): 19. Ameisen. In: Naturführer Steirisches Vulkanland. – BVR-Verlag, Auersbach, 60.

Kinzner, M.-C., Wagner, H.C., Peskoller, A., Moder, K., Dowell, F.E., Arthofer, W., Schlick-Steiner, B.C. & Steiner, F.M. (2015): A near-infrared spectroscopy routine for unambiguous identification of cryptic ant species. – PeerJ 3: e991.

Kirchmair, G., Friess, T., Brandner, J., Stangl, J., Borovsky, R., Gunczy, J., Paill, W., Gunczy, L.W., Rode, M., Kuzmits, L., Frankl, H., Stani, W., Fröhlich, D., Preiml, S. & Kunz, G. (2017): Zoologischer Bericht vom Tag der Biodiversität 2017 im Naturpark Südsteiermark. – Mitteilungen des Naturwissenschaftlichen Vereines für Steiermark 147: 99-134.

Klausnitzer, B. (1996): Zum Gedenken an Dr. Erich Kreissl (31. Oktober 1927 bis 25. September 1995). – Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 48: 117-124.

Klingenstein, F., Kornacker, P.M., Martens, H. & Schippmann, U. (2005): Gebietsfremde Arten Positionspapier des Bundesamtes für Naturschutz. – Bundesamt für Naturschutz, Bonn, 1-26.

Kreissl, E. (1973): *Prenolepis nitens* (Mayr) – eine für die Steiermark neue Armeisenart (Hym., Formicidae). – Mitteilungen der Abteilung für Zoologie am Landesmuseum Joanneum Graz 2: 169-170.

Kreissl, E. (1976): Was kann und soll zum Schutz von Waldameisen getan werden? – Steirischer Naturschutzbrief 16: 13-16.

Kreissl, E. (1978): Erhebung des steirischen Ameisenbestandes. – Steirischer Landespressedienst, Graz, 18.

Kudrna, O. & Fric, Z.F. (2013): On the identity and taxonomic status of *Lycaena alcon rebeli* Hirschke, 1905 — a long story of confusion and ignorance resulting in the fabrication of a "ghost species" (Lepidoptera: Lycaenidae). – Nachrichten des Entomologischen Vereins Apollo 34: 117-124.

Kühnelt, W. (1953): Beiträge zur Kenntnis der Bodentierwelt Kärntens und seiner Nachbargebiete. – Carinthia II 143/63: 4274.

Kühnelt, W. (1962): Die Tierwelt in Steiermark. – Mitteilungen des Naturwissenschaftlichen Vereines für Steiermark 92: 47-72.

Kutter, H. (1977): Hymenoptera. Formicidae. – Schweizerische Entomologische Gesellschaft, Zürich, 1-298.

Kutter, H. (1978): Hymenoptera. Formicidae. – Schweizerische Entomologische Gesellschaft, Zürich, 1-100.

Lieb, G.K. (1991): Eine Gebietsgliederung der Steiermark aufgrund naturräumlicher Gegebenheiten. – Mitteilungen der Abteilung für Botanik am Landesmuseum Joanneum Graz 20: 1-30.

Lubbock, J. (1883): Ameisen, Bienen und Wespen. Beobachtungen über die Lebensweise der geselligen Hymenopteren. F. A. Brockhaus, Leipzig, 1- 381.

Mayr, G.L. (1855): Formicina austriaca. – Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesellschaft in Wien 5: 273-478.

Neuhäuser, L. (1993): Die Palpenkäfer der Steiermark aus landesfaunistischer und ökologischer Sicht (Pselaphidae, Coleoptera). – Master thesis, Karl-Franzenz-Universität, Graz, 1-344.

Neuhäuser, L. (1996): Erstnachweise von Palpenkäfern für die Steiermark mit einer Checkliste der im Bundesland vorkommenden Arten (Pselaphidae, Coleoptera). – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 125: 177-190.

Neuhäuser-Happe, L. (1996a): Requiem für einen Marillenbaum. Die bemerkenswerte Käferfaunula eines Totbaumes im Stadtgebiet von Graz (Coleoptera). – Mitteilungen der Abteilung für Zoologie am Landesmuseum Joanneum Graz 50: 109-116.

Neuhäuser-Happe, L. (1996b): Zur Verbreitung und Ökologie wenig bekannter und seltener Palpenkäfer in der Steiermark (Pselaphidae, Coleoptera). – Mitteilungen des Naturwissenschaftlichen Vereines für Steiermark 126: 189-213.

Neuhäuser-Happe, L. (1997): Zur Verbreitung von Blindkäfern aus der Colydiiden-Verwandtschaft in Südösterreich (Anommatidae, Colydiidae; Coleoptera). – Carinthia II 187/107: 471-478.

Neuhäuser-Happe, L. (1999): Verbreitung und Ökologie der Ameisenkäfer in Kärnten und den angrenzenden Gebieten (Scydmaenidae, Coleoptera). – Carinthia II 189/109: 491-514.

Neuhäuser-Happe, L. & Fritz, J.J. (1998): Von schillernden Rittern und gefräßigen Räubern Insektenleben auf dem Schloßberg. In: Adlbauer, K. & Ster, T. (Eds.): Lebensraum mit Geschichte – Der Grazer Schloßberg. – Austria Medienservice, Graz, 155-197.

Ölzant, S. (2001): Freilandökologische Untersuchungen an der Gastameise *Formicoxenus nitidulus* (Nylander, 1846) unter besonderer Berücksichtigung der Nesttemperatur (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 4: 1-10.

Österreichische Gesellschaft für Ameisenkunde (1995): Bemerkenswerte Ameisenfunde aus Österreich und angrenzender Gebiete (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 1: 1-3.

Prince, A.J. (1994): *Lasius platythorax* Seifert 1991 (Hym., Formicidae) on the somerset levels, with notes on distinguishing the male from that of *Lasis niger* (L.). – Entomologist's Monthly Magazine: 299-303.

Ritter, H. (1953): Nachweis von *Anergates atratulus* Schenk. (Hym., Form.) in Österreich. – Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 5: 50.

Ronchetti, G. (1978): Distribution of ants of the *Formica rufa*-group in Europe. Meeting of the work groups: "*Formica rufa*" (and) "Vertebrated predators of insects." – Instituto di entomologia dell' Universita degli studi di Pavia, 1-11, 5 maps.

Santschi, F. (1927): A propos du *Tetramorium caespitum* L. – Folia Myrmecologica et Termitologica 1: 53-58.

Schlagbauer, J. (1997): Untersuchungen zur Taxonomie und Lebensweise an Milben der Gattung *Lophodispus* Kurosa, 1971 (Acari, Heterostigmata, Scutacaridae): *L. irregularis* (Mahunka, 1971) und *L. bulgaricus* Dobrev, 1992. – Master thesis, Karl-Franzens-Universität, Graz, 1-92.

Schlick-Steiner, B.C. & Steiner, F.M. (1999): Faunistisch-Ökologische Untersuchungen an den freilebenden Ameisen (Hymenoptera: Formicidae) Wiens. – Myrmecologische Nachrichten 3: 9-53.

Schlick-Steiner, B.C. & Steiner, F.M. (2004): Die Ameisenfauna (Hymenoptera: Formicidae). In: Naturdach KW Friesach. Sukzessionsstudie. – Schriftenreihe Forschung im Verbund 87: 55-65.

Schlick-Steiner, B.C., Steiner, F.M., Moder, K., Seifert, B., Sanetra, M., Dyreson, E., Stauffer, C. & Christian, E. (2006): A multidisciplinary approach reveals cryptic diversity in Western Palearctic *Tetramorium* ants (Hymenoptera: Formicidae). – Molecular Phylogenetics and Evolution 40: 259-273.

Schlick-Steiner, B.C., Steiner, F.M. & Schödl, S. (2003): Rote Listen ausgewählter Tiergruppen Niederösterreichs – Ameisen: (Hymenoptera: Formicidae). – Amt der Niederösterreichischen Landesregierung, Abteilung Naturschutz, St. Pölten, 1-75.

Seifert, B. (1992a): 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. (1992b): *Formica nigricans* Emery, 1909 – an ecomorph of *Formica pratensis* Retzius, 1783 (Hymenoptera, Formicidae). – Entomologica Fennica 2: 217-226.

Seifert, B. (2006a): Social cleptogamy in the ant subgenus *Chthonolasius* Ruzsky, 1912 – survival as a minority. – Abhandlungen und Berichte des Naturkundemuseums Görlitz 77: 251-276.

Seifert, B. (2006b): *Temnothorax saxonicus* (Seifert, 1995) stat.n., comb.n. – a parapatric, closely-related species of *T. sordidulus* (Müller, 1923) comb.n. and description of two new closely-related species, *T. schoedli* sp.n. and *T. artvinense* sp.n., from Turkey (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 8: 1-12.

Seifert, B. (2007): Die Ameisen Mittel- und Nordeuropas. – lutra Verlags- und Vertriebsgesellschaft, Görlitz und Tauer, 1-368.

Seifert, B. (2008): Removal of allometric variance improves species separation in multi-character discriminant functions when species are strongly allometric and exposes diagnostic characters. – Myrmecological News 11: 91-105.

Seifert, B. (2016a): Analyzing large-scale and intranidal phenotype distributions in eusocial Hymenoptera – a taxonomic tool to distinguish intraspecific dimorphism from heterospecificity. – Myrmecological News 23: 41-59.

Seifert, B. (2016b): Inconvenient hyperdiversity – the traditional concept of "*Pheidole pallidula*" includes four cryptic species (Hymenoptera: Formicidae). – Soil Organisms 88: 1-17.

Seifert, B. (2017): The ecology of Central European non-arboreal ants – 37 years of a broad-spectrum analysis under permanent taxonomic control. – Soil Organisms 89: 1-67.

Seifert, B. (2018): The ants of Central and North Europe. – lutra Verlags- und Vertriebsgesellschaft, Tauer, 1-408.

Seifert, B. (2019): A taxonomic revision of the members of the *Camponotus lateralis* species group (Hymenoptera: Formicidae) from Europe, Asia Minor and Caucasia. – Soil Organisms 91: 7-32.

Seifert, B. (2020a): A taxonomic revision of the Palaearctic members of the subgenus *Lasius* s.str. (Hymenoptera, Formicidae). – Soil Organisms 92: 15-86.

Seifert, B. (2020b): Invasive, superkoloniale Ameisen nördlich der Alpen – eine Welle rollt an. – Ameisenschutz aktuell 34: 63-74.

Seifert, B. (under review): A taxonomic revision of the Palaearctic members of the *Formica rufa* group (Hymenoptera, Formicidae) – the famous mound-building red wood ants. – Myrmecological News 30.

Seifert, B., Csősz, S. & Schulz, A. (2014): NC-Clustering demonstrates heterospecificity of the cryptic ant species *Temnothorax luteus* (Forel, 1874) and *T. racovitzai* (Bondroit, 1918) (Hymenoptera: Formicidae). – Contributions to Entomology 64: 47-57.

Seifert, B., Kulmuni, J. & Pamilo, P. (2010): Independent hybrid populations of *Formica polyctena* X *rufa* wood ants (Hymenoptera: Formicidae) abound under conditions of forest fragmentation. – Evolutionary Ecology 24: 1219-1237.

Seifert, B., Schlick-Steiner, B.C. & Steiner, F.M. (2009): *Myrmica constricta* Karavajev, 1934 – a cryptic sister species of *Myrmica hellenica* Finzi, 1926 (Hymenoptera: Formicidae). – Soil Organisms 81: 53-76.

Sheard, J.K., Sanders, N.J., Gundlach, C., Schär, S. & Larsen, R.S. (2020): Monitoring the influx of new species through citizen science: the first introduced ant in Denmark. – PeerJ 8: e8850.

Spitzenberger, F. (1996): Erich Kreissl zum Gedenken. – Mitteilungen der Abteilung für Zoologie am Landesmuseum Joanneum Graz 50: 1-10.

Steiner, F.M., Ambach, J., Glaser, F., Wagner, H.C., Müller, J. & Schlick-Steiner, B.C. (2017): Formicidae (Insecta: Hymenoptera). In: Schuster, R. (Eds.): Checklisten der Fauna Österreichs. Austrian Academy of Sciences, Budapest, 1-24.

Steiner, F.M., Schlick-Steiner, B.C., VanDerWal, J., Reuther, K.D., Christian, E., Stauffer, C., Suarez, A.V., Williams, S.E. & Crozier, R.H. (2008): Combined modelling of distribution and niche in invasion biology: a case study of two invasive *Tetramorium* ant species: Distribution and niche in invasion modelling. – Diversity and Distributions 14: 538-545.

Tartally, A., Koschuh, A. & Varga, Z. (2014): The re-discovered *Maculinea rebeli* (Hirschke, 1904): Host ant usage, parasitoid and initial food plant around the type locality with taxonomical aspects (Lepidoptera, Lycaenidae). – ZooKeys 406: 25-40.

Tista, M. (2019): Die Ameisenfauna (Hymenoptera: Formicidae) des Naturdenkmals „Trockenrasen" in Tattendorf. – Biodiversität und Naturschutz in Ostösterreich - BCBEA 4: 130-138.

Wagner, H.C. (2008): Ameisen (Formicidae) des Johnsbachtales. – Schriften des Nationalparks Gesäuse 3: 170-173.

Wagner, H.C. (2009): Ameisen (Formicidae) & der Rotbraune Keulenkäfer *Claviger testaceus* am Tamischbachturm. – Schriften des Nationalparks Gesäuse 4: 149-160.

Wagner, H.C. (2010): Ein Beitrag zu den Ameisen (Formicidae) in höheren Lagen des Nationalparks Gesäuse. – Schriften des Nationalparks Gesäuse 5: 116-127.

Wagner, H.C. (2011a): Die Ameisen (Formicidae) einer Lawinenrinne im Nationalpark Gesäuse (Steiermark). – Schriften des Nationalparks Gesäuse 6: 123-136.

Wagner, H.C. (2011b): Tag der Artenvielfalt – Die Ameisen (Hymenoptera: Formicidae) im Botanischen Garten Graz. – Mitteilungen des naturwissenschaftlichen Vereines für Steiermark 141: 235-240.

Wagner, H.C. (2012): Revision der Ameisensammlung (Hymenoptera: Formicidae) des Kärntner Landesmuseums. – Carinthia II 202./122.: 545-600.

Wagner, H.C. (2014): Die Ameisen Kärntens. Verbreitung, Biologie, Ökologie und Gefährdung. – Naturwissenschaftlicher Verein für Kärnten, Klagenfurt am Wörthersee, 1-462.

Wagner, H.C. (2019a): Die Ameisen der steirischen Obst- und Weingärten. – OBST – WEIN – GARTEN: 18-19.

Wagner, H.C. (2019b): Ein Freilandbestimmungsschlüssel für Ameisen (Hymenoptera: Formicidae) in Österreich. – Joannea Zoologie 17: 23-52.

Wagner, H.C. (2019c): Wiener Ameisenbeobachtungen (Hymenoptera: Formicidae). – Beiträge zur Entomofaunistik 20: 143-159.

Wagner, H.C. & Zettel, H. (2019): Die Hautflüglerfauna (Hymenoptera) des Lainzer Tiergartens in Wien: 4. Ameisen (Formicidae). – Beiträge zur Entomofaunistik 20: 199-213.

Wagner, H.C., Ambach, J. & Glaser, F. (2010): 10 Erstmeldungen von Ameisen (Hymenoptera: Formicidae) für die Steiermark (Österreich). – Joannea Zoologie 11: 19-30.

Wagner, H.C., Arthofer, W., Seifert, B., Muster, C., Steiner, F.M. & Schlick-Steiner, B.C. (2017): Light at the end of the tunnel: integrative taxonomy delimits cryptic species in the *Tetramorium caespitum* complex (Hymenoptera: Formicidae). – Myrmecological News 25: 95-130.

Wagner, H.C., Glaser, F., Schlick-Steiner, B.C. & Steiner, F.M. (2011): Das Insekt des Jahres 2011: Die Große Kerbameise *Formica exsecta* Nylander 1846 (Hymenoptera: Formicidae). – Entomologica Austriaca 18: 125-140.

Wagner, H.C., Komposch, C., Aurenhammer, S., Degasperi, G., Korn, R., Frei, B., Volkmer, J., Heimburg, H., Ivenz, D., Rief, A., Wiesmair, B., Zechmeister, T., Schneider, M., Dejaco, T., Netzberger, R., Kirchmair, G., Gunczy, L.W., Zweidick, O., Kunz, G., Paill, W., Schwarz, M., Pfeifer, J., Arthofer, P., Holzer, E., Borovsky, R., Huber, E., Platz, A., Papenberg, E., Schied, J., Rausch, H.R., Graf, W., Muster, C., Gunczy, J., Fuchs, P., Pichler, G.A., Allspach, A., Pass, T., Teischinger, G., Wiesinger, G. & Kreiner, D. (2016): Bericht über das zweite ÖEG-Insektencamp: 1019 Wirbellose Tierarten aus dem Nationalpark Gesäuse (Obersteiermark). – Entomologica Austriaca 23: 207-260.

Wagner, H.C., Komposch, C., Degasperi, G., Schneider, M., Kerschbaumsteiner, H., Gunczy, L.W., Heimburg, H., Frei, B., Aurenhammer, S., Zweidick, O., Fuchs, P., Netzberger, R., Borovsky, R., Kirchmair, G., Preiml, S., Teischinger, G., Duda, M., Korn, R., Kunz, G., Vogtenhuber, P., Ockermüller, E., Seeber, J., Gunczy, J. & Allspach, A. (2018): Bericht über das vierte ÖEG-Insektencamp: Parasitische Ameisen, endemische Käfer und viele weitere Invertebraten aus dem Biosphärenpark Nockberge (Kärnten). – Entomologica Austriaca 25: 95-144.

Wagner, H.C., Komposch, C., Volkmer, J., Degasperi, G., Frei, B., Korn, R., Wiesmair, B., Kerschbaumsteiner, H., Kunz, G., Schwab, J., Aurenhammer, S., Platz, A., Pfeifer, J., Arthofer, P., Urach, K., Lanzer, M., Morchner, D., Pass, T. & Holzer, E. (2015): Bericht über das erste ÖEG-Insektencamp: Faunistische Erfassungen im Lafnitztal (Oststeiermark, Südburgenland). – Entomologica Austriaca 22: 185-233.

Wagner, H.C., Koschuh, A., Schatz, I. & Stalling, T. (2012): Die Myrmekophilen einer Lawinenrinne im Nationalpark Gesäuse (Steiermark). – Abhandlungen der Zoologisch-Botanischen-Gesellschaft 38: 147-161.

Wagner, H.C., Wiesmair, B., Paill, W., Degasperi, G., Komposch, C., Schattanek, P., Schneider, M., Aurenhammer, S., Gunczy, L.W., Rabitsch, W., Heimburg, H., Zweidick, O., Volkmer, J., Frei, B., Kerschbaumsteiner, H., Huber, E., Netzberger, R., Borovsky, R., Kunz, G., Zechmeister, T., Ockermüller, E., Preiml, S., Papenberg, E., Kirchmair, G., Fröhlich, D., Allspach, A., Zittra, C., Svetnik, I., Bodner, M., Vogtenhuber, P., Körner, A., Thieme, T., Christian, E., Seeber, J., Baumann, J., Gross, H., Hittorf, M., Rausch, H., Burckhardt, D., Graf, W. & Baumgartner, C. (2019): Bericht über das fünfte ÖEG-Insektencamp: Biodiversitätsforschung im Nationalpark Donau-Auen (Wien, Niederösterreich). – Entomologica Austriaca 26: 25-113.

Wetterer, J.K. (2009): Worldwide spread of the Penny Ant, *Tetramorium bicarinatum* (Hymenoptera: Formicidae). – Sociobiology 54: 1-20.

Wieser, B. & Trummer, E. eds. (2014): Naturführer Steirisches Vulkanland. – BVR-Verlag, Auersbach, 1-382.

Winter, U. (1974): Sozialparasiten der *Leptothorax*-Gruppe (Hym., Formicidae) aus der Umgebung des Tennengebirges (Österreich). – Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 24: 124-126.

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