

## Genus *Camponotus* MAYR, 1861 (Hymenoptera: Formicidae) in Romania: distribution and identification key to the worker caste

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**Summary:** The genus *Camponotus* is one of the largest ant genera in Romania, with 11 species distributed across the entire country. In the framework of this study we present the distribution data of eleven *Camponotus* species in Romania: *C. herculeanus*, *C. ligniperda*, *C. vagus*, *C. truncatus*, *C. atricolor*, *C. dalmaticus*, *C. fallax*, *C. lateralis*, *C. piceus*, *C. tergestinus*, *C. aethiops*. The occurrence of *C. sylvaticus* in Romania is questionable, since the only published data are from the 19<sup>th</sup> century and the species could easily have been misidentified due to the lack of appropriate keys at that time. In addition to these data a key is provided to the worker caste of these species, including species with likely occurrence in Romania.

**Rezumat:** Genul *Camponotus* este unul dintre cele mai mari genuri de furnici din România conținând 11 specii distribuite pe tot cuprinsul țării. În cadrul acestui studiu prezentăm datele de distribuție a celor 11 specii de *Camponotus*: *C. herculeanus*, *C. ligniperda*, *C. vagus*, *C. truncatus*, *C. atricolor*, *C. dalmaticus*, *C. fallax*, *C. lateralis*, *C. piceus*, *C. tergestinus*, *C. aethiops*. Prezența speciei *C. sylvaticus* în România este nesigură, deoarece singurele date despre această specie au fost publicate în secolul al XIX-lea, iar la acea vreme datorită lipsei cheilor moderne de determinare specia respectivă putea fi confundată cu ușurință cu alte specii din același gen. Pe lângă datele și hărțile de distribuție articolul oferă și o cheie de determinare pentru lucrătoarele acestui gen incluzând și specii cu posibilă prezență pe teritoriul țării.

**Key words:** ants, *Camponotus*, distribution, key, Romania

### Introduction

Among the ant genera, *Camponotus* MAYR, 1861 is the largest and most diverse, being divided in 46 subgenera containing approximately 1580 species described worldwide, most of them from the tropics (BOLTON *et al.* 2006). In the Palaearctic eight subgenera with more than 100 species are known (CZECHOWSKI *et al.* 2002). However, there are relatively few *Camponotus* species in central and eastern Europe: seven in Germany (SEIFERT 2001, 2007), six in Poland (BOROWIEC 2007, SUCHOCKA *et al.* 2008), seven in the Czech Republic (WERNER and WIEZIK 2007), seven in Slovakia (WERNER and WIEZIK 2007), eight in Austria (STEINER *et al.* 2002, SEIFERT 2007), eleven in Hungary (IONESCU-HIRSCH *et al.* 2009), ten in Slovenia (BRAČKO 2007), nine in Croatia (BRAČKO 2006), and eight in Ukraine (A. RADCHENKO *pers. comm.*). The number of *Camponotus* species increases from north to south: thus 11 species are known in Montenegro (KARAMAN 2004), 11 in Serbia (PETROV 2004, 2006), nine in Macedonia (KARAMAN 2009) 12 in Bulgaria (V. ANTONOVA *pers. comm.*), 16 in Greece (AGOSTI and COLLINGWOOD 1987a) and 35 in Turkey (K. KIRAN *pers. comm.*). Some of the species nest in wood while others nest in the ground. There are carnivorous and aphid tending species as well.

*Camponotus* species are listed in the earliest faunistic reports concerning the current territory of

Romania from the 19<sup>th</sup> century (e.g. MAYR 1853, FUSS 1855, FRIVALDSZKY 1869, 1871, MOCSÁRY 1876, 1879). These sporadic records mostly refer to the western part of present-day Romania, while data on southern Romania are available only from the beginning of the 20<sup>th</sup> century (e.g. FOREL 1906, MONTANDON and SANTSCHI 1910, POGOREVICI 1947). Starting from the 1950s, data on the distribution and ecology of *Camponotus* species in Romania are more frequent (e.g. PARASCHIVESCU 1961, 1962a,b, 1968, 1972a,b, 1975a-d, 1976a,b, 1978a,b, Csösz *et al.* 2001). Nonetheless CİRDEI *et al.*'s (1962) study is the only one to treat exclusively the distribution of *Camponotus* species in Romania. They list only five species: *C. herculeanus*, *C. ligniperda*, *C. vagus*, *C. aethiops* (also as *C. aethiops* var. *marginata*), and *C. piceus*, and restrict their study within Romania to the eastern region of the country, Moldova. The checklist of Romanian ants (MARKÓ *et al.* 2006) and a recent publication (IONESCU-HIRSCH *et al.* 2009) report 11 valid *Camponotus* species for Romania, belonging to four subgenera (*Camponotus* s. str., *Colobopsis* MAYR, 1861, *Myrmentoma* FOREL, 1912, *Tanaemyrmex* ASHMEAD, 1905).

Since the last publication to deal with the distribution of this genus in Romania is quite old (CİRDEI *et al.* 1962), we include here the complete list of published localities for all known Romanian *Camponotus* species, along with distribution maps.

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We also provide a key to the worker caste of all currently known Romanian *Camponotus* species.

## Materials and methods

The current list of species was prepared on the basis of all publications containing data on *Camponotus* species from the territory of present-day Romania, irrespective of the article's original focus (faunistics, ecology, etc.). The list of names was created on the basis of RADCHENKO's (1996, 1997a-c) and BOLTON *et al.*'s (2006) comprehensive works. Beside the name of each species we also list the valid synonyms and the erroneous names that were published in the Romanian literature. The faunistic data are the same in two of MOCSÁRY's (1897, 1918) and MARKÓ's studies (1997, 1998); thus we cite only the earlier publications in both cases. Collecting sites are listed according to their larger regional administrative entities (counties). These counties are abbreviated as follows: AB – Alba; AR – Arad; B – Bucharest; BC – Bacău; BH – Bihor; BN – Bistrița-Năsăud; BV – Brașov; CJ – Cluj; CL – Călărași; CS – Caraș-Severin; CT – Constanța; CV – Covasna; DB – Dâmbovița; DJ – Dolj; GJ – Gorj; GR – Giurgiu; IF – Ilfov; IL – Ialomița; IS – Iași; HD – Hunedoara; HR – Harghita; MH – Mehedinți; MM – Maramureș; MS – Mureș; NT – Neamț; PH – Prahova; SB – Sibiu; SJ – Sălaj; SM – Satu Mare; SV – Suceava; TL – Tulcea; TM – Timiș; VN – Vrancea; VS – Vaslui. In some cases collecting sites could not be precisely identified, as only larger regions, mountains or river valleys are mentioned. Such collecting sites are listed under the category of Unknown Locations (UL), and the distribution maps of species do not show these collecting sites. Among collecting sites the island of Ada-Kaleh is also listed; once situated in the middle of the Danube River close to the town of Orșova (Mehedinți County), the island no longer exists.

The key to the worker caste was constructed on the basis of currently available keys to central Europe (SEIFERT 2007, SUCHOCKA *et al.* 2008) and the Balkans (AGOSTI and COLLINGWOOD 1987b), as well as on personal observations. Abbreviations used in the keys are: CS – cephalic size: the arithmetic mean of maximum head length in median line and maximum head width either across, behind or before the eyes; MW – mesosoma width measured at its widest point, at the pronotum; PEW – petiole width; PW – propodeum width; PL – propodeum length; SL – scape length.

## List of species

*Camponotus (Camponotus) herculeanus* (LINNAEUS, 1758)

The species was previously reported from Romania also as *Formica herculeana* LINNAEUS in FUSS (1853) and as *Camponotus herculeanus* [sic] in PARASCHIVESCU (1976b).

*C. herculeanus* is distributed throughout northern and eastern Europe, and from southern Europe and Asia Minor, to western and eastern Siberia (CZECHOWSKI *et al.* 2002). The species has two subspecies: *C. herculeanus herculeanus* is distributed in Europe and in the most part of the Palaearctic region, while *C. herculeanus sachalinensis* FOREL, 1904 is known from the easternmost part of the Palaearctic, e.g. Vostok region, Mongolia, China (RADCHENKO 1996, 1997b). It inhabits mostly coniferous forests or forest edges where it nests in rotten wood stumps or occasionally in living trees. It is a common species in Romania, found everywhere in the mountains (Fig. 1).

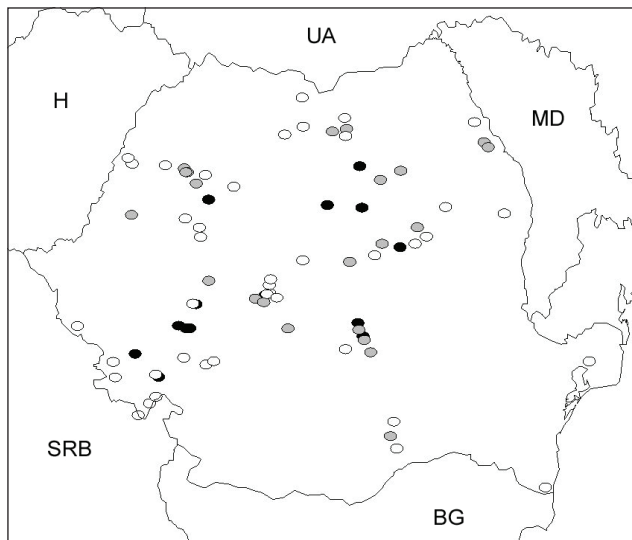


Fig. 1. Distribution of *C. herculeanus*, *C. ligniperda*, and *C. vagus* in Romania. Symbols: black dots – *C. herculeanus*, grey dots – *C. ligniperda*, white dots – *C. vagus*.

**Collecting sites:** AB: Cîmpeni, Gîrda (PARASCHIVESCU 1982); B: București (PARASCHIVESCU 1974); BC: Bacău (CÎRDEI *et al.* 1962, GOAGĂ and PARASCHIVESCU 1991), Găidarul Hill (GOAGĂ and PARASCHIVESCU 1991); CS: Mehadia (FRIVALDSZKY 1869), Băile Herculane (GOAGĂ and PARASCHIVESCU 1991), Semenic Mts. – Piatra Gozna and Semenic Peaks (PARASCHIVESCU 1975c); CJ: Călata (PARASCHIVESCU and RAICEV ARCAȘU 1976), Ciucea (PARASCHIVESCU and RAICEV ARCAȘU 1976, MARKÓ 1997a, MARKÓ 1998), Gilăului Mts. – Măguri-Răcățău (CSÖSZ and MARKÓ 2005); CV: Fagul Rotund (MARKÓ *et al.* 2004); HD: Gura Zlata, Subcetate, Retezat Mts. – Gemene, Retezat Mts. – Pietrele (PARASCHIVESCU 1972a, PARASCHIVESCU 1976a); HR: Borsec (CSÖSZ and MARKÓ 2005), Lacul Dracului (MARKÓ *et al.* 2004), Hășmașul Mare Mt. (CSÖSZ and MARKÓ 2005); MM: Făina Valley (FRIVALDSZKY 1875); MS: Sovata (PARASCHIVESCU 1972b); NT: Cheile Bicazului, Pîngărați (CÎRDEI *et al.* 1962, CÎRDEI *et al.* 1969); PH: Bușteni (CSÖSZ and MARKÓ 2005), Câmpina, Comarnic (PARASCHIVESCU 1976a), Posada (PARASCHIVESCU *et al.* 1979), Sinaia

(PARASCHIVESCU 1973a, 1976a); SB: Păltiniș, Prislop (CSÓSZ and MARKÓ 2005); SV: Vatra Dornei (CÎRDEI and BULIMAR 1965, CÎRDEI *et al.* 1969), UL: Transylvania (FUSS 1853, FRIVALDSZKY 1869), Prahova Valley (KNECHTEL 1956), Parîngul Mts. (GOAGĂ and PARASCHIVESCU 1991), Retezat Mts. (MARKÓ 1997b), Dobrogea, Danube Delta (PARASCHIVESCU 1975a), Șandru Mt. (GOAGĂ and PARASCHIVESCU 1991), Romanian Plain, Banat, Crișul Repede Valley (PARASCHIVESCU 1978b), Călimani Mts. – Ilva Valley (GALLÉ *et al.* 2005), Călimani Mts. – Râștolița Valley, Gurghiu Mountains near Sovata (MARKÓ 1999b), Rarău Mts. (CÎRDEI *et al.* 1962, CÎRDEI *et al.* 1969, MOSCALIUC 2008), Cindrel Mts. (CSÓSZ and MARKÓ 2005), Northern Oltenia, Muntenia (PARASCHIVESCU 1976b).

***Camponotus (Camponotus) ligniperda*** (LATREILLE, 1802)

The species was previously reported from Romania also as *Formica ligniperda* LATREILLE in MAYR (1853) and as *Componatus ligniperda* [sic] in PARASCHIVESCU (1976b).

It is a common European species present throughout Europe, but it is also found in the Caucasus and Asia Minor. Its distribution is generally more southern than that of *C. herculeanus* (CZECHOWSKI *et al.* 2002). It inhabits mostly mixed and deciduous forests, but can also be found in open habitats. Nests are built mostly in dead trees or wood stumps. In Romania it is a common species (Fig. 1).

**Collecting sites:** AB: Cîmpeni, Gîrda (PARASCHIVESCU 1982); AR: Beliu (MOCSÁRY 1875, 1876); BC: Slănic-Moldova (PARASCHIVESCU 1963, GOAGĂ and PARASCHIVESCU 1991), Tîrgu Ocna – Trotuș Valley (PARASCHIVESCU 1963, 1972b); BH: Oradea (MOCSÁRY 1876); BN: Sângeorz-Băi (KNECHTEL and PARASCHIVESCU 1962); BV: Racoș (CSÓSZ and MARKÓ 2005); CS: Sasca Montană – Nera Valley and Sușara Valley (PARASCHIVESCU 1975c); CJ: Călata (PARASCHIVESCU and RAICEV ARCAȘU 1976), Ciucea (PARASCHIVESCU and RAICEV ARCAȘU 1976, MARKÓ 1997a, 1998), Cluj-Napoca (POGOREVICI 1947), Poieni (KISS and MÁTIS 2002), Valea Drăganului (MARKÓ 1997a, 1998); DB: Râul Alb (FROMUNDA *et al.* 1967); HD: Orăștie, Retezat Mts. – Rîu Mare (CSÓSZ and MARKÓ 2005); HR: Tușnad (CSÓSZ and MARKÓ 2005); IF: Băneasa (PARASCHIVESCU 1974); IS: Breazu (CÎRDEI *et al.* 1962), surroundings of Iași (PARASCHIVESCU 1978b); MS: Stânceni (MARKÓ 1999b); MM: Făina Valley (FRIVALDSZKY 1875); NT: Cheile Bicazului, Pîngărați (CÎRDEI *et al.* 1962, CÎRDEI *et al.* 1969); PH: Câmpina (KNECHTEL and PARASCHIVESCU 1962, PARASCHIVESCU 1976a), Comarnic, Sinaia (PARASCHIVESCU 1976a); SB: Cîsnădioara, Gușterița, Păltiniș, Sibiu, Cindrel Mts. – Râul Sadu (CSÓSZ and MARKÓ 2005); SJ: Stana (CSÓSZ *et al.* 2001); SV: Vatra Dornei (CÎRDEI and BULIMAR 1965, CÎRDEI *et al.* 1969), Poiana Stampei (CÎRDEI *et al.* 1969); UL: Valea Uzului – Dărmănești – Uz – Bașca (PARASCHIVESCU 1963),

Prahova Valley (KNECHTEL 1956), Dobrogea, Danube Delta (PARASCHIVESCU 1975a), Romanian Plain, Banat, Crișul Repede Valley, Someșul Mare Valley, Dobrogea Plateau and steppe zones (PARASCHIVESCU 1978b), mountain zone (PARASCHIVESCU *et al.* 1976), Cindrel Mts. (PARASCHIVESCU 1975a), Cerna Valley (FRIVALDSZKY 1873), Făgăraș Mts. – Negoi (CSÓSZ and MARKÓ 2005), Rarău Mts. (CÎRDEI *et al.* 1962, CÎRDEI *et al.* 1969, MOSCALIUC 2008), Muntenia – Northern Oltenia (PARASCHIVESCU 1976b), Transylvania (MAYR 1853).

***Camponotus (Camponotus) vagus*** (SCOPOLI, 1763)

The species was previously reported from Romania also as *Formica pubescens* FABRICIUS in MAYR (1853) and FUSS (1855), as *Camponotus pubescens* (FABRICIUS) in FRIVALDSZKY (1869) and MOCSÁRY (1874, 1875, 1876, 1885), as *Camponolus pubescens* [sic] in MOCSÁRY (1884), as *Camponotus herculeanus st. vagus* SCOPOLI in MONTANDON and SANTSCHI (1910) and as *Componatus vagus* [sic] in PARASCHIVESCU (1976b). It is a common European species which can be found from southern Finland and Sweden to the north-western parts of North Africa, and from the Atlantic through the northern Mediterranean, Asia Minor, Caucasus, and northern Kazakhstan to the Altai Mountains (CZECHOWSKI *et al.* 2002). It inhabits mostly warm forests, preferring open places and clearings. Nests are built mostly in dead trees and wood stumps. In Romania it is a common species present throughout the country (Fig. 1).

**Collecting sites:** AB: Abrud, Cîmpeni, Gîrda (PARASCHIVESCU 1982); B: București (PARASCHIVESCU 1974); BC: Bacău (CÎRDEI *et al.* 1962), Slănic-Moldova, Tîrgu Ocna (PARASCHIVESCU 1962a); BH: Băile 1 Mai (MOCSÁRY 1875), Vadu Crișului (MOCSÁRY 1875, 1876), Oradea (MOCSÁRY 1876); BN: Sângeorz-Băi (KNECHTEL and PARASCHIVESCU 1962), Năsăud (PARASCHIVESCU 1962a); CJ: Cluj-Napoca (POGOREVICI 1947); CS: Mehadia (FRIVALDSZKY 1869), Oravița, Sasca Montană – Sușarei Valley (PARASCHIVESCU 1975c); CV: Ozunca (FROMUNDA *et al.* 1967); CT: Hagieni (PARASCHIVESCU 1961); DB: Râul Alb (FROMUNDA *et al.* 1967); GJ: Cornești (FROMUNDA *et al.* 1967), Cloșani (KNECHTEL and PARASCHIVESCU 1962), Tîrgu Jiu (POGOREVICI 1947); GR: Comana (MONTANDON and SANTSCHI 1910); HD: Hațeg (MOCSÁRY 1884, 1885); IS: Borșa (GOAGĂ and PARASCHIVESCU 1991); MH: Dubova – Mraconia Valley (PARASCHIVESCU 1967, PARASCHIVESCU 1975b), Cazanele Mari, Svinița (PARASCHIVESCU 1975b), Eșelnița Valley, Svinița – Paulina Valley (PARASCHIVESCU 1967), Eșelnița, Povalina (PARASCHIVESCU 1975b); MM: Borșa (PARASCHIVESCU 1962a); SJ: Stana (CSÓSZ *et al.* 2001); SB: Șura Mare (FUSS 1855, MOCSÁRY 1874, MOCSÁRY 1885), Cîsnădie, Sibiu, Stejărișu, Gușterița, Tâlmăciu, Cîsnădioara (CSÓSZ and MARKÓ 2005); SV: Mestecăniș (CÎRDEI and BULIMAR 1965, CÎRDEI *et al.* 1969), Rarău (CÎRDEI *et al.* 1969); TL: Murighiol (BULIMAR 1985); TM: Banloc (FRIVALDSZKY 1869, MOCSÁRY 1876); VS: Lunca Bîrladului, Crasna (BULIMAR 1985); UL: Dobrogea, Danube Delta, Cindrel Mts. (PARASCHIVESCU 1975a), Carpathian and Sub-Carpathian zones

(PARASCHIVESCU 1978a), Romanian Plain, Banat, Someșul Mare Valley, Dobrogea Plateau and steppe zone (PARASCHIVESCU 1978b), Transylvania (MAYR 1853, FRIVALDSZKY 1869), Transylvanian Plain (MOCSÁRY 1884, 1885), Bârlad Valley (MONTANDON and SANTSCHI 1910), Eastern part of the Romanian Plain (PARASCHIVESCU 1976b).

***Camponotus (Colobopsis) truncatus* (SPINOLA, 1808)**

The species was previously reported from Romania also as *Formica truncata* SPINOLA, 1808 in MAYR (1857), as *Colobopsis truncata* (SPINOLA, 1808) in FRIVALDSZKY (1869, 1873) and POGOREVICI (1947), as *Camponotus truncata* in PARASCHIVESCU (1967), and as *Componatus truncatus* [sic] in PARASCHIVESCU (1976b).

It is a mediterranean zoogeographical element distributed mostly in southern and central Europe and in the southern part of eastern Europe, but it is also present further to East as far as Kopet Dag (RADCHENKO 1997c, SUCHOCKA *et al.* 2008). It is a thermophilous species living exclusively in trees in open habitats, orchards and light forests. Colonies contain two types of workers: 'regular' workers and soldiers with plug-shaped heads. In Romania it can be found everywhere, although data on its distribution are scarce (Fig. 2.).

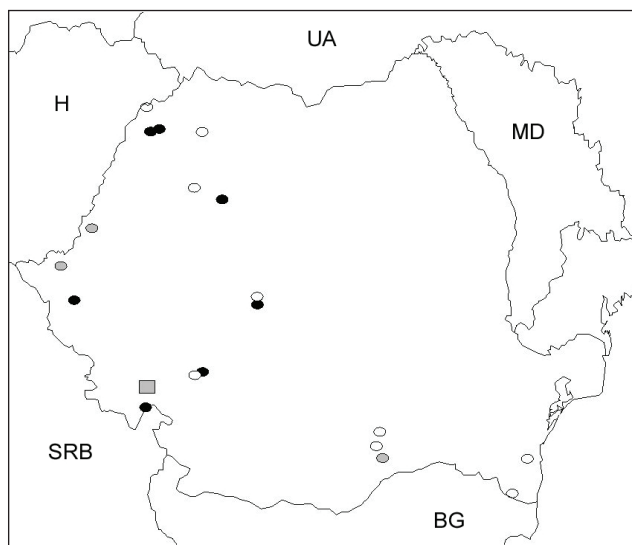


Fig. 2. Distribution of *C. truncatus*, *C. atricolor*, *C. dalmaticus*, and *C. fallax* in Romania. Symbols: black dots – *C. truncatus*, grey dots – *C. atricolor*, grey square – *C. dalmaticus*, white dots – *C. fallax*.

**Collecting sites:** CJ: Cluj-Napoca (POGOREVICI 1947); CS: Mehadia (MAYR 1857, FRIVALDSZKY 1869, 1873, MOCSÁRY 1897); GJ: Tîrgu Jiu (POGOREVICI 1947); GR: Comana (MONTANDON and SANTSCHI 1910); MM: Arduzel (MARKÓ 1999a); MH: Eșelnița (PARASCHIVESCU 1975b), Eșelnița Valley (PARASCHIVESCU 1967); SB: Sibiu, Cîsnădie (CSÓSZ and MARKÓ 2005); SJ: Stana (CSÓSZ *et al.* 2001); SM: Foieni (MARKÓ 2008a), Becheni, Tășnad (MOCSÁRY 1897); TM: Timișoara (POGOREVICI 1947); UL: Cindrel Mts. (PARASCHIVESCU 1975a), Banat (PARASCHIVESCU 1978b), Western

part of the Romanian Plain (PARASCHIVESCU 1976b).

***Camponotus (Myrmentoma) atricolor* (NYLANDER, 1849) sensu SEIFERT (2007)**

The species was previously reported from Romania as *Camponotus lateralis* var. *atricolor* (NYLANDER, 1849) in FOREL (1906) and MONTANDON and SANTSCHI (1910).

This species has a controversial status. ATANASSOV and DLUSSKIJ (1992) synonymized it with *C. piceus* due to their findings of intermediate morphs between the two species concerning the depth of the mesopropodeal furrow. A. RADCHENKO (*pers. comm.*) also supports this hypothesis on the basis of type material investigation of *C. atricolor*. Thus, several authors treat it as junior synonym of *C. piceus* (RADCHENKO 1997a, BOLTON *et al.* 2006, WERNER and WIEZIK 2007), while other specialists consider it a valid species (STEINER *et al.* 2002, GALLÉ *et al.* 2005, SEIFERT 2007). This morph shows clear differences from *C. piceus* in characters other than just the depth of mesopropodeal furrow (see also EMERY 1925), suggesting crypsis. Further investigation should elucidate the taxonomic status of the 'atricolor' morph. In Romania the occurrence of *C. atricolor* is reported only from Dobrogea region near the Black Sea (FOREL 1906) and from Comana, Giurgiu County, southern Romania (MONTANDON and SANTSCHI 1910) (Fig. 2). More recently GALLÉ *et al.* (2005) also mention the occurrence of intermediate *C. piceus/atricolor* specimens from Munar and Bezdin (Secusigiu village), Arad County, western Romania, while reporting the occurrence of *C. atricolor sensu* SEIFERT (2007) in the bordering Hungarian region. Based on personal collections from the same region we can also confirm the occurrence of *C. atricolor sensu* SEIFERT (2007) in Arad County, although the morphometric data prove its intermediate state: 6 worker, Nădab, Arad County, RO, 20.05.2007, leg. B. MARKÓ, mean PW/PL = 0.739 (±0.06), mean PEW/MW = 0.53 (±0.027) (see the identification key for comparison with piceus morphs) (Fig. 2).

It is mainly distributed in southern and central Europe and in the southern part of eastern Europe (SEIFERT 2007) and Turkey. It is a xerothermophilous species living mostly in open, dry grasslands, with nests built in the ground. Workers are highly polymorphic. Its distribution in Romania is not yet clear, as there are few available data regarding its presence.

***Camponotus (Myrmentoma) dalmaticus* (NYLANDER, 1849)**

The species was previously reported from Romania as *Camponotus lateralis dalmaticus* (NYLANDER) in MOCSÁRY (1897).

It is distributed almost exclusively in southern Europe, although it can also be found in Switzerland, and occurs as far east as Asia Minor and the Near East (RADCHENKO 2007). It prefers warm habitats. In Romania it is known from a single location: Mehadia (MOCSÁRY 1897) in Caraș-Severin County in southern Romania (Fig. 2). The reference material could not be verified. *C. dalmaticus* has nonetheless clear morphological characters that could hardly allow its

misidentification, and it is also present in neighbouring countries. We thus consider it as a likely species for Romania until further evidence is acquired.

***Camponotus (Myrmentoma) fallax* (NYLANDER, 1856)**

The species was previously reported from Romania also as *Camponotus fallax* v. *ruszkyi* EMERY, 1898 in MONTANDON and SANTSCHI (1910), and as *Componatus fallax* [sic] in PARASCHIVESCU (1976).

It is widely distributed in Europe, and can be found as far north as southern Sweden, while also present in north-west Africa, the Caucasus, north-west Kazakhstan, and in the southern part of western Siberia (CZECHOWSKI *et al.* 2002). It lives mainly in light, warm forests, or even orchards and city parks. Nests are built in dead trees, or dead twigs of living trees, but also in wooden parts of buildings. In Romania it is widely distributed but few data are available (Fig. 2).

**Collecting sites:** B: Bucureşti (MONTANDON and SANTSCHI 1910, PARASCHIVESCU 1974); CT: Negru Vodă (PARASCHIVESCU 1961, 1962b), Valu lui Traian (PARASCHIVESCU 1961); GJ: Corneşti (FROMUNDA *et al.* 1967); IF: Băneasa (PARASCHIVESCU 1974); MM: Arduzel (MARKÓ 1999a); SB: Sibiu (CSŐSZ and MARKÓ 2005); SJ: Stana (CSŐSZ *et al.* 2001); SM: Foieni (MARKÓ 2008a); UL: Cindrel Mts., Transylvania (PARASCHIVESCU 1975a); Plain zone (PARASCHIVESCU 1978a), Romanian Plain, Dobrogea Plateau and steppe zones (PARASCHIVESCU 1978b), Rarău Mts. (MOSCALIUC 2008), Western part of Romanian Plain (PARASCHIVESCU 1976).

***Camponotus (Myrmentoma) lateralis* (OLIVIER, 1792)**

It is present in southern and central Europe, but also in Crimea, the Caucasus, Asia Minor, Kopet Dag and NW Africa (RADCHENKO 1997a). It inhabits warm, xerotherm areas; nests are mostly built in dead wood. It occurs in every region of Romania, although data are scattered and scarce (Fig. 3). The occurrence of *C. lateralis* sp. 2 (SEIFERT 2007) can also be expected, based on the preliminary distribution data.

**Collecting sites:** BC: Tîrgu Ocna (PARASCHIVESCU and HURGHİŞIU 1973); BH: Oradea (MOCSÁRY 1897); CS: Baziaş (MOCSÁRY 1897), Mehadia (FRIVALDSZKY 1873, MOCSÁRY 1897); CV: Vâlcele (MOCSÁRY 1897); IS: Valea lui David (CÎRDEI and BULIMAR 1965); MH: Orşova (FRIVALDSZKY 1873, MOCSÁRY 1897); MS: Târgu Mureş, Ungheni (RÖSZLER 1943); SB: Ocna Sibiului (PARASCHIVESCU and HURGHİŞIU 1973); UL: Cibin Mts. (PARASCHIVESCU 1975a), Domogled Mts. (FRIVALDSZKY 1873, MOCSÁRY 1897), Porţile de Fier (FRIVALDSZKY 1873, MOCSÁRY 1897), Romanian Plain (PARASCHIVESCU 1978b).

***Camponotus (Myrmentoma) piceus* (LEACH, 1825)**

The species was previously reported from Romania also as *Camponotus (Myrmentoma) lateralis picea* (LEACH, 1825) in CÎRDEI and BULIMAR (1965), CÎRDEI *et al.* (1962), as *Camponotus lateralis* v. *picea* (LEACH,

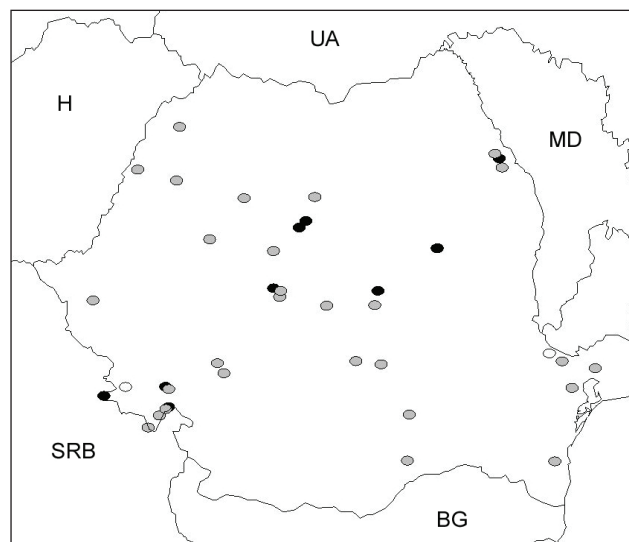


Fig. 3. Distribution of *C. lateralis*, *C. piceus*, and *C. tergestinus* in Romania. Symbols: black dots – *C. lateralis*, grey dots – *C. piceus*, white dots – *C. tergestinus*.

1825) in POGOREVICI (1947), as *Camponotus lateralis* v. *piceus* (LEACH, 1825) in MOCSÁRY (1897), as *Camponotus picea* in FROMUNDA *et al.* (1965, 1967), PARASCHIVESCU (1967, 1974, 1975b, d, 1976a), PARASCHIVESCU and RAICEV ARCAŞU (1976), PARASCHIVESCU (1978a, b, 1982), as *Componatus picea* [sic] in PARASCHIVESCU (1976b), as *Camponotus (Orthonotomyrmex) picea* in KNECHTEL (1956), PARASCHIVESCU (1961), and as *Camponotus pilea* [sic] in PARASCHIVESCU (1975d).

It is mainly distributed in southern and central Europe and in the southern part of eastern Europe, but it is also present in north-west Africa, Asia Minor, Lebanon, Iran, the Caucasus, and northern Kazakhstan (CZECHOWSKI *et al.* 2002). It is a xerothermophilous species living mostly in open, dry grasslands, with nests built in the ground. Workers are highly polymorphic. It is present throughout Romania (Fig. 3.). The occurrence of *C. piceus* sp. 2 (SEIFERT 2007) can also be expected, based on preliminary distribution data.

**Collecting sites:** AB: Cîmpeni (PARASCHIVESCU 1982), Sânmiclăuş (CSŐSZ and MARKÓ 2005); AR: Munar, Bezdin (GALLÉ *et al.* 2005); BH: Oradea (MOCSÁRY 1897, PARASCHIVESCU and RAICEV ARCAŞU 1976, MARKÓ 1997a, 1998), Şuncuiuş (PARASCHIVESCU and RAICEV ARCAŞU 1976, MARKÓ 1997a, 1998); BV: Breaza (KNECHTEL 1956), Sânpetru (CSŐSZ and MARKÓ 2005); CJ: Cluj-Napoca (POGOREVICI 1947); CS: Băile Herculane (CÎRDEI and BULIMAR 1965); CT: Valu lui Traian (PARASCHIVESCU 1961), South and North from Valu lui Traian (PARASCHIVESCU 1975d); DB: Râul Alb (FROMUNDA *et al.* 1967); GJ: Tîrgu Jiu (POGOREVICI 1947), Dobriţa (FROMUNDA *et al.* 1967); GR: Comana (PARASCHIVESCU 1974); IF: Căciulaţi (PARASCHIVESCU 1974); IS: Bîrnova (CÎRDEI *et al.* 1962, CÎRDEI and BULIMAR 1965), Breazu (CÎRDEI and BULIMAR 1965); MH: Ada-Kaleh Island, Mraconia Valley – Dubova (PARASCHIVESCU 1967, 1975b), Cazanele Mari, Sviniţa (PARASCHIVESCU 1975b), Eşelniţa Valley (PARASCHIVESCU 1967),

Eşelnița, Povalina (PARASCHIVESCU 1975b); MS: Reghin (Csősz and MARKÓ 2005); PH: Câmpina (PARASCHIVESCU 1976a); SB: Gușterița, Șura Mare (Csősz and MARKÓ 2005); SM: Tășnad (MOCSÁRY 1897); TL: Telița (FROMUNDA *et al.* 1967, FROMUNDA *et al.* 1965), Mahmudia (PARASCHIVESCU 1961), Babadag (PARASCHIVESCU 1961, 1975d); TM: Timișoara (POGOREVICI 1947); UL: between I. L. Caragiale and Târgoviște, between Râul Alb and Pucioasa (FROMUNDA *et al.* 1965), Carpathian and Sub-Carpathian zones (PARASCHIVESCU 1978a), Banat, Crișul Repede Valley, Dobrogea Plateau and steppe zones (PARASCHIVESCU 1978b), Romanian Plain (PARASCHIVESCU 1976b).

***Camponotus (Myrmentoma) tergestinus* MÜLLER, 1921**

Its occurrence in Romania was just recently reported (IONESCU-HIRSCH *et al.* 2009). It is currently known only from three locations in southern Romania: CS: Damian; TL: Cetățuia (Măcin Mts.); UL: surroundings of Plopeni (PH county) (Fig. 3).

The species shows a scattered distribution. It is currently known from a few locations in Italy (F. RIGATO *pers. comm.*), from Slovenia (BRAČKO 2007), Hungary (IONESCU-HIRSCH *et al.* 2009) and from the European part of Turkey (AGOSTI and COLLINGWOOD 1987a). Little is known about the species' ecology and life-history (IONESCU-HIRSCH *et al.* 2009). It prefers warm habitats, probably nests in oak wood.

***Camponotus (Tanaemyrmex) aethiops* (LATREILLE, 1798)**

The species was previously reported from Romania also as *Camponotus aetiops* var. *marginata* (LATREILLE) in CÎRDEI *et al.* (1969), as *Camponotus (Tanaemyrmex) aethiops* var. *marginata* (LATREILLE) in CÎRDEI *et al.* (1962), as *Camponotus (Tanaemyrmex) aetiops* var. *marginata* (LATREILLE) [sic] in CÎRDEI and BULIMAR (1965), as *Camponotus marginatus* (LATREILLE) in FRIVALDSZKY (1873), MOCSÁRY (1897), POGOREVICI (1947), as *Camponotus maculatus st. aethiops* in FOREL (1906), MONTANDON and SANTSCHI (1910), as *Camponotus aethios* [sic] in PARASCHIVESCU (1976b), as *Camponotus aethiosop* [sic] in PARASCHIVESCU (1967), as *Camponotus (Tanaemyrmex) aethiops* [sic] in PARASCHIVESCU (1975a), as *Camponotus (Tanaemyrmex) aethiops* [sic] in PARASCHIVESCU (1961), as *Camponotus (Tanaemyrmex) aetiops* [sic] in CÎRDEI and BULIMAR (1965).

It is a common European species distributed from Germany to Italy and from Spain to southern Russia. It can also be found in north-west Africa, Asia Minor, the Caucasus, Near East, Iran, Afghanistan, Kazakhstan (RADCHENKO 1997c). It inhabits xerotherm grasslands and shrub areas. Nests are built in the soil. It is a common species in Romania (Fig. 4).

**Collecting sites:** AB: Cîmpeni, Gîrda (PARASCHIVESCU 1982); BC: Roșiori, Motoșani (PARASCHIVESCU *et al.* 1975); Margineni (GOAGĂ and PARASCHIVESCU 1991), Barcana, Plopana, Tamași (PARASCHIVESCU *et al.* 1975, GOAGĂ and PARASCHIVESCU 1991); BH: Băile Felix (PARASCHIVESCU and RAICEV ARCAȘU 1976),

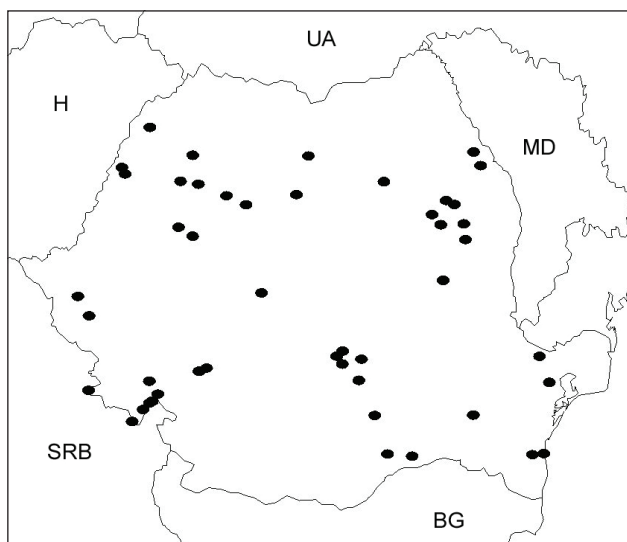
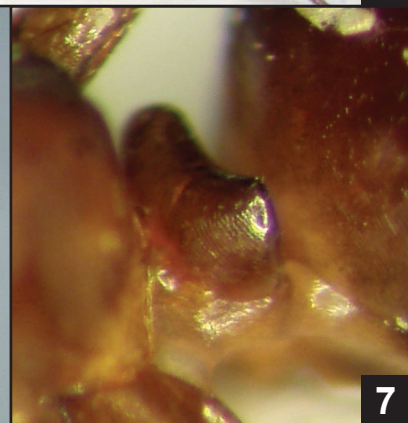


Fig. 4. Distribution of *C. aethiops* in Romania.

Oradea (MOCSÁRY 1897, PARASCHIVESCU and RAICEV ARCAȘU 1976, MARKÓ 1997a, 1998); BN: Colibița (Csősz and MARKÓ 2005); BV: Ciucaș (FROMUNDA *et al.* 1967); CL: Mostiștea (FROMUNDA *et al.* 1967); CJ: Cluj-Napoca (POGOREVICI 1947), Cluj-Napoca – Fînațele Clujului (MARKÓ 1997b), Poieni (KISS and MÁTIS 2002); CS: Baziaș (MOCSÁRY 1897), Cerna Valley (FRIVALDSZKY 1873), Mehadia (MOCSÁRY 1897); CT: Constanța (GOAGĂ and PARASCHIVESCU 1991), Valu lui Traian (SCOBIOLA *et al.* 1955, PARASCHIVESCU 1961, 1968, 1975d, GOAGĂ and PARASCHIVESCU 1991); DB: I. L. Caragiale (FROMUNDA *et al.* 1967, PARASCHIVESCU 1968), Râul Alb (FROMUNDA *et al.* 1967, PARASCHIVESCU 1968), Pucioasa (PARASCHIVESCU 1968), Moroeni (FROMUNDA *et al.* 1967); GJ: Cornești (Fromunda *et al.* 1967), Tîrgu Jiu (POGOREVICI 1947); GR: Comana (MONTANDON and SANTSCHI 1910, PARASCHIVESCU 1974); IF: Buftea (PARASCHIVESCU 1974); IL: Mărculești (SCOBIOLA *et al.* 1955); IS: surroundings of Iași (PARASCHIVESCU 1978b), Breazu (CÎRDEI *et al.* 1962), Bîrnova (CÎRDEI and BULIMAR 1965, CÎRDEI *et al.* 1969); MH: Orșova (FRIVALDSZKY 1869, 1873, MOCSÁRY 1897, PARASCHIVESCU 1975b), Dubova (PARASCHIVESCU 1968, 1975b), Mraconia (PARASCHIVESCU 1975b), Mala (PARASCHIVESCU 1968), Bahna, Cazanele Mari, Ogradena, Svinița, Povalina (PARASCHIVESCU 1975b), Eşelnița (PARASCHIVESCU 1975b, 1968), Dubova – Mraconia Valley, Orșova-Topleț – Cerna Valley, Bahna Valley, Eşelnița Valley, Ogradena – Mala Valley, Svinița – Paulina Valley (PARASCHIVESCU 1967); MS: Reghin (Csősz and MARKÓ 2005); NT: Bicaz (CÎRDEI *et al.* 1962, CÎRDEI and BULIMAR 1965,

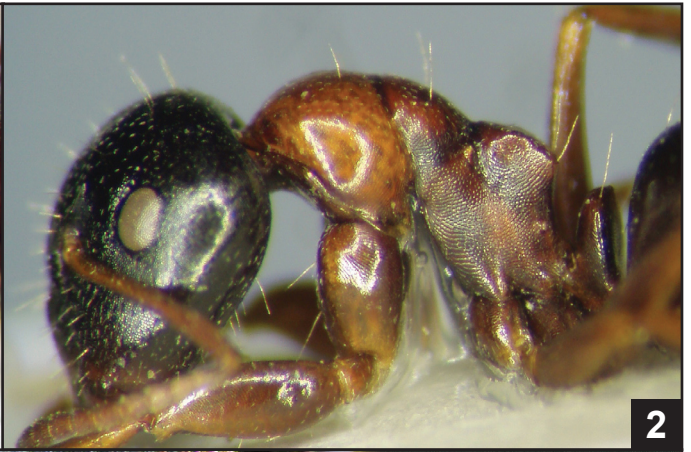
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PLATE 1. 1. *C. aethiops*, head, full-face view; 2. *C. vagus*, clypeus, full-face view; 3. *C. fallax* clypeus, full-face view; 4. *C. sylvaticus*, head, full-face view; 5. *C. truncatus*, soldier, head, anterolateral view; 6. *C. truncatus*, worker, lateral view; 7. *C. truncatus* petiole, dorsolateral view; 8. *C. tergestinus*, petiole, frontal view; 9. *C. piceus*, lateral view; 10. *C. herculeanus*, lateral view.





1



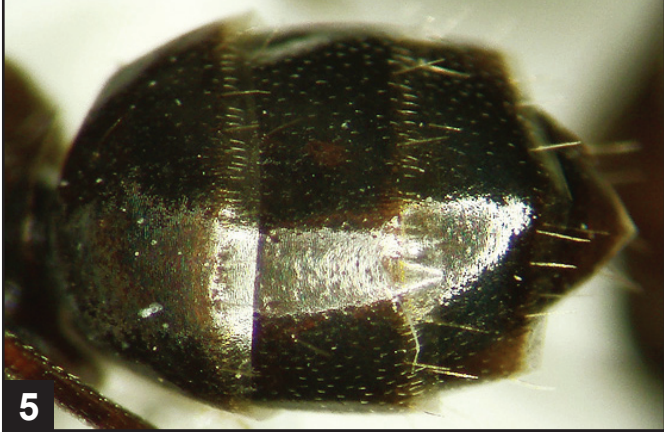
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7



8



9



10



CİRDEI *et al.* 1969); PH: Câmpina (PARASCHIVESCU 1976a); SB: Sibiu (MOCSÁRY 1897, CSÖSZ and MARKÓ 2005), Gușterița (CSÖSZ and MARKÓ 2005); SJ: Zalău (MOCSÁRY 1897), Stana (CSÖSZ *et al.* 2001); SM: Pir (MOCSÁRY 1897); TM: Cerna (PARASCHIVESCU 1975b), Timișoara (POGOREVICI 1947); TL: Telița (FROMUNDA *et al.* 1965, FROMUNDA *et al.* 1967), Babadag (GOAGĂ and PARASCHIVESCU 1991); VN: Repedea (CİRDEI *et al.* 1962); UL: Tasian (FROMUNDA *et al.* 1967), between I. L. Caragiale and Târgoviște, between Râul Alb and Pucioasa (FROMUNDA *et al.* 1965), Carpathian and Sub-Carpathian zones (PARASCHIVESCU 1978a), Romanian Plain, Banat, Crișul Repede Valley, Dobrogea Plateau and steppe zones (PARASCHIVESCU 1978b), Sub-Carpathian zone of Muntenia, mountain zone (PARASCHIVESCU *et al.* 1976), South-Western part of the Romanian Plain (PARASCHIVESCU 1976b), Dobrogea (FOREL 1906, PARASCHIVESCU 1975a), Danube Delta, Cindrel Mts., Transylvania (PARASCHIVESCU 1975a).

### Species of uncertain Romanian occurrence

*Camponotus (Tanaemyrmex) sylvaticus* (OLIVIER, 1792)

It is distributed mainly in southern Europe. According to RADCHENKO (2007) it can be found in Portugal, Spain, France, Italy, Bulgaria and Greece. There are two very old records of this species from Romania: CS: Mehadia (MOCSÁRY 1897) (southern Romania); SM: Pir (MOCSÁRY 1897) (north-west Romania). The collection of the Hungarian Natural History Museum, which holds at least part of MOCSÁRY's voucher specimens, contains one lightly coloured *C. fallax* gyne and two *C. fallax* males labelled as "Peér, 30.04.82", which were identified by L. BIRÓ as "*Camponotus sylvaticus* OLIV.". Peér is the current Pir in Romania, while the date refers to 1882. These are most probably the specimens that MOCSÁRY refers to in his work, although this cannot be taken for certain. Other voucher material could not be found. *C. sylvaticus* reproductives could be easily misidentified based on their morphological characters and the lack of appropriate keys. In addition, considering the fact that the species does not occur in the surrounding countries, with the exception of Bulgaria (RADCHENKO 2007, V. ANTONOVA *pers. comm.*), *C. sylvaticus* can be considered to be a species of uncertain Romanian occurrence, although its presence cannot be ruled out.

### Key to the worker caste of *Camponotus* species of Romania

(1) Clypeus projecting anteriorly as a rectangular plate with sharp corners laterally (Plate 1.1, 4) ..... (2)

←

PLATE 2. 1. *C. lateralis*, head and mesosoma, dorso-lateral view; 2. *C. dalmaticus*, head and mesosoma, dorsolateral view; 3. *C. tergestinus*, lateral view; 4. *C. tergestinus*, antennal scape; 5. *C. fallax*, gaster, lateral view; 6. *C. herculeanus*, gaster, dorsolateral view; 7. *C. vagus*, lateral view; 8. *C. vagus*, gaster, lateral view; 9. *C. ligniperda*, gaster, lateral view; 10. *C. ligniperda*, lateral view.

- Clypeus without or with very short anterior projection, broadly rounded anteriorly, or with truncated corners laterally (Plate 1.2), or free margin incised medially (Plate 1.3) ..... (3)

(2) Genae with erect hairs (Plate 1.1); hind tibia without longitudinal ridge; head dark-brown to black ..... *aethiops* (LATREILLE)  
- Genae without erect hairs (Plate 1.4); hind tibia with longitudinal ridge; head ferruginous ..... *sylvaticus* (OLIVIER)

(3) 'Soldier': head cylindrical, abruptly truncate (Plate 1.5); worker: dorsum of propodeum distinctly concave in lateral view (Plate 1.6); petiole scale acute in lateral view, with dorsum concave in anterior view (Plate 1.7) .....  
..... *truncatus* (SPINOLA)  
- Head not cylindrical and not abruptly truncated in any sub-caste; other combination of characters: if propodeum dorsum slightly concave in lateral view, than petiole scale dorsum convex (Plate 1.8) ..... (4)

(4) Propodeum dorsum flat and broad, at right or acute angle to declivity, laterally with sharp edges with perpendicular sides (Plate 1.9, 2.1, 2.2) ..... (5)  
- Propodeum dorsum not flattened, compressed laterally, at obtuse angle to declivity, without distinct edges laterally (Plate 1.10) ..... (7)

(5) Body color uniformly dark brown to black (Plate 1.9); propodeum dorsum with scattered erect hairs (Plate 1.9)

- (a) scape long:  $SL/CS > -0.42CS + 1.54$ ; base of scape widened, approximately 1.25 times wider, than the narrowest portion of the scape after the widening; back of the propodeum with longitudinal rugosity, petiole narrow (SEIFERT 2007) ..... *piceus* sp. 2. *sensu* SEIFERT (2007)

- (a) scape short:  $SL/CS < -0.42CS + 1.54$ ; base of scape widened, approximately 1.23 times wider than the narrowest portion of the scape after the widening; propodeum dorsum convex, propodeum forming mostly a distinct, separate cube, and it is relatively wide:  $PW/PL = 0.781 (\pm 0.07)$ ; petiole is relatively narrow:  $PEW/MW = 0.507 (\pm 0.027)$  (SEIFERT 2007) ..... *piceus* (LEACH)

- (b) scape short:  $SL/CS < -0.42CS + 1.54$ ; base of scape is not widened: it is only 1.09 times wider than the narrowest portion of the scape after the widening; propodeal dorsum in part horizontal in profile, and relatively narrow:  $PW/PL = 0.701 (\pm 0.039)$ ; petiole is relatively wide:  $PEW/MW = 0.553 (\pm 0.019)$  (SEIFERT 2007). ..... *atricolor* (NYLANDER) *sensu* SEIFERT (2007)

- At least part of mesosoma yellowish- or reddish-brown; propodeum dorsum with a single transverse row of erect hairs along edge with declivity (Plate 2.1) ..... (6)

- (6) Head and mesosoma concolor, usually ochraceous-red (Plate 2.1), rarely dark-brown, gaster black
- (a) dorsal part of scape without standing hairs; base of scape is visibly widened, approximately 1.10-1.45 times wider than the narrowest portion of the scape after the widening (SEIFERT 2007). ..... *lateralis* (OLIVIER)
  - (b) dorsal part of the scape with numerous standing hairs; base of scape not widened, approximately 1.00-1.12 times wider than the narrowest portion of the scape after the widening (SEIFERT 2007). ..... *lateralis* sp. 2 *sensu* SEIFERT (2007)
- Head black, mesosoma red, sometimes with dark maculae (Plate 2.2), gaster black ..... *dalmaticus* (NYLANDER)
- (7) Gena with erect hairs; head with coarse punctuation; scape with row of erect setae (Plate 2. 3, 4); head with coarse punctuation; scape with row of erect setae (Plate 2.4) ..... *tergestinus* MÜLLER
- Gena without erect hairs; head with feebler punctuation; scape with appressed pubescence ..... (8)
- (8) Clypeus notched in middle of anterior border (Plate 1.3); gaster with sparse pilosity (Plate 2.5) ..... *fallax* (NYLANDER)
- Anterior margin of clypeus without distinct median notch (Plate 1.2); gaster covered with long hairs and appressed pubescence (Plate 2.6) .... (9)
- (9) Completely black; pubescence on gaster very long (Plate 2.7, 8) ..... *vagus* (SCOPOLI)
- At least antennal funiculus, leg and petiole brown; pubescence shorter (Plate 2.6) ..... (10)
- (10) Gaster shiny with short pubescence (Plate 2.9), distance between neighboring hairlets equals their length; first gastral tergite anteriorly and ventrally ferruginous-red (Plate 2.10). ..... *ligniperda* (LATREILLE)
- Gaster dull, with longer and denser pubescence (Plate 2.6); first tergite with small brownish macula at most at petiole junction (Plate 1.10). ..... *herculeanus* (LINNAEUS)

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