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Natural History Monographs
of the Upper Silesian Museum

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Lech Borowiec
Sebastian Salata

A monographic review of ants of Greece (*Hymenoptera: Formicidae*)

Vol. 1.
Introduction and review
of all subfamilies except
the subfamily Myrmicinae.

Part 1: text

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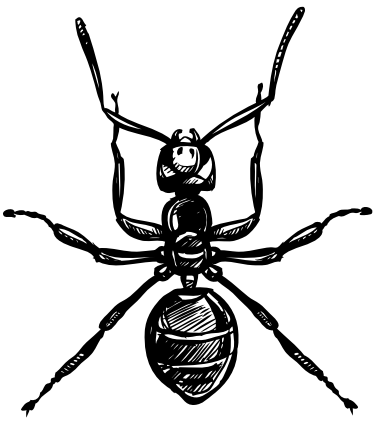

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Muzeum Górnośląskie w Bytomiu jest instytucją kultury
Samorządu Województwa Śląskiego.

Dedicated to my son, Marek L. Borowiec, an excellent myrmecologist, who inspired me to study ants in the Mediterranean Subregion, especially Greece, where we took our first myrmecological trip together.

Lech Borowiec

Lech Borowiec & Sebastian Salata

A monographic review of ants of Greece (Hymenoptera: Formicidae)

Vol. 1. Introduction and review of all subfamilies except the subfamily Myrmicinae.
Part 1: text

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Contents

Introduction

Greece is a country of the Balkans, located in Southeastern Europe, bordered to the north by Albania, North Macedonia and Bulgaria; to the east by Turkey, and is surrounded to the east by the Aegean Sea, to the south by the Cretan and the Libyan Seas, and to the west by the Ionian Sea which separates Greece from Italy. The extreme points of Greece are: North: Ormenio village (41°45'41'' N, 26°13'15'' E), South: Gavdos island (34°48'11'' N, 24°07'25'' E), East: Strongyli island (36°06'17'' N, 29°38'39'' E), West: Othonoi island (39°51'11'' N, 19°22'41'' E). The country consists of a mountainous, peninsular mainland jutting out into the Mediterranean Sea at the southernmost tip of the Balkans, and two smaller peninsulas projected from it: the Chalkidiki and the Peloponnese, which is joined to the mainland by the Isthmus of Corinth. Greece also has many islands (1 200 to 6 000, depending on the minimum size to take into account, the number of inhabited islands is variously cited as between 166 and 227), of various sizes, the largest being Crete, Euboea, Lesbos, Rhodes, Chios, Kefalonia, Corfu, Limnos and Thassos; groups of smaller islands include the northern Aegean Islands, Cyclades, Dodecanese, Ionian Islands and North Sporades. According to the CIA World Factbook, Greece has 13 676 kilometers of coastline, the largest in the Mediterranean Basin.

Zoogeographically Greece is entirely placed in Mediterranean Province but it is also influenced by the Anatolian, Pontic and Iranian-Turanian faunas. The great distinctiveness of fauna of the eastern part of the Mediterranean basin causes that this region is often recognized as Eastern Mediterranean Subregion. The complex geological structure, numerous isolated mountain ranges, rich vegetation and partial location on numerous islands cause that individual regions of Greece differ greatly in biodiversity and demonstrate a high degree of endemism.

The depth of knowledge on the myrmecofauna of Greece is still insufficient, and lack of updated keys to identification and monographic studies present a serious obstacle in research on Greek ants. Although the last decades have brought a lot of new information about Greek ants, both faunistic and taxonomic, there is still need for more holistic surveys on these insects from this region. Our monographic review is intended to fill this gap and provide a good tool for regional research in Greece. In the monograph, the main emphasis is on the diagnostic characters of ants and the possibly rich iconography allowing easier identification of these insects. We realize that in some ant groups it is very difficult to identify individual specimens to the species level based only on basic entomological equipment. In such cases, the identification keys lead only to species complexes, and for more precise identification we provide literature sources with revisions of particular genera or species groups. In the monograph, we also show taxa with an uncertain species status, which may be yet undescribed species or represent some unclear individual or geographical variability.

History of studies on Greek ants

The very first publication focused on Greek ants, with description of new taxa, was a report from an expedition to the Peloponnese published by Brullé (1833). In the chapter "Famille de Formicaires" he noted 8 species of ants including two new to science: *Formica nodus* (now *Cataglyphis nodus*) and *Formica pallidinervis* (now synonym of *Camponotus lateralis*). Due to numerous taxonomic changes, the current status of the remaining 6 species

mentioned in this study (*Formica herculeana*, *F. rufa*, *F. cunicularia*, *F. nigra*, *Myrmica rubra* and *Atta capitata*) is difficult to verify. Shortly after the mid-nineteenth century, Lucas (1854), in a work on arthropods from Crete, noted from this island *Myrmica rubra* (current status unclear, probably *Aphaenogaster rugosoferruginea*) and *Formica pubescens* (current status unclear, probably a *Camponotus* species). The next publicaton with descriptions of new taxa from Greece was Roger's (1859) paper on some ants from the Mediterranean area. He designated Greece as terra typica for *Atta splendida* (now *Aphaenogaster splendida*), *Formica aerea* (now *Proformica aerea*), and *Atta striola*. The current status of the latter taxon is unclear as its type series consisted of specimens from Spain and Greece and most likely contained two different species. This name is usually treated as a junior synonym of *Aphaenogaster gibbosa* but Greek specimens probably represent *Aphaenogaster epirotes*. Additionaly, Roger described from Zakynthos *Formica* (*Hypoclinea*) *kiesenwetteri* (now *Camponotus kiesenwetteri*) and *Stigmatomma denticulatum*. He also noted from Zakynthos *Formica* (*Hypoclinea*) *frauenfeldi* (now *Lepisiota frauenfledi*) and *Leptothorax recedens* (now *Temnothorax recedens*), from Parnassos Mts. *Formica truncata* (now *Colobopsis truncata*), and generally from Greece *Atta semipolita* (current status unclear, probably *Aphaenogaster subterranea* or *A. subterraneoides*), *Atta testaceopilosa* (current status unclear, probably *Aphaenogaster balcanica*), and *Formica cunicularia*.

A number of works focused on Greek ants was authored by Auguste Forel (1848-1931). Forel published a number of important taxonomic and faunistic papers on ants from various parts of the world, including papers dedicated entirely to the ants of Greece (Forel 1886 b, 1889) which included descriptions of 10 new taxa. However, new taxa described from this country were included also in his other papers (Forel 1910, 1911 a, 1913 c). In the second half of the nineteenth century, Carlo Emery (1848-1925) joined the significant myrmecological researchers. His contribution to studies on Greek ants covers an important review on Cretan ants (Emery 1894 a) with descriptions of four new taxa (including endemic *Aphaenogaster cecconii* and *Aphaenogaster simonellii*), a paper with descriptions of *Monomorium creticum* and *Aphaenogaster epirotes* (Emery 1895), a note on ants of Cephalonia (Emery 1901) with description of two new taxa, and a paper on ants from Rhodes with descriptions of five new taxa (Emery 1915). A number of new taxa described from Greece can also be found in his other revisions (Emery 1869, 1906, 1908, 1922, 1925 a, 1925 b). Until the Second World War, Bruno Finzi (1897-1941) and Carlo Menozzi (1802-1943) significantly contributed to studies on the ants of the Greek fauna. The first researcher enriched the list of taxa known from Greece with a number of species (Finzi 1928, 1930 b, 1939). The second researcher deepened the knowledge on biodiversity of ants of the Dodecanese, describing the endemic to Greece or Aegean: *Acropyga paleartica*, *Aenictus rhodiensis*, *Messor carpathous*, *Solenopsis crivellarii, Strongylognathus silvestrii*, *Temnothorax dessyi*, and *Temnothorax solerii*. Felix Santschi (1872-1940), an extremely prolific myrmecologist having a reputation of taxonomic splitter, described from Greece *Aphaenogaster sporadis* and *Messor hellenius*, and four infrasubspecific taxa (Santschi 1926, 1927, 1929 c, 1933, 1934). After the Second World War, the first work on Greek ants was a note on species collected in Rhodes (Hamann & Klemm 1976), followed by two faunistic notes published by Legakis (1983, 1984).

Two milestones in studies on the ants of the Balkan Peninsula were the species key published by Agosti & Collingwood (1987) and annotated list of the ants of Greece compiled by Legakis (2011). Although both papers contain a number of errors, uncritically cite ques-

tionable taxa and list synonymic names as good taxa from Greece, they undoubtfully provided a good reference point for intensive study of ants from this region. Meanwhile, Greek fauna was continuously enriched with new discoveries, i.e. Douwes et al. (1988) described endemic *Epimyrma adlerzi*, Seifert (1992, 2003) described endemic *Myrmica pelops* and *Lasius karpinisi*, Schulz (1994) described endemic *Aphaenoagaster graeca*, and Mei (1998) described endemic *Lasius myrmidon* (now *Metalasius myrmidon*). Aditionally, Buschinger and Douwes (1993) reviewed parasitic anst of Greece and Collingwood (1993) provided some insights on ant biodiversity of some Greek islands.

The first step to organize the knowledge on ants in Greece was a critical checklist of ants by Borowiec & Salata (2012) published along with a supplement (Borowiec & Salata 2013). Our team continued faunistic research in various regions of Greece, also in cooperation with researchers from Greece, Slovenia and Turkey (Borowiec & Salata 2014 a, 2017 a, b, 2018 a, b, c, d, 2021 a, b, 2022, Borowiec et al. 2021, Bračko et al. 2016, Salata et al. 2020 a). Establishing the status of a number of taxa from Greece required taxonomic revisions and comparative studies with fauna from other regions (Salata & Borowiec 2015 a, b, c, 2017, 2018 a, b, 2019 a, b, Csösz et al. 2018, Salata et al. 2018 a, b, 2019 a, b, 2020 b, 2021). As a result of this work, a number of new species have been described from Greece and a number have been reported from Greece for the first time. Finally, important additions to the fauna of Greece, with descriptions of the new species, were published by Boer (2013), Seifert & Galkowski (2016) and Seifert (2019, 2020 a).

Greece: the physical background

Although Greece is located practically entirely within the Mediterranean, it is characterized by a large number of habitats due to the huge horizontal and vertical diversity. Small lowlands are placed near the coast, and these are the Salonica, Thracian, Thessalian and Argolic Plains. As much as 81% of its territory is covered by mountains with an average altitude of 1,200–1900 m above sea level, which usually stretch longitudinally. On the western part, an extension of the Dinaric Mountains stretch from the border with Albania in a form of series of separate longitudinal massifs. Its highest peak, Mount Smolikas in the Pindos massif, reaches 2637 m above sea level. However, the highest mountain areas lie in the central-eastern part of the country, where the Olympus massif rises with the highest peak, Mitikas, 2,917 m above sea level. Mountainous landscape dominates also the Peloponnese, with the highest peak Ilias reaching 2404 m above sea level, and Aegean islands. The Cretan landscape is defined by large and high mountain ranges crossing from west to east and its highest peak, Idi, reaches 2456 m above sea level. Despite harsh and snowy winters, the highest mountain peaks of the Peloponnese are covered with mountain steppe habitats. Most likely it is due to warm summers characterized with high solar insolation and high temperatures which create conditions favorable for this habitat. Thus, the vegetation characteristic for the alpine zone does not occur on these massifs.

Mountains of the western Greece are limestone and sandstone, and were formed during the Alpine orogeny. The north-eastern Greek mountains, including the Olympus massif, were created during the Hercynian orogeny and are predominantly made of metamorphic rocks. Numerous karst formations can be found on the Peloponnese. Greece is a seismically active area and its insular mountains are predominantly volcanic. However, nowadays there is only one active volcano, Kajmeni, located on Santorini.

The soil of Greece is mostly rocky and of little use for agriculture. The decomposition of limestone in the mountain valleys creates sediments of alkaline soil that is used mainly for pasture. Only in the lowlands of Macedonia, Thrace, Attica and Thessaly alluvial soils are fertile and have agricultural potential. In northern Greece, rice cultivation developed on an extensive river alluvia.

A Mediterranean climate, with long, hot and dry summers and mild and humid winters, dominates most of the Greek territory. However, the latitudinal span of Greece is 6 °, which makes the climatic differences in the southern and northern parts of the country noticeable. The mountains located on western Greece and the Peloponnese experience quite heavy snowfall in winter. While the Greek islands and the eastern mainland's coast have relatively high and stable temperatures thanks to the Aegean Sea influences. The northern part of Greece, where dominantes a more continental climate, is in general cooler and has higher precipitation than in the rest of the country. As a result, the vegetation of Thrace and Macedonia is richer than in other regions. The average temperature in these regions in January is around 5-7 ° C, in July around 25-27 ° C, and the average annual temperature of Northern Greece is 16 ° C. While in Central and Southern Greece the average temperature ranges from 8-10 ° C in winter, 27-28 ° C in summer, and the annual average is 18 ° C. On the southernmost islands (e. g. Rhodes and Crete), winters are even milder (average temperature 13 ° C), summers are hotter (average temperature 29 ° C), and the annual average temperature on these islands exceeds 19 ° C. Rainfall varies across the country. In the Ionian Islands, annually 1000 mm and more drops, sometimes even up to 2000 mm. In the Aegean islands, annual rainfall reaches 1000 mm. Quite different values prevail in mainland Greece. In the Pindos mountains to the east, average rainfall is 400 mm, in the lowlands of Thrace and Sterea Ellas, 384 mm of rain is at most. The summer drought lasts from two months in the west to five in the east. Due to the lack of rainfall and the generally high temperatures in summer, forest fires are among the frequent catastrophic events.

The mountainous landscape of Greece keeps the rivers short and full of rapids and waterfalls. Due to the uneven distribution of rainfall, the rivers in the country are characterized by a high variability of the water level. In the south, many small rivers dry up during the summer. The two large rivers running through Balkans have their estuaries on the territory of Greece: Evros and Strimonas. The other big rivers that run entirely through the territory of the country are: Haliacmon (297 km long), and Pineios (217 km long). There are only two large lakes within the borders of Greece. Lake Prespa, with an area of 288 km², is divided between Greece, Albania and North Macedonia. Whereas Lake Doiran, with an area of 41 km², is shared with North Macedonia. Additionally, there are around 30 smaller natural lakes, but some of them are largely drained or are in the final stage of overgrowing. There are also approximately 13 artificial lakes created as a result of the partitioning of the rivers, that range in size from 2.4 to 80.6 km².

Due to the long lasting activity of humans, the landscapes of Greece are severely transformed, and a large part of this country has been deprived of its original forest land. The warmest regions have vast areas covered with evergreen shrubs and macchia dwarf shrubs, which are referred to as phrygana. Due to pastoralism, phryganas are rarely compact and most often are divided by pastures overgrown with various herbal plants. Phryganas can form more compact habitats on islands, where goat breeding has been restricted. Intensive pasto-

ralism on the lower mountain areas prompt formation of grassy and extensive pastures that are overgrown with shrubs on their peripheries. Whereas, mountain steppes-like habitats are formed on high mountain grazed plateaus. Olive trees are cultivated in many parts of Greece. They can take the form of intensive plantations characterized with poor vegetation or less intensive mosaic of trees mixed with the frigana scrub. The other commonly cultivated trees are figs and citruses (Figs 0.2-13).

Coastlines can be formed of cliffs overgrown with herbs or flat alluvia, which are often transformed into salinas. Forests are mainly found in the mountains. The large part of them consist of heavily exploited secondary forests. However, enclaves of natural deciduous forests and fir forests are preserved in the north-eastern Greece and in the higher parts of the mountains respectively. The arid lowlands on the mainland and islands are covered with pine forests. Because coniferous forests are prone to wildfires, wastelands in various stages of succession are common habitats on Greek lowlands. The moist habitats may be occupied by secondary mixed and deciduous forests, while stream valleys are commonly overgrown with gallery forests dominated by plane trees.

Material and methods

Monograph is based mostly on the collection of Balkan ants preserved in the Museum of Natural History, University of Wrocław. This collection was largely the result of many years of exploration of the Balkan countries by the senior author, and later also by intensive field research in the Balkan countries led by the junior author. Additionally, the collection was enriched by material exchanged with myrmecological centers working on ants from the Mediterranean basin. The distribution data for each species also includes locations published in taxonomic papers. However, it should be noted that data from older papers should be treated with caution. Recent taxonomic revisions revealed several cryptic species which were omitted or misidentified in papers proceeding these revisions. The monograph covers some species so far not recorded from Greece, but known from neighboring countries adjacent to Greece. This applies to the narrow area of Aegean Turkey and Albania, Bulgaria and North Macedonia.

The iconography is largely based on photographs of specimens from materials collected in Greece. Only in the absence of such materials, we used specimens collected in other countries. All photos, unless stated otherwise, are original and were taken by Lech Borowiec using Nikon SMZ18 and Nikon SMZ 1500 stereomicroscopes, Nikon D5200 camera and Helicon Focus software. Photos from the AntWeb online database were used only when no specimen of a particular species was available, and their source is properly cited.

When assigning the bibliographic data and the new distribution records to the Greek regions , we decided not to follow the country's new administrative division implemented on January 1, 2011. It is due to the fact that in the very first catalog of Greek ants (Legakis 2011) was published based on the old regional division and some of records listed there could not be assigned to the new regional units.

Keys to identification are mostly based on the worker caste, we used morphological characters of sexual castes only when species determination could not be made based on workers only. However, when available, we included photographs of males and gynes to maintain the comprehensive picture of species diversity.

We use the following abbreviations for measurements and indexes:

CI – cephalic index: HW/HL.

ClyW – maximum clypeal width in full face view.

CS – arithmetic mean of HL and HW as less variable indicator of body size.

EL – eye length, measured along the maximum diameter of the eye.

EW – eye width, measured along the minimum diameter of the eye.

GHL – length of longest seta on gaster, measured in the transition area from frontal face to dorsal surface of first tergite.

GuHL – maximum length of setae on underside of head (”gula“).

HL – maximum cephalic length measured in a straight line from mid-point of anterior clypeal margin to mid-point of posterior margin in full-face view; the head must be carefully tilted to the position with the true maximum. Excavations of posterior head and/or clypeus reduce CL.

HLmax – maximum cephalic length of the largest major worker.

HLmin – maximum cephalic length of the smallest minor worker.

HTmax – maximum diameter of hind tibia at midpoint.

HW – maximum cephalic width; measured in full-face view directly above the eyes.

HWmax – maximum cephalic width of the largest major worker.

HWmin – maximum cephalic width of the smallest minor worker.

ML – mesosoma length; diagonal length of mesosoma in lateral view from the anterior point of the mesosoma to the posteroventral margin of the propodeum.

MLmax – mesosoma length of the largest major worker.

MLmin – mesosoma length of the smallest minor worker.

MW – mesosoma width; maximum mesosoma width, usually across promesonotum.

MWmax – mesosoma width of the largest major worker.

MWmin – mesosoma width of the largest minor worker.

PnHL – length of the longest hair on pronotum.

SL – scape length; maximum straight-line length of scape excluding the basal condylar bulb.

SLmin – scape length of the smallest minor worker.

SLmax – scape length of the largest minor worker.

Abbreviations to collections:

MNHW - Museum of Natural History, University of Wrocław, Poland, in temporary deposit by Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland;

MHNG - Muséum d'Historie Naturelle, Genève, Switzerland.

Pilosity inclination degree applies to this used in Wilson (1995). The appressed (0–5°) hairs run parallel, or nearly parallel to the body surface, decumbent hairs stand 10–15°, subdecumbent hair stands 30°, suberect hairs stand 35–45°, and the erect hairs stand more than 45° from the body surface.

Key to subfamilies

1. Pedicel with two distinct segments (petiole and postpetiole) (Fig. 4.2) ..... 2.

—. Pedicel with one segment (petiole) (Figs 6.2, 8.2, 11.2, 15.2, 30.4) ..... 4.

2. Frontal lobes well developed and horizontal, at least partly covering the antennal sockets .... **Myrmicinae**, vol. 2

—. Frontal lobes strongly reduced and vertical or absent, antennal sockets wholly exposed .... 3.

3. Promesonotal suture absent (Fig. 4.2). Antennae 10-segmented (Fig. 4.3) ....**Aenictinae**, p. 15

—. Promesonotal suture well developed and visible from above. Antennae 12-segmented .... **Leptanillinae**, p 13

4. Sting projected, first gastral segment separated from the second one by a distinct constriction (Figs 6.2, 8.2, 12.5) ..... 5.

—. Sting not projected, first and second gastral segments not separated by a constriction (Figs 15.2, 29.2) ….....…. 7.

5. Tergite of the second gastral segment much longer than its sternite, strongly arched, abdominal segments pointed downward (Figs 5.2, 6.2) ..... **Proceratiinae**, p. 16

—. Tergite of the second gastral segment as long as its sternite, never arched, abdominal segments not pointed downward (Figs 8.2, 12.5) ..... 6.

6. Petiole broadly attached to the first gastral segment, separated from it only by shallow constriction (Figs 8.2, 9.2) ..... **Amblyoponinae**, p. 20

—. Petiole narrowly attached to the first gastral segment, separated from gaster by sharp and deep constriction (Figs 10.2, 13.2, 14.2) ..... **Ponerinae**, page. 23

7. Apex of gaster with circular nozzle-like acidopore, fringed with setae (Figs 31.2, 92.2, 97.2) …….....…. **Formicinae**, p. 53

—. Apex of gaster without acidopore and coronula only with transverse slit (Figs 15.2, 17.2, 20.2) ..... **Dolichoderinae**, p. 32

Subfamily Leptanillinae

In Greece, one genus and an unclear number of species (at least three confirmed).

Genus *Leptanilla* Emery, 1870

Useful identification keys, revisions and taxonomic papers: Baroni Urbani 1977, Kugler 1986, Scupola & Ballarin 2009, Ward & Sumnich 2012, Griebenow 2020.

Diagnosis. Minute ants, pedicel with two distinct segments; antennae 12-segmented, stout; antennal scape short, shorter than width of head**;** frontal lobes absent so that antennal

sockets are fully exposed and located very close to the anterior margin of the head; eyes absent; promesonotal suture present, deeply impressed and articulated; propodeum unarmed; propodeal lobes absent; pygidium larger and conspicuous, not armed with teeth or spine; sting present**.**

Note. Ward & Sumnicht (2012) recorded the genus *Leptanilla* from Greece based on a series of 14 males taken from a blue pan trap set in the open woodland on the island of Rhodes (Dodecanese). Molecular and morphological data suggest that these specimens represent three distinct morphotypes. The poor state of the *Leptanilla* taxonomy hinders identification of the Greek male specimens. So far, eighteen species of *Leptanilla* have been described from the Mediterranean area and additionally seven unnamed species were noted only from males. Eleven of these are based on workers (or workers and queens), six are known from males only, and there is no Mediterranean species with both sexes and worker caste described (Ward & Sumnicht 2012). Because males are usually collected separately from the workers, a parallel taxonomy has developed for the two castes (Bolton 1990).

Biological notes. Little known. In Spain a complete colony was found during the excavation of a *Leptothorax* nest and numerous workers were collected in large soil samples composed of moist sand with a low organic content from slopes of small seasonal water courses (Barandica et al. 1994, Lopez et al. 1994). Males of *Leptanilla* are usually caught using light traps or blue pan traps.

Key to males from Greece (after Griebenow 2020)

1. Stylar apex with obtuse tooth subtending dorsal process ..... ***Leptanilla* GR02**, p. 14.

–. Stylar apex lacking obtuse tooth subtending dorsal process ..... 2.

2. Penial apex entire ..... ***Leptanilla* GR01**, p. 14.

–. Penial apex emarginated ..... ***Leptanilla* GR03**, p. 15.

1. *Leptanilla* GR01

(Figs 1.1-3)

Distribution in Greece: Dodecanese (Ward & Sumnich 2012: 7, Borowiec et al. 2021: 20).

Description (after Ward & Sumnich 2012). Larger species (HW 0.24, HL 0.29, WL 0.57; n = 1) with relatively broad head (CI 0.83); scape length about one-half head width (SI 0.51), scape slender (SI2 0.42), its maximum width about one-third of length; remaining antennal segments relatively elon-gate (ALI 0.66), all segments longer than wide; profemur relatively robust (FI 0.37); aedeagus shield-shaped, tapering to a rounded apex that is medially cleft; harpago (distal portion of paramere) expanded apically into a subtriangular lobe, with an acute outer (ventral) tooth and a rounded, obtuse inner (dorsal) tooth.

Biological notes. Little known, taken from a blue pan trap set in open woodland.

2. *Leptanilla* GR02

(Figs 2.1-3)

Distribution in Greece: Dodecanese (Ward & Sumnich 2012: 8, Borowiec et al. 2021: 20).

Distribution in Europe and Mediterranean Basin: Greece.

Description (after Ward & Sumnich 2012). Smaller species (HW 0.18-0.20, HL 0.25-0.28, WL 0.43-0.48; n = 7) with moderately elongate head (CI 0.68-0.74); scape length more than one-half head width (SI 0.57-0.66), scape slender (SI2 0.41-0.48), its maximum width about one-third of length; remaining antennal segments relatively elongate (ALI 0.63-0.72), all segments longer than wide; profemur slender (FI 0.28-0.33); aedeagus extended distally as a tongue-like lobe, bluntly rounded apically with a slight medial indentation; harpago expanded apically into a bifurcate process, both teeth acute, the inner (dorsal) tooth subtended proximally by a third, smaller obtuse tooth.

Biological notes. Little known, taken from a blue pan trap set in open woodland.

3. *Leptanilla* GR03

(Figs 3.1-3)

Distribution in Greece: Dodecanese (Ward & Sumnich 2012: 8, Borowiec et al. 2021: 20).

Distribution in Europe and Mediterranean Basin: Greece.

Description (after Ward & Sumnich 2012). Intermediate-sized species (HW 0.19-0.20, HL 0.30-0.32, WL 0.50-0.57; n = 3) with very elongate head (CI 0.59-0.64); scape length more than one-half head width (SI 0.56-0.59), scape short and robust (SI2 0.36-0.37), apically enlarged, its maximum width about two-fifths of length; remaining antennal segments relatively short (ALI 0.47-0.49), almost moniliform, segments 3-9 about as wide as long; eye with conspicuous pilosity; profemur robust (FI 0.40-0.42); aedeagus extended distally in the form of a broad triangular plate; harpago a simple slender digitiform lobe, neither expanded apically nor with teeth or angles.

Biological notes. Little known, taken from a blue pan trap set in open woodland.

Subfamily Aenictinae

In Greece one genus and one species.

Genus *Aenictus* Shuckard, 1840

Useful identification keys, revisions and taxonomic papers: Aktaç et al. 2004.

Diagnosis. Body linear; clypeus reduced; antennae 10-segmented, stout; antennal scape short, shorter than width of head; antennal sockets horizontal, in the plane of the transverse axis of head; palp formula 2, 2; eyes absent; promesonotal suture absent; propodeum unarmed; propodeal lobes present; waist of two separated segments; pygidium very small, reduced to a narrow U-shaped sclerite**.**

In Greece only one species.

4. *Aenictus rhodiensis* Menozzi, 1936

(Figs 4.1-3)

Aenictus rhodiensis Menozzi, 1936: 266.

Distribution in Greece: Aegean islands (Borowiec & Salata 2018 c: 3); **Dodecanese** (Menozzi 1936: 267, Legakis 2011: 3, Borowiec et al. 2021: 11).

Distribution in Europe and Mediterranean Basin: Greece; Israel; Turkey.

Description. HL: 0.460-0.643 (mean (0.554), HW: 0.332-0.541 (mean: 0.437), SL: 0.238-0.381 (mean 0.306), ML: 0.552-0.881 (mean 0.709), MW: 0.224-0.333 (mean 0.279). **Color.** Whole body yellow to orange-yellow, gaster slightly lighter than head and mesosoma (Figs 4.1-3). **Setation.** Head, antennae, promesonotum, petiole, postpetiole, gaster and legs covered with sparse, long and erected setae of various length, propodeum with only short erect setae. **Head.** 1.19-1.43 as long as wide, in small specimens proportionally longer than in the large specimens, parallelsided to softly rounded on sides with shallowly to deeply concave posterior margin, anterior margin of clypeus emarginated (Fig. 4.3). Eyes reduced. Head finely punctate, interspaces smooth and shiny. Antennae 10-segmented. Scape short, distinctly widened from base to apex, SL/HW 0.65-0.76. First funicular segment 1.5 times as long as wide. Funicular segments 2-10 about as broad as or slightly wider than long. Last funicular segment elongated, slightly shorter than the segments 8-10 combined. **Mesosoma**. Elongated, approximately 2.5 times as long as wide (Fig. 4.1). Anterior face of the pronotum regularly convex then dorsum in profile almost straight to shallowly concave, the posterior face of the propodeum forms a straight angle with its dorsal face (Fig. 4.2). Mesosomal surface mostly smooth and shiny. **Waist and gaster.** Petiole globular in profile, in dorsal view with rounded sides, postpetiole globular. Ventral margin of petiole anteriorly with blunt denticle, ventral margin of postpetiole anteriorly with sharp denticle, petiolar segments and gaster mostly smooth and shiny. **Legs.** Elongated, tibiae strongly widened from base to 2/3 length, apical spurs simple. Fore and hind basitarsus as long as the three subsequent segments combined. Claws simple.

Comparative remarks. *Aenictus rhodiensis* is a distinct species and the only representative of army ants in this region. From members of Amblyponinae and Ponerinae subfamilies it differs in two segmented pedicel and shiny body surface. The most similar are members of the genus *Leptanilla,* but *A. rhodiensis* differs in mesosoma lacking promesonotal suture, absence of significant constriction on mesosoma in dorsal view, and in 10-segmented antennae. While *Leptanilla* species have distinct promesonotal suture, their mesosoma in dorsal view has a significant constriction, and they have 12-segmented antennae. *Aenictus rhodiensis,* with length above 2.5 mm, is also distinctly larger than any species of the Mediterranean *Leptanilla* which are considered as one of the smallest ants and usually their bodies are shorter than 2 mm.

Biological notes. Biology of this species is little known. *Aenictus rhodiensis* belongs to the true army ants. On Samos a colony was found under a large stone located in the old pine forest. It created a globular aggregation of individuals. Disturbed workers formed a column that relocated the colony to the bottom of a litter constructed of pine needles.

Subfamily Proceratiinae

In Greece only one genus *Proceratium* Roger, 1863 with three species.

Genus *Proceratium* Roger, 1863

Useful identification keys, revisions and taxonomic papers: Baroni Urbani & de Andrade 2003.

Diagnosis. Body not linear, dorsal profile forms arch; clypeus small, armed with an anterior projection; antennae 12-segmented, stout; antennal scape short, shorter than width of

head; palp formula 2, 2 or 4, 3; eyes very small, often look as a single small dot; promesonotal suture absent; propodeum unarmed; waist of one segment; first gastral segment separated from subsequent segments by a deep suture**.**

In Greece recorded three species.

A key to species of the genus *Proceratium* (partly after Baroni Urbani & de Andrade 2003)

1. Petiole wide and convex (Figs 5.1, 2, 6.1, 2). Anterior clypeal border medially rectangular or triangular. First gastral tergite without transparent macula. Palp formula 4,3 ..... 2.

—. Petiole narrow and rectangular (Figs 7.1, 2). Anterior clypeal border straight (Fig. 7.3). First gastral tergite with a transparent macula close to the posterior border. Palp formula 2,2 …….…..…. ***P. numidicum* (Roger)**, p. 17

2. Clypeus medially strongly protruding anteriorly and rectangular (Fig. 5.3) .... ***P. algiricum* Forel**, p. 18

—. Clypeus medially protruding anteriorly but triangular (Fig. 6.3) .... ***P. melinum* (Roger)**, p. 19

Review of Species

5. *Proceratium algiricum* Forel, 1899

(Figs 5.1-7)

Proceratium (*Sysphincta*) *algiricum* Forel, 1899: 305;
Proceratium mayri Forel, 1899: 306.

Distribution in Greece: Epirus (Legakis 2011: 4, Salata & Borowiec 2018 a: 22); **Ionian Islands** (Emery 1909: 361 - as *Sysphincta mayri*, Finzi 1930 b: 311 - as *Sysphincta mayri*, Legakis 2011: 4, Salata & Borowiec 2018 a: 22); **Macedonia** (Borowiec & Salata 2012: 531); **Peloponnese** (Legakis 2011: 4).

Distribution in Europe and Mediterranean Basin: Algeria; Croatia; Greece; Italy: mainland, Sicily; Malta; Morocco; Serbia; Tunisia.

Description (partly after Baroni Urbani & de Andrade 2003)**. Worker:** The largest species: ML 1.16-1.46, HL 0.97-1.14, HW 0.84-1.02. **Color.** Whole body yellowish-brown to light brown (Figs 5.1-7). **Setation.** Body pubescence and setation of three types. Short, dense, subdecumbent pubescence cover the whole body, sparse and suberect hairs also cover the whole body except funiculi and dense and decumbent pubescence on the funiculi. **Head.** Distinctly longer than wide: CI 84.1-89.0, strongly convex posteriorly, with subparallel lateral sides (Fig. 5.3), surface sparsely rugulose. Frontal carinae diverging in the anterior half and subparallel in the posterior half, genal carina absent. Eyes small, in small specimens represented by a weakly pigmented dot below the integument and in larger specimens by a dark dot within the integument. First funicular segment 1/3 longer than broad. Funicular segments 2-10 as broad as long. Last funicular segment slightly shorter than the segments 8-10 combined. Scapus much shorter than the vertical margin and gently thickening apically. Masticatory margin of the mandibles with 3-4 denticles before the pointed apical tooth.

Palp formula 4,3. **Mesosoma.** About as long as the head (mandibles included, Fig. 5.2), surface minutely punctate and sparsely rugulose. Declivous face of the propodeum with a semitransparent lamella on each side, the lamella sometimes denticulate apically, broader on the posterior half. **Waist and gaster.** Petiole convex in profile, with the sides diverging on the anterior fourth and strongly convex posteriorly in dorsal view. Anterior border of the petiole gently concave and carinate, the carina sometimes forming a denticle on each side. Surface of petiole and postpetiole minutely punctate and sparsely rugulose. Gaster superficially shining and covered by minute, piligerous impressions. **Legs.** Slender. All tibiae with a pectinate spur. Spurs of fore legs with basal spine. Fore basitarsi as long as the mid ones. Hind basitarsi about 1/6 shorter than hind tibiae. Second tarsomere of hind legs longer than the pretarsus. Pretarsal claws simple.

Gyne as in Figs 5.4-7.

Comparative remarks. *Proceratium algiricum* belongs to the complex of species with palp formula 4,3 and convex petiole with neck, and is similar only to *P. melinum* but it differs in triangular clypeal protruding plate (in *P. algiricum* rectangular). *Proceratium algiricum* is a distinctly larger species with ML 1.16-1.46 while in *P. melinum* ML is only 0.93-1.15.

Biological notes. Little known. In Greece, gyne was collected under stone, in a gorge with stream and plane forest at the altitude 322 m.

6. *Proceratium melinum* (Roger, 1860)

(Figs 6.1-3)

Ponera melina Roger, 1860: 291;
Sysphincta europaea Forel, 1886 b: clxiii;
Sysphincta europaea subsp. *rossica* Arnoldi, 1930: 144;
Sysphincta fialai Kratochvil, 1944: 54.

Distribution in Greece: Crete (Salata & Borowiec 2018 a: 22, Salata et al. 2020 a: 16); **Dodecanese** (Legakis 2011: 4, Salata & Borowiec 2018 a: 22, Borowiec et al. 2021: 24); **Ionian Islands** (Emery 1898: 124, Emery 1909: 361, Emery 1914: 156, Finzi 1930 b: 311 - as *Sysphincta europaea*); **Peloponnese** (Forel 1886: clxv - as *Sysphincta europaea*, Legakis 2011: 4, Salata & Borowiec 2018 a: 22); **Sterea Ellas** (Legakis 2011: 4).

Distribution in Europe and Mediterranean Basin: Albania; Austria; Bulgaria; Croatia; Czech Rep.; France: Corsica, mainland; Greece; Hungary; Israel; Italy: mainland; Malta; Montenegro; North Macedonia; Romania; Russia; Slovakia; Slovenia; Spain: mainland; Turkey; Ukraine.

Description (partly after Baroni Urbani & de Andrade 2003)**.** Worker: Medium large species: ML 0.93-1.15, HL 0.76-0.91, HW 0.69-0.82. **Color.** Whole body yellowish to light brown (Figs 6.1-3). **Setation.** Body pubescence and setation of three types. Short, dense, subdecumbent pubescence covers the whole body, sparse and suberect hairs also cover the whole body except funiculi and dense and decumbent pubescence on the funiculi. **Head.** Distinctly longer than wide: CI 88.6-91.0, with gently convex sides in two anterior thirds and weakly converging posteriorly (Fig. 6.3). Frontal carinae diverging posteriorly, poorly raised and not close to each other, genal carina absent. Eyes small and represented by a dark dot below the integument. First funicular segment slightly longer than broad. Funicular segments

2-10 about as broad as long. Last funicular segment as long as the segments 8-10 combined. Scapes much shorter of the vertexal margin and gently thickening apically. Masticatory margin of the mandibles with 4-5 denticles before the pointed apical tooth. Palp formula 4,3. **Mesosoma.** As long as or slightly shorter than maximum head length (mandibles included, Fig. 6.2), surface granulo-punctate. Declivous face of the propodeum flat with superficially marginate sides. Propodeal lobes subround. **Waist and gaster.** Petiole convex in profile, with the sides diverging on the anterior fourth and convex posteriorly in dorsal view. Anterior border of the petiole convex and carinate, the carina forming a denticle on each side. Head rugosopunctate. Petiole and postpetiole granulate. Gaster superficially shining and covered by piligerous impressions. Legs. Slender, all tibiae with a pectinate spur. Spurs of fore legs with basal spine. Fore basitarsi longer than mid ones. Hind basitarsi about 1/5 shorter than hind tibiae. Second tarsomere of hind legs about 1/5 longer than the pretarsus. Pretarsal claws simple.

Comparative remarks. *Proceratium melinum* belongs to the complex of species with palp formula 4,3 and convex petiole, and is similar only to *P. algiricum* but it differs in rectangular clypeal protruding plate (in *P. melinum* triangular). *Proceratium algiricum* is a distinctly larger species with ML 1.16-1.46 while in *P. melinum* ML is only 0.93-1.15.

Biological notes. Biology of this species is little known. Nests were found in soil, rotten wood, under deep-set stones and, in a few cases, tree branches. Nest usually consists of small rounded chambers hollowed out of soft rotten wood or in the soil.

7. *Proceratium numidicum* Santschi, 1912

(Figs 7.1-3)

Proceratium numidicum Santschi, 1912 a: 172;
Proceratium normandi Santschi, 1929 a: 138.

Distribution in Greece: Sterea Ellas: Euboea Island (Borowiec & Salata 2018 e: 10).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Bulgaria; Cyprus; Greece; Tunisia; Turkey.

Description (partly after Baroni Urbani & de Andrade 2003)**.** Worker: The smallest species: ML 0.82-0.90, HL 0.71-0.75, HW 0.69-0.72. **Color.** Whole body dark ferrugineous-brown with lighter antennae and legs (Figs 7.1-3). **Setation.** Body pubescence and setation of three types. Short, dense, suberect and subdecumbent pubescence covers the whole body, sparse erect hairs also cover the whole body except funiculi and dense and decumbent pubescence on the funiculi. **Head.** Almost as long as wide: CI 95.8-96.0, with gently convex sides (Fig. 7.3), surface reticulato punctate and rugulose. Frontal carinae far from each other, partly converging the antennal insertions, genal carina marked. Eyes visible as a dark dot below the integument. First funicular segment slightly longer than broad. Funicular segments 2-10 broader than long. Last funicular segment as long as the segments 8-10 combined. Scapus shorter of the vertexal margin and gently thickening apically. Masticatory margin of the mandibles with 7-9 denticles before the pointed apical tooth. Palp formula 2,2. **Mesosoma.** shorter than maximum head length (mandibles included, Fig. 7.2), surface sparsely granulo-punctate. Declivous face of the propodeum flat. **Waist and gaster.** Petiole subrectangular in profile. Anterior border of the petiole straight and anterolaterally carinate, surface

of petiole and postpetiole sparsely granulo-punctate. Gaster smooth with minute piligerous punctures. **Legs.** Slender, all tibiae with a pectinate spur. Spurs of fore legs without basal spine. Fore basitarsi longer than the mid ones. Hind basitarsi about 1/4 shorter than hind tibiae. Second tarsomere of hind legs shorter than the pretarsus. Pretarsal claws simple.

Comparative remarks. *Proceratium numidicum* differs from two other Greek members of this genus in palp formula 2,2, petiole without narrower and rectangular, anterior clypeal border straight and first gastral tergite with a transparent macula close to the posterior border. With HL 0.71-0.75 it is the smallest species, in both relatives HL is from 0.76 to 1.14.

Biological notes. Biology of this species is little known, in Greece collected by pitfall trap.

Subfamily Amblyoponinae

In Greece only one genus *Stigmatomma* Roger, 1859 with two species.

Genus *Stigmatomma* Roger

Useful identification keys, revisions and taxonomic papers: Baroni Urbani 1978.

Diagnosis. Body linear; clypeus small, anterior margin with a row of teeth; antennae 12-segmented, stout; antennal scape short, shorter than width of head; mandibles very elongate, masticatory margin with large, often bispinose teeth; palp formula 4,3 or 5,3; eyes very small, often look as a single small dot or reduced; promesonotal suture present; propodeum unarmed; waist of one large segment; first gastral segment separated from subsequent segments by a deep suture**.**

A key to species of the genus *Stigmatomma*

1. Palpal formula 5:3, metasternum with small spiniform process, eyes small but well visible (Fig. 9.2) …….. ***S. impressifrons*** **Emery**, p. 20

─. Palpal formula 4:3, metasternum without spiniform process, eyes rudimental reduced to the one ommatidium, almost invisible (Fig. 8.2) ……. ***S. denticulatum*** **Roger**, p. 22

Review of Species

8. *Stigmatomma denticulatum* Roger, 1859

(Figs 8.1-7)

Stigmatomma denticulatum Roger, 1859: 251;
Amblyopone gheorghieffi Forel, 1892 b: 309;
Stigmatomma denticulatum var. *gracilicornis* Menozzi, 1936: 268.

Distribution in Greece: Aegean Islands (Legakis 2011: 3 - as *Amblyopone denticulata*, Borowiec & Salata 2018 c: 7); **Crete** (Borowiec & Salata 2013: 365, Salata et al. 2020 a: 16); **Dodecanese** (Menozzi 1936: 268 - as *Stigmatomma denticulatum* var. *gracilicornis*, Legakis 2011: 3 - as *Amblyopone denticulata*, Borowiec et al. 2021: 25); **Epirus** (Legakis 2011: 3 - as *Amblyopone denticulata*, Borowiec & Salata 2018 a: 9); **Ionian Islands** (Roger 1859: 250, Emery 1909: 358, Finzi 1930 b: 311, Legakis 2011: 3 - as *Amblyopone denticulata,* Borowiec & Salata 2014 a: 516, Salata & Borowiec 2017: 298-299, Borowiec & Salata

2018 d: 8, Borowiec & Salata 2021 a: 10); **Peloponnese** (Legakis 2011: 3 - as *Amblyopone denticulata*, Borowiec & Salata 2017 b: 220, Salata & Borowiec 2019 b: 105); **Sterea Ellas** (Forel 1886: clxvii - as *Amblyopone denticulata,* Legakis 2011: 3 - as *Amblyopone denticulata*); **Thrace** (Bračko et al. 2016: 27).

Distribution in Europe and Mediterranean Basin: Albania; Bulgaria; Croatia; Greece; Israel; Italy: mainland; Lebanon; Malta; Morocco; ?North Macedonia; Romania; Serbia; Spain: mainland; Turkey.

Description (partly after Baroni-Urbani 1978)**.** Small to moderately large: HL: 0.746-0.921 (mean 0.833); HW: 0.627-0.809 (mean 0.714); SL: 0.397-0.543 (mean 0.481); ML: 0.94-1.24; MW: 0.40-0.51. **Color.** Whole body from yellow to rusty yellow (Figs 8.1-3). **Head.** Moderately elongate, 1.1-1.3 times as long as wide, widest in anterior third then softly converging posterad, occipital corners rounded, occipital margin shallowly concave (Fig. 8.3). Clypeus short, transverse, with softly rounded anterior margin armed with a row of slightly angulated denticles, each denticle at apex with a minute spine. Clypeus with diffused longitudinal striation, surface microreticulate but shiny, with a pair of long erected setae in the middle and few short erected setae laterally. Mandibles long and narrow, with striated sculpture, inner margin with four large and apically bidentate teeth, two large unidentate teeth and small tooth close to apex of mandibles, a small additional tooth can be located also behind the last bidentate tooth. Head distincty microreticulate and granulate, frons often with distinct longitudinal striation, interspaces from slightly shiny to slightly dull, with long and sparse subdecumbent pubescence not covering head surface, erected setae absent, ventral side of head mostly with short subdecumbent pubescence and few erected setae. Scape very short, 0.6-0.7 times as long as width of head, stout, slightly widened from base to apex, but apically slightly constricted, its surface distinctly microreticulate and slightly dull, with short subdecumbent to suberect pubescence, ventral surface also with few erect setae. Funicular segments transverse, stout, only the first segment 1.4 times as long as wide, segments 2-5 short, slightly wider than long, the rest of funicular segments distinctly broader than six basal segments (Fig. 8.3). Eyes rudimental, reduced to the one ommatidium, almost invisible. **Mesosoma.** Elongate, 2.3-2.5 times as long as wide, dorsally and laterally without or with rudimental microreticulation but with sparse punctuation, propodeum on sides with oblique and longitudinal striation, interspaces shiny, with short and sparse appressed to decumbent pubescence. In lateral view pronotum slightly convex, mesonotum and propodeum straight, posterior face of propodeum oblique, mesonotal suture distinct. Mesosomal dorsum lacking erected setae (Fig. 8.2). **Waist and gaster.** Petiole in form of globular node broadly connected with gaster, surface sparsely punctate, interspaces shiny, covered with sparse and short pubescence in anterior half and longer subdecumbent to decumbent pubescence basally. Gaster longer than mesosoma, tergites with micropunctation and finely diffused microreticulation, surface shiny, covered with moderately long and moderately dense subdecumbent pubescence not covering surface and few to several longer erected setae (Figs 8.1, 2). **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered with moderately long and sparse subdecumbent to decumbent hairs, erected setae absent sometimes few additional suberect hairs present.

Gyne as in Figs 8.4-6, male as in Fig. 8.7.

Comparative remarks. *Stigmatomma denticulatum* differs from *S. impressifrons* in smaller body size, with total length below 4.5 mm (in *S. impressifrons* above 5.5 mm), palpal

formula 4:3 (in S. *impressifrons* 5:3), metasternum without spiniform process (present in S. *impressifrons*) and eyes reduced to a single ommatidium, hardly visible.

Biological notes. *Stigmatomma denticulatum* is a thermophilous species most often collected close to streams in luminous deciduous and mixed forest Sometimes the species was collected under stones in coniferous forest with mediterranean shrubs. In mountains, specimens were observed under limestones rocks and stones in pastures with oak shrubs. Nests were found under stones or in rock crevices on limestones walls exposed to sun. Collecting sites come from low and middle altitude (from 40 to 720 m).

9. *Stigmatomma impressifrons* Emery, 1869

(Figs 9.1-3)

Stigmatomma impressifrons Emery, 1869: 13.

Distribution in Greece: Dodecanese (Forel 1886: clxvii - as *Amblyopone impressifrons*, Legakis 2011: 3 - as *Amblyopone impressifrons*).

Distribution in Europe and Mediterranean Basin: Bulgaria; Greece; Italy: mainland, Sicily; Spain: mainland.

Description (partly after Baroni-Urbani 1978)**.** Small to large: HL: 1.21; HW: 1.29; SL: 0.79. **Color.** Whole body from rusty yellow to greyish brown, antennae and legs yellow (Figs 9.1-3). **Head.** As long as or slightly wider than long, widest in anterior third then softly converging posterad, occipital corners rounded, occipital margin shallowly concave (Fig. 9.3). Clypeus very short, transverse, with softly rounded anterior margin armed with a row of slightly angulated denticles, each denticle at apex with a minute spine. Clypeus with diffused longitudinal striation, surface microreticulate but shiny, with a pair of long erected setae in the middle and few short erected setae laterally. Mandibles long and narrow, with striated sculpture, inner margin with 5 large, bidentate apically teeth, two or three large unidentate teeth behind last bidentate tooth and small tooth close to apex. Anterolateral corners of head often prolongate in denticle or spine. Head with very distinct granulate sculpture, frons sometimes with distinct longitudinal striation, interspaces appear irregular and slightly dull, with moderately long and moderately dense subdecumbent pubescence, erected setae absent, ventral side of head mostly with short subdecumbent pubescence and few erected setae. Scape very short, 0.6 times as long as width of head, stout, slightly widened from base to apex, but apically slightly constricted, its surface distinctly microreticulate and slightly dull, with short subdecumbent to suberect pubescence, ventral surface also with few erect setae. Funicular segments transverse, stout, only first segment 1.4 times as long as wide, segments 2 longer than wide, segments 3-6 short, slightly wider than long, the rest of funicular segments distinctly broader than six basal segments (Fig. 9.3). Eyes minute but well visible, composed with more than four ommatidia. **Mesosoma.** Elongate, 2.4 times as long as wide, dorsally and laterally with fine microreticulation with sparse punctuation, propodeum on sides with oblique and longitudinal striation, interspaces shiny, with short and sparse appressed to decumbent pubescence , surface from slightly shiny to slightly granulate. In lateral view pronotum slightly convex, mesonotum and propodeum straight, posterior face of propodeum oblique, mesonotal suture distinct. Mesosomal dorsum lacking erected setae (Figs 9.1, 2). **Waist and gaster.** Petiole in form of cubicous node broadly connected with gaster, surface sparsely punctate, interspaces slightly irregular but shiny, covered with sparse and short pu-

bescence in anterior half and longer subdecumbent to decumbent, longer pubescence basally. Gaster longer than mesosoma, tergites with micropunctation and fine microreticulation, surface shiny, covered with moderately long and moderately dense subdecumbent pubescence not covering surface and few to several longer standing hairs. **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered with moderately long and sparse subdecumbent to decumbent hairs, erected setae absent sometimes few additional suberect hairs present.

Comparative remarks. *Stigmatomma impressifrons* differs from *S. denticulatum* in larger body size, with total length above 5.5 mm (in S. *denticulatum* below 4.5 mm), palpal formula 5:3 (in *S. impressifrons* 4:3), metasternum with spiniform process (absent in S. *denticulatum*), head slightly wider than long and eyes small but well visible.

Biological notes. No data from Greece.

Subfamily Ponerinae

In Greece recorded three genera with five species.

A key to genera

1. Mandibles with more than 8 dents and denticles, the 1-3 apical dents often somewhat stronger and the following 8-13 dents small to minute. Mid and hind tibiae each with one pectinate spur …..... 2.
─. Mandibles with 6-7 strong dents of approximately equal size. Mid and hind tibiae each with two spurs, median spur large and pectinate, lateral spur much smaller and not pectinate ……..… ***Cryptopone*** **Emery**, p. 23
2. Petiolar base in profile with two small, sharp dents or angles and anteriorly with a circular translucent “window” (Fig. 13.5) …… ***Ponera*** **Latreille**, p. 29
─. Petiolar base in profile form a simple rounded lobe, without a translucent “window” ……...…… ***Hyponomera*** **Santschi**, p. 25

Genus *Cryptopone* Emery, 1893

Diagnosis. Body linear; clypeus narrow with convex anterior margin, not armed with teeth; antennae 12-segmented, stout; antennal scape short, shorter than width of head; mandibles moderately elongate, masticatory margin with spiniform denticles of equal size; palp formula 2,2; eyes very small, often look as a single small dot; promesonotal suture present; propodeum unarmed; waist of one segment in form of thick scale; first gastral segment not separated from subsequent segments by a deep suture; mid and hind tibiae each with one pectinate and one spiniform spur.

In Greece only one species.

10. *Cryptopone ochracea* (Mayr, 1855)

(Figs 10.1-3)

Ponera ochracea Mayr, 1855: 390;
Euponera (*Pseudoponera*) *ochracea* subsp. *sicula* Emery, 1909 b: 365.

Distribution in Greece: Crete (Borowiec & Salata 2013: 352, Salata et al. 2020 a: 17); **Dodecanese** (Menozzi 1936: 269 - as *Euponera ochracea*, Legakis 2011: 3, Borowiec et al. 2021: 18); **Macedonia** (new record: Drama, Paranesti-Thermia rd., 350 m, 7 X 1999, 41.3861 / 24.4737); **Peloponnese** (Legakis 2011: 3).

Distribution in Europe and Mediterranean Basin: Bulgaria; Croatia; France: Corsica, mainland; Georgia; Greece; Hungary; Israel; Italy: mainland, Sardinia, Sicily; Portugal; Romania; Saudi Arabia; Serbia; Spain: Baleares, mainland; Switzerland; Turkey; Ukraine.

Description. Small: HL: 0.730-0.794 (mean 0.762); HW: 0.667-0.683 (mean 0.675); SL: 0.492-0.539 (mean 0.516); ML: 0.96-1.11; MW: 0.45-0.51. **Color.** Body uniformly yellow including antennae and legs (Figs 10.1-3). **Head.** Stout, 1.1 times as long as wide, almost parallelsided, occipital corners rounded, occipital margin shallowly concave (Fig. 10.3). Clypeus transverse, with rounded anterior margin and strongly convergent sides. Clypeus distinctly microreticulated with numerous short to long suberect setae, anterior margin with a row of long setae, the longest in the middle of clypeal margin with length up to 0.159. Head with slightly granulate microsculpture, appears indistinctly dull, with short and dense suberect pubescence not covering head surface, erected setae absent, only frontal plate with moderately long decumbent to suberect hairs, ventral side of head with subdecumbent to decumbent pubescence and few short erected setae. Scape short, 0.7- 0.8 times as long as width of head, stout, distinctly widened from base to apex, but apically shallowly constricted, its surface microreticulate but shiny, with short and dense subdecumbent to decumbent pubescence and sparse, short erect setae. Funicular segments transverse, stout, only first segment 2.0-2.1 times as long as wide, segments 2-5 very short, more than twice shorter than first segment, the rest of funicular segments distinctly broader than six basal segments (Fig. 10.3). Eyes very small, placed close to anterior margin of head, composed with at most 6 ommatidia. Mandibles sparsely punctate, interspaces smooth and shiny. **Mesosoma.** Elongate, 2.2 times as long as wide, distinctly microsculptured dorsally, lateral sides with weaker sculpture, with moderately long and dense subdecumbent to decumbent pubescence more or less covering body surface, pronotum anterolaterally and mesonotum and propodeum posterolaterally with a long erect seta. In lateral view pronotum slightly convex, mesonotum and propodeum straight or slightly concave in mesonotal suture, posterior face of propodeum almost perpendicular, mesonotal suture distinct (Figs 10.1, 2). **Waist and gaster.** Petiole in form of high, trapezoidal node, with almost flat and oblique anterior face, and flat perpendicular posterior face, apex rounded, frontal and lateral faces with moderately dense decumbent to suberect hairs, apical crest with a row of erected setae. Gaster longer than mesosoma, tergites distinctly micropunctate, surface shiny, covered with moderately long and dense appressed to decumbent pubescence. First two gastral tergites with few moderately long erected setae, third tergite with several long erected setae. **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered with long and dense decumbent to suberect hairs, with few erected long setae, especially on mid tibiae, inner margin of tibiae lacking row of thorns.

Comparative remarks. *Cryptopone ochracea*, at first glance, is similar to the species of *Ponera* and *Hypoponera* but it differs in mandibles with 6-7 strong dents of approximately equal size, mid and hind tibiae each with two spurs, median spur large and pectinate and lateral spur much smaller and not pectinate. In both relative genera mandibles have more than 8 dents and denticles and the 1-3 apical dents are often somewhat larger than the following

8-13 dents, and mid and hind tibiae have only one pectinate spur. Body and legs vestiture in *C. ochracea* is longer and denser than in both related genera with several erected setae on first two gastral tergites and tibiae.

Biological notes. In Greece, *Cryptopone ochracea* was collected in sandy beach area, wooded stream valley and deciduous gallery forest at low altitude from 1 to 350 m. Nests were observed under stones.

Genus *Hypoponera* Santschi, 1938

Useful identification keys, revisions and taxonomic papers: Seifert 2003, Bolton & Fisher 2011, Seifert 2013.

Diagnosis. Body linear; clypeus narrow with convex anterior margin, not armed with teeth; antennae 12-segmented, stout; antennal scape elongate, slightly shorter than width of head; mandibles elongate, masticatory margin with spiniform denticles of unequal size; palp formula 1,2; eyes very small, with at most 5 ommatidia; promesonotal suture present but shallow; propodeum unarmed; waist of one segment in form of thick scale; petiolar base with rounded lobe, anteriorly without transparent window; first gastral segment not separated from subsequent segments by a deep suture; mid and hind tibiae each with one pectinate spur.

In Greece confirmed two species.

A key to species of the genus *Hypoponera*

1. Scape reaching to hind margin of head, SL/CW > 0.88. Petiole in profile significantly higher and narrower (Fig. 11.2). Mesopleuron completely covered with carinulate sculpture ……..…….. ***H. eduardi*** **(Forel)**, p. 25

─. Scape not reaching to hind margin of head, SL/CW < 0.88. Petiole in profile significantly lower and thicker (Fig. 12.5). Mesopleuron smooth ….. ***H. punctatissima*** **(Roger)**, p. 27

Review of species

11. *Hypoponera eduardi* (Forel, 1894)

(Figs 11.1-6)

Ponera eduardi Forel, 1894 a: 15;
Ponera antipodum Forel, 1895 b: 43;
Ponera dideroti Forel, 1913 a: 203.

Distribution in Greece: Aegean Islands (Legakis 2011: 3, Borowiec & Salata 2018: 6, Salata et al. 2019 a: 21); **Crete** (Borowiec & Salata 2012: 497, Salata & Borowiec 2017: 296, Salata et al. 2020 a: 17, Salata et al. 2019 a: 21); **Dodecanese** (Menozzi 1936: 269 - as *Ponera eduardi*, Legakis 2011: 3, Salata et al. 2019 a: 21, Borowiec et al. 2021: 18); **Epirus** (Borowiec & Salata 2018: 6, Salata et al. 2019 a: 21); **Ionian Islands** (Emery 1898: 124, Finzi 1930 b: 311 - as *Ponera eduardi*, Legakis 2011: 3, Salata et al. 2019 a: 21, Borowiec & Salata 2021 a: 7; **new data:** Lefkada, 3.3 km W of Nidri, 492 m, 10 VI 2021, 38.70886 / 20.67459); **Macedonia** (Borowiec & Salata 2012: 497, Salata et al. 2019 a: 21, Borowiec & Salata 2022: 7); **Peloponnese** (Legakis 2011: 3, Borowiec & Salata 2017 b: 209, Salata et al. 2019 a: 21); Sterea Ellas (Forel 1888: 256 – as *Ponera contracta*, Salata et al. 2019 a: 21).

Distribution in Europe and Mediterranean Basin: Algeria; Azores; Bosnia and Herzegovina; Bulgaria; Croatia; France: Corsica, mainland; Georgia; Gibraltar; Greece; Israel; Italy: mainland, Sardinia, Sicily; Malta; Montenegro; Morocco; North Macedonia; Portugal; Saudi Arabia; Serbia; Spain: Baleares, Canary Islands, mainland; Switzerland; Turkey; Ukraine; United Arab Emirates; Yemen - cosmopolitan.

Description. Small: HL: 0.643-0.651 (mean 0.649); HW: 0.522-0.540 (mean 0.533); SL: 0.473-0.492 (mean 0.481); ML: 0.83-0.89; MW: 0.38-0.41. **Color.** Head, mesosoma and gaster from yellowish brown to dark brown, petiole yellowish to brown, usually paler than mesosoma and gaster, sometimes also pronotum paler than the rest of mesosoma, antennae and legs yellow, often coxa partly infuscate; dark forms predominate (Figs 11.1-6). **Head.** Moderately elongate, 1.2 times as long as wide, almost parallelsided, occipital corners rounded, occipital margin shallowly concave. Clypeus transverse, with rounded anterior margin and strongly convergent sides. Clypeus with diffused microreticulation but shiny, with moderately long and sparse subdecumbent to decumbent hairs and few erect setae, anterior margin with a row of long setae and few short setae, anterior setae with length up to 0.111. Head distinctly microreticulated, interspaces indistinctly shiny, occasionally dull, with moderately long and moderately dense subdecumbent pubescence not covering head surface, erected setae absent, only frontal plate with long decumbent to suberect hairs, ventral side of head with very short and sparse subdecumbent pubescence (Fig. 11.3). Scape short, 0.9 times as long as width of head, stout, distinctly widened from base to apex, but apically slightly constricted, its surface microreticulate but shiny, with short and moderately dense subdecumbent pubescence. Funicular segments transverse, stout, only first segment 1.5 times as long as wide, segments 2-5 very short, more than twice shorter than first segment , the rest of funicular segments distinctly broader than six basal segments (Fig. 11.3). Eyes very small, placed close to anterior margin of head, composed with at most 5 ommatidia. Mandibles sparsely punctate, interspaces smooth and shiny. **Mesosoma.** Elongate, 2.1-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, sides of mesonotum only slightly less microreticulate than dorsum, surface indistinctly shiny to slightly dull, with short to moderately long and moderately dense appressed to decumbent pubescence (Figs 11.1, 2). In lateral view pronotum slightly convex, mesonotum and propodeum straight, posterior face of propodeum oblique, mesonotal suture distinct. Mesosomal dorsum lacking erected setae. **Waist and gaster.** Petiole in form of high, trapezoidal node, 1.7 times as high as wide at base, with almost flat anterior, and posterior face, apex rounded, anterior and lateral faces and apex with sparse appressed to decumbent hairs. Gaster longer than mesosoma, tergites distinctly microsculptured, surface from shiny to slightly dull, covered with long and dense appressed to subdecumbent pubescence partly covering surface. First two gastral tergites lacking erected setae, only posterior margins with a row of long hairs, third tergite with few long erected setae. **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered with moderately long and sparse appressed to subdecumbent hairs, erected setae absent, inner margin of tibiae lacking row of thorns only apically with few suberect hairs.

Gyne as in Figs 11.4-6.

Comparative remarks. Both Greek members of the genus *Hypoponera* are superficially similar and differ in subtle characters. *Hypoponera eduardi* looks less shiny and has mesopleuron completely covered with carinulate sculpture while *H. punctatissima* looks slightly shiny and has mesopleuron smooth. *Hypoponera eduardi* has slightly longer scapi

reaching to hind margin of head, SL/CW > 0.88 and petiole in profile significantly higher and narrower, approximately 1.7 times as high as wide (Fig. 11.2). While in *H. punctatissima* scape is not reaching to hind margin of head, SL/CW < 0.88 and petiole in profile is significantly lower and thicker, approximately 1.5 times as high as wide (Fig. 12.5).

Biological notes. In Greece, most records of *Hypoponera eduardi* come from stream valleys overgrown with deciduous forests, especially plane forest. Few additional observations are from roadsides in pine forests, frygana with oak shrubs. Nests are located under stones, usually in shady places, often on the gravel pits of periodic water springs. Most records are from low altitudes 1 to 400 m, the highest locality comes from in deciduous forest at 660 m.

12. *Hypoponera punctatissima* (Roger, 1859)

(Figs 12.1-6)

Ponera punctatissima Roger, 1859: 246;
Ponera androgyna Roger, 1859: 246;
Ponera tarda Charsley, 1877: 162;
Ponera punctatissima r. *jugata* Forel, 1892 a: 251;
Ponera ergatandria st. *cognata* Santschi, 1912 b: 153;
Ponera ragusai var. *sordida* Santschi, 1914 a: 54;
Ponera incisa Santschi, 1914: 320 b;
Ponera sulcatinasis r. *durbanensis* Forel, 1914: 213;
Ponera ergatandria r. *petri* Forel, 1916: 397;
Ponera brevis Santschi, 1921 a: 113;
Ponera punctatissima var. *exacta* Santschi, 1923 a: 134;
Ponera mina Wheeler, 1927: 131;
Ponera argonautorum Arnoldi, 1932: 66;
Ponera mumfordi Wheeler, 1933: 141;
Ponera mesoepinotalis Weber, 1942: 44;
Ponera breviceps Bernard, 1953: 202;
Ponera ursoidea Bernard, 1953: 202;
Ponera sulcitana Stefani, 1970: 1.

Distribution in Greece: Greece generally (Agosti & Collingwood 1987: 51, Salata et al. 2019 a: 21); **Aegean Islands** (Legakis 2011: 3, Salata et al. 2019 a: 21); **Crete** (Borowiec & Salata 2013: 365 – as *Ponera testacea*; Salata et al. 2020: 17, only loc. HER023 – as *Cryptopone ochracea)*.

Distribution in Europe and Mediterranean Basin: Andorra; Armenia; Austria; Azores; Belgium; Britain; Bulgaria; Czech Rep.; Denmark; Egypt; Finland; France: mainland; Germany; Greece; Hungary; Ireland; Israel; Italy: mainland, Sardinia; Libya; Luxembourg; Madeira; Malta; Morocco; Netherlands; Norway; Oman; Poland; Portugal; Romania; Saudi Arabia; Serbia; Slovakia; Spain: Baleares, Canary Islands, mainland; Sweden; Switzerland; Tunisia; Turkey; Ukraine; United Arab Emirates; Yemen - cosmopolitan

Description. Small: HL: 0.584-0.695 (mean 0.652); HW: 0.452-0.603 (mean 0.535); SL: 0.381-0.484 (mean 0.446); ML: 0.73-0.94; MW: 0.34-0.46. **Color.** Head, mesosoma and

gaster from yellow to yellowish brown, head and gaster often slightly darker than mesosoma, sometimes head with yellow spot in frontal area dorsally to antennal insertions, antennae and legs yellow; pale forms predominate (Figs 12.1-3), dark form rare (Figs 12.4-6). **Head.** Moderately elongate, 1.1-1.3 times as long as wide, almost parallelsided, occipital corners rounded, occipital margin shallowly concave (Figs 12.3, 6). Clypeus transverse, with rounded anterior margin and strongly convergent sides. Clypeus with diffused microreticulation but shiny, with moderately long and sparse subdecumbent to decumbent hairs and few erect setae, anterior margin with a row of long setae and few short setae, anterior setae with length up to 0.111. Head with indistinctly diffused microreticulation, interspaces shiny, never dull, with moderately long and moderately dense subdecumbent pubescence not covering head surface, erected setae absent, only frontal plate with moderately long decumbent to suberect hairs, ventral side of head with very short and sparse subdecumbent pubescence. Scape short, 0.9 times as long as width of head, stout, distinctly widened from base to apex, but apically slightly constricted, its surface microreticulate but shiny, with short and moderately dense subdecumbent pubescence. Funicular segments transverse, stout, only first segment 1.5 times as long as wide, segments 2-5 very short, more than twice shorter than first segment , the rest of funicular segments distinctly broader than six basal segments (Figs 12.3, 6). Eyes very small, placed close to anterior margin of head, composed with at most 5 ommatidia. Mandibles sparsely punctate, interspaces smooth and shiny. **Mesosoma.** Elongate, 2.0-2.2 times as long as wide, dorsally with diffused microreticulation, sides of mesonotum mostly smooth and shiny, also sides of pronotum and propodeum partly smooth and shiny, surface of mesosoma with short to moderately long and moderately dense appressed to decumbent pubescence. In lateral view pronotum slightly convex, mesonotum and propodeum straight, posterior face of propodeum oblique, mesonotal suture distinct. Mesosomal dorsum lacking erected setae, at most with few erected setae (Figs 12.1, 2, 4, 5). **Waist and gaster.** Petiole in form of high, stout, trapezoidal node, 1.5 times as high as wide at base, with almost flat anterior, and posterior face, apex rounded, anterior and lateral faces and apex with sparse appressed to decumbent hairs. Gaster longer than mesosoma, tergites with diffused microreticulation and micropunctation, surface shiny, covered with moderately long and moderately dense appressed to subdecumbent pubescence not covering surface. First two gastral tergites lacking erected setae, only posterior margins posterolaterally with long, erect hairs, third tergite with few long erected setae. **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered withmoderately long and sparse appressed to subdecumbent hairs, erected setae absent, inner margin of tibiae lacking row of thorns only apically with few suberect hairs.

Comparative remarks. See comparative characters for *Hypoponera eduardi*. In Greece, *H. punctatissima* is less common than *H. eduardi* and was recorded only from anthropogenic habitats.

Biological notes. In Crete *Hypoponera punctatissima* was collected under stones in sandy beach area and in deciduous forest growing along the stream, both localities were from altitude below 50 m. In Central Europe this species is usually reported from mounds or heaps of decomposing, heat-producing organic material. In more natural habitats it was noted in open and sun-exposed sites in park meadow in urban area, paved area in urban area, a *Molinia* stand in a bog, an orchard and a xerothermous grassland on a sand and a bare granite rock (Seifert 2018).

Genus *Ponera* Latreille, 1804

Useful identification keys, revisions and taxonomic papers: Csősz & Seifert 2003.

Diagnosis. Linear ants, pedicel with one distinct segments; palp formula 2,2; antennae 12-segmented, stout; mandibles stoutly triangular; clypeus simple, without extended lobes; eyes minute or rudimental; antennal scape short, shorter than width of head, funicle gradually incrassate with an apical club**;** frontal lobes absent so that antennal sockets are fully exposed and very close to the anterior margin of the head; eyes absent; promesonotal suture present, deeply impressed and articulated; propodeum unarmed; propodeal lobes absent; petiolar base in profile with a circular translucent "window" anteriorly; pygidium larger and conspicuous, not armed with teeth or spine; a strong sting is present**.**

In Greece two species.

A key to species of the genus *Ponera*

1. Petiolar node in profile higher and narrower, petiole width to high of petiolar node 1.062-1.260 (Fig. 13.2). On average larger CW 0.52-0.60. Body color from yellow to almost black ..... ***P. coarcata*** **(Latreille)**, p. 29

─. Petiolar node in profile lower and thicker, petiole width to high of petiolar node 1.105-1.422 (Fig. 14.2). On average smaller CW 0.47-0.56. Body color usually from yellow to red, only occasionally partly brown ..... ***P. testacea*** **Emery**, p. 31

Review of species

13. *Ponera coarctata* (Latreille, 1802)

(Figs 13.1-7)

Formica coarctata Latreille, 1802 b: 65;
Formica contracta Latreille, 1802 a: 195;
Ponera coarctata var. *atlantis* Santschi, 1921: 166;
Ponera coarctata subsp. *coarctata* nat. *colchica* Arnoldi, 1932: 63 unavailable name.

Distribution in Greece: Aegean Island (Forel 1889: 256, Borowiec & Salata 2018 c: 7); **Epirus** (Legakis 1983: 4, 2011: 3, Salata & Borowiec 2017: 298, Borowiec & Salata 2018 a: 9); **Ionian Islands** (Forel 1889: 256, Finzi 1930 b: 311, Legakis 2011: 3, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 10); **Macedonia** (Legakis 2011: 3, Borowiec & Salata 2012: 530, 2022: 9); **Peloponnese** (Forel 1886: clxvii, Borowiec & Salata 2013: 365, Borowiec & Salata 2017: 219, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b: 11); **Sterea Ellas** (Forel 1889: 256, Legakis 2011: 3, Borowiec & Salata 2018 e: 9); **Thessaly** (Legakis 2011: 3, Borowiec & Salata 2018 b: 234); **Thrace** (Bračko et al. 2016: 26).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Azerbaijan; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Cyprus; Czech Rep.; France: Corsica, mainland; Georgia; Germany; Gibraltar; Greece; Hungary; Israel; Italy: mainland, Sardinia, Sicily; Luxembourg; Madeira; Moldova; Montenegro; Morocco; Netherlands; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Switzerland; Tunisia; Turkey; Ukraine.

Description. Small: HL: 0.624-0.730 (mean 0.673); HW: 0.476-0.587 (mean 0.519); SL: 0.432-0.492 (mean 0.461); ML: 0.83-0.93; MW: 0.37-0.43. **Color.** Body from yellowish red to dark brown, pronotum often and propodeal dorsum sometimes paler than the rest of mesosoma, posterior margin of first gastral tergite often paler than the rest of tergal surface, antennae and legs yellow; dark forms predominate, nests with only pale colored workers are very rare, usually part of workers are at least partly brown (Figs 13.1-6). **Head.** Elongate, 1.2-1.4 times as long as wide, almost parallelsided, occipital corners rounded, occipital margin shallowly concave. Clypeus transverse, with rounded anterior margin and strongly convergent sides. Clypeus with diffused microreticulation but indistinctly shiny, with very short and very sparse appressed hairs, anterior margin with a row of long setae and few short setae, anterior setae with length up to 0.111. Head dense micropunctation, appears slightly microgranulate, interspaces indistinctly shiny, occasionally dull, with moderately long and moderately dense subdecumbent pubescence not covering head surface, erected setae absent, only frontal plate with moderately long decumbent to suberect hairs, ventral side of head with decumbent to suberect pubescence (Fig. 13.3). Scape short, 0.8- 0.9 times as long as width of head, stout, distinctly widened from base to apex, but apically slightly constricted, its surface microreticulate but shiny, with short and dense subdecumbent to decumbent pubescence. Funicular segments transverse, stout, only first segment 2.0-2.1 times as long as wide, segments 2-5 very short, more than twice shorter than first segment , the rest of funicular segments distinctly broader than six basal segments (Fig. 13.3). Eyes very small, placed close to anterior margin of head, composed with at most 5 ommatidia. Mandibles sparsely punctate, interspaces smooth and shiny. **Mesosoma.** Elongate, 2.1-2.3 times as long as wide, dorsally and laterally with diffused microsculpture but indistinctly shiny, with very moderately long and moderately dense appressed to decumbent pubescence. In lateral view pronotum slightly convex, mesonotum and propodeum straight, posterior face of propodeum almost perpendicular, mesonotal suture distinct. Mesosomal dorsum lacking erected setae (Figs 13.1, 2). **Waist and gaster.** Petiole in form of high, trapezoidal node, with almost flat anterior, dorsal and posterior face, dorsally with sparse decumbent to suberect hairs. Gaster longer than mesosoma, tergites distinctly microsculptured , surface from shiny to slightly dull, covered with long and dense appressed to decumbent pubescence. First two gastral tergites lacking erected setae, third tergite with few long erected setae. **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered with long and dense subdecumbent hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne as in Figs 13.4-6, male as in Fig. 13.7.

Comparative remarks. Both members of *Ponera* are superficially similar and difficult to identify. Only dark brown specimens of *P. coarctata* can be distinguished because Greek populations of *P. testacea* are never completely brown. Pale forms of both species differ mainly in shape of petiole, higher and narrower in *P. coarctata* (petiole width to high of petiolar node 1.062-1.260, see Seifert 2018 p. 80) and lower and thicker in *P. testacea* (petiole width to high of petiolar node 1.105-1.422). In Greece, *P. coarctata* is more ubiquistic than *P. testacea*, noted from dry and humid places, usually prefers shady habitats, especially in lowlands while *P. testacea* prefers open, warm and dry habitats.

Biological notes. *Ponera coarctata* is an ubiquistic forest species, noted from luminous pine forests, mountain deciduous and coniferous forests, stream valleys with plane forests,

occasionally from open habitats like mountain pastures but from altitude above 900 m. Nesting always under stones. Collecting sites come from an altitude 88-1400 m.

14. *Ponera testacea* Emery, 1895

(Figs 14.1-4)

Ponera coarctata var. testacea Emery, 1895 a: 62;
Ponera coarctata var. *lucida* Emery, 1898: 130;
Ponera coarctata var. *crassisquama* Emery, 1916 b: 54;
Ponera coarctata subsp. *testacea* natio *taurica* Arnoldi, 1932: 65 unavailable name.

Distribution in Greece: Aegean Islands (Borowiec & Salata 2018: 7); **Ionian Islands** (Finzi 1930 b: 311 - as *Ponera coarctata* var. *testacea*, Legakis 2011: 4, Borowiec & Salata 2014 a: 516, Salata & Borowiec 2017: 298); **Macedonia** (Borowiec & Salata 2012: 531); **Peloponnese** (Legakis 2011: 4, Borowiec & Salata 2021 b: 11); **Sterea Ellas** (Borowiec & Salata 2021 b: 11); **Thessaly** (Borowiec & Salata 2018: 234); **Thrace** (Bračko et al. 2016: 26).

Distribution in Europe and Mediterranean Basin: Austria; Azerbaijan; Belgium; Britain; Bulgaria; Croatia; Czech Rep.; France: Corsica, mainland; Germany; Greece; Hungary; Italy: mainland, Sardinia, Sicily; Montenegro; Netherlands; Poland; Romania; Serbia; Slovakia; Spain: Baleares, mainland; Switzerland.

Description. Small: HL: 0.643-0.676 (mean 0.658); HW: 0.484-0.519 (mean 0.505); SL: 0.437-0.497 (mean 0.462); ML: 0.86-0.91; MW: 0.35-0.39. **Color.** Body yellowish, yellowish red to yellowish brown, never brown or dark brown, antennae and legs yellow (Figs 14.1-3). **Head.** Elongate, 1.3 times as long as wide, almost parallelsided, occipital corners rounded, occipital margin shallowly concave. Clypeus transverse, with rounded anterior margin and strongly convergent sides. Clypeus with diffused microreticulation but indistinctly shiny, with very short and very sparse appressed hairs, anterior margin with a row of long setae and few short setae, anterior setae with length up to 0.110. Head dense micropunctation, appears slightly microgranulate, interspaces indistinctly shiny, occasionally dull, with moderately long and moderately dense subdecumbent pubescence not covering head surface, erected setae absent, only frontal plate with moderately long decumbent to suberect hairs, ventral side of head with decumbent to suberect pubescence (Fig. 14.3). Scape short, 0.9 times as long as width of head, stout, distinctly widened from base to apex, but apically slightly constricted, its surface microreticulate but shiny, with short and moderately dense subdecumbent to decumbent pubescence. Funicular segments transverse, stout, only first segment 2.0-2.1 times as long as wide, segments 2-5 very short, more than twice shorter than first segment , the rest of funicular segments distinctly broader than six basal segments. Eyes very small, placed close to anterior margin of head, composed with at most 5 ommatidia. Mandibles sparsely punctate, interspaces smooth and shiny. **Mesosoma.** Elongate, 2.2-2.5 times as long as wide, dorsally and laterally with diffused microreticulation and micropunctation but indistinctly shiny, with moderately long and moderately dense appressed to decumbent pubescence. In lateral view pronotum slightly convex, mesonotum and propodeum straight, posterior face of propodeum almost perpendicular, mesonotal suture distinct. Mesosomal dorsum lacking erected setae (Figs 14.1, 2). **Waist and gaster.** Petiole in form of high but stout trapezoidal

node, with almost flat anterior, dorsal and posterior face, dorsally with sparse decumbent to suberect hairs. Gaster longer than mesosoma, tergites distinctly microsculptured, surface from shiny to slightly dull, covered with moderately long andmoderately dense appressed to decumbent pubescence. First two gastral tergites lacking erected setae, third tergite with few long erected setae. **Legs.** Stout, tibiae distinctly widened from base to apex, surface covered with moderately long and moderately dense subdecumbent hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne not studied.

Comparative remarks. See comparative remarks in *Ponera coarctata*. In Greece, *Ponera testacea* is less ubiquistic species than *P. coarctata* and prefers more arid habitats such as warm forests and pastures with oaks. Dark form of *P. testacea* described as *Ponera coarctata* var. *lucida* Emery, 1898 at first glance is very similar to *P. coarctata* and differs only in structure of petiole and slightly smaller size. This form was recorded mainly from the eastern part of distiribution range of *P. testacea* (Turkey, including western part, and Azerbaijan) but has never been found in Greek materials (Csősz et al. 2022).

Biological notes. More thermophilous than *P. coarctata*. Collected in luminous mixed forests close to stream, mountain deciduous forests, gorge with deciduous forest and pastures with big oaks. Nests observed under stones. Collecting sites come from an altitude 100-1320 m.

Subfamily Dolichoderinae

In Greece five genera with eight species, presence of one to two additional species is also possible.

A key to genera

1. Dorsal profile of mesosoma straight to convex, without or with shallow cleft between mesonotum and propodeum (Figs 15.2, 18.2, 19.2, 20.2). Cuticle of head only weakly sculptured and without deepened foveolae (Figs 15.1, 18.1, 19.1 20.1) ..... 2.

—. Dorsal profile of mesosoma with deep cleft between mesonotum and propodeum (Fig. 17.2). Cuticle of head strongly sculptured with deepened foveolae (Figs 17.1, 2) .... ***Dolichoderus*** **Lund**, p. 36

2. Propodeum in profile not or only slightly surpassed by promesonotum (Figs 15.2, 19.2, 20.2). Mandibular denticles not strongly heterodont (Figs 15.3, 20.3).....3.

—. Propodeum in profile distinctly surpassed by promesonotum (Fig. 18.2). Mandibular denticles strongly heterodont, with 5-6 larger dents dispersed over the masticatory border and 11-15 clearly smaller denticles present in interspaces (Fig. 18.4) .... ***Linepithema*** **Lund**, p. 38

3. Petiolar scale well-developed, upright or only slightly tilted frontad (Figs 15.2, 19.2). Dorsal face of gaster not strongly produced frontad (Figs 15.2, 19.2). Anteromedian margin of clypeus without excavation (Figs 15.3. 19.3) .....4.

—. Petiolar scale strongly reduced – either depressed and fused with the basis or completely missing, upright or only slightly tilted frontad. Dorsal face of gaster strongly produced

frontad, overhanging petiole (Figs 20.2, 21.2, 22.2). Anteromedian margin of clypeus with excavation (Figs 20.3, 21.3, 22.3) ..... ***Tapinoma*** Förster, p. 42

4. Small, CW < 0.800. Anterior clypeal margin clearly convex (Figs 15.3. 16.3). Palp formula 5/4. Body unicoloured or mesosoma only slightly lighter than head and gaster (Figs 15.2, 16.2) ..... ***Bothriomyrmex*** **Emery**, p. 33

—. Large, CW > 0.850-1.600. Anterior clypeal margin straight or slightly concave (Fig. 19.3). Palp formula 6/4. Body distinctly bicoloured (Figs 19.1, 2) .... ***Liometopum*** **Mayr**, p. 40

Genus *Bothriomyrmex* Emery, 1869

Useful identification keys, revisions and taxonomic papers: Seifert 2012 a.

Diagnosis. Monomorphic, very small, ML below 0.70; mandibles with 5-6 teeth; palp formula 4:3; antennae 12-segmented, no antennal club; antennal scape short, shorter than width of head, without projected setae; antennal sockets close to the posterior clypeal margin; eyes small, almost circular, placed distinctly in front of the middle of head; ocelli absent; mesothorax softly constricted in the middle; mesonotal groove shallow or only in form of mesonotal suture, metapleural gland present; propodeum unarmed; propodeal spiracle circular; petiole in form of a narrow erect scale; acidopore absent, apex of gaster only with transverse slit**.**

In Greece confirmed two species.

A key to species of the genus *Bothriomyrmex*

1. Pubescence of first gaster tergite short, tergite surface well visible (Fig. 16.1). Clypeal width small, ClyW/CS 0.736-0.771 ..... ***B. corsicus*** **Santschi**, p. 33

—. Pubescence of first gaster tergite long, tergite surface less visible (Fig. 15.1). Clypeal width small, ClyW/CS 0.773-0.820 ..... ***B. communista*** **Santschi**, p. 35

15. *Bothriomyrmex communista* Santschi, 1919

(Figs 15.1-7)

Bothriomyrmex meridionalis var. *communista* Santschi, 1919 a: 206;
Bothriomyrmex meridionalis var. *adriaca* Santschi, 1922: 66;
Bothriomyrmex adriacus anatolicus Emery, 1925 a: 16;
Bothriomyrmex adriacus ionius Emery, 1925 a: 16;
Bothriomyrmex adriacus ionius var. *sicula* Emery, 1925 a: 17 unavailable name;
Bothriomyrmex corsicus subsp. *mohelensis* Novak in Novak & Sadil, 1941: 97;
Bothriomyrmex meridionalis var. *hungarica* Röszler, 1942 a: 39.

Distribution in Greece: Aegean Islands (Forel 1889: 256 - as *Bothriomyrmex meridionalis*, Legakis 2011: 22-23 – as *Bothriomyrmex atlantis* and *B. meridionalis*, Borowiec & Salata 2018 c: 4; **new data:** Samos, Kontakeika, 222 m, 7 X 2019, 37.79704 / 26.74492); **Dodecanese** (Forel 1889: 256 - as *Bothriomyrmex meridionalis*, Legakis 2011: 22-23 – as *Bothriomyrmex atlantis*, Borowiec et al. 2021: 13); **Epirus** (Seifert 2012: 92, Borowiec &

Salata 2018 a: 4); **Ionian Islands** (Emery 1925: 16 - as *Bothriomyrmex adriacus ionius*, Legakis 2011: 23 – as *Bothriomyrmex meridionalis*, Seifert 2012: 92, Salata & Borowiec 2017 a: 298-299, Borowiec & Salata 2018 d: 4, Salata & Borowiec 2019 b: 100-104, 114); **Macedonia** (Petrov & Legakis 1996: 31 – as *Bothriomyrmex meridionalis*, Legakis 2011: 23 – as *Bothriomyrmex meridionalis*, Borowiec & Salata 2012: 469); **Peloponnese** (Emery 1925: 16 - as *Bothriomyrmex adriacus*, Legakis 2011: 22-23 – as *Bothriomyrmex adriacus* and *B. atlantis*, Salata & Borowiec 2017 a: 298-299, Borowiec & Salata 2017 b: 203, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b: 4; **new data:** Achaia, 1.56 km S of Aroania, 980 m, 30 V 2018, 37.86942 / 22.00791); **Sterea Ellas** (Forel 1886: clxvii - as *Bothriomyrmex meridionalis*, Finzi 1928: 790 (as *Bothriomyrmex adriacus* var. *jonius*, Legakis 2011: 22-23 – as *Bothriomyrmex atlantis* and *B. ionius*, Borowiec & Salata 2018 e: 5, Borowiec & Salata 2021 b: 4; **new data:** Evritania, Livadaki vic., 1540 m, 12 VI 2007, 38.71515 / 21.88492); **Thessaly** (Borowiec & Salata 2018 b: 222, Salata & Borowiec 2019 b: 121); **Thrace** (Bračko et al. 2016: 12).

Distribution in Europe and Mediterranean Basin: Albania; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Republic; Georgia; Greece: Aegean Is., Dodecanese, Ionian Is., mainland; Hungary; Italy: mainland; Montenegro; North Macedonia; Serbia; Slovakia; Slovenia; Turkey; Ukraine.

Description. Small: HL: 0.571-0.659 (mean 0.628); HW: 0.492-0.579 (mean 0.559); SL: 0.473-0.556 (mean 0.519); EL: 0.071-0.092 (mean 0.083); ML: 0.66-0.73; MW: 0.34-0.41. **Color.** Whole body, including antennae and legs yellow, often body with a gray or light brown tinge (Figs 15.1-6). **Head.** Slightly elongate approximately 1.1 times as long as wide, on sides softly rounded, occipital corners rounded, occipital margin shallowly concave (Fig. 15.3). Clypeus with diffused microreticulation but shiny, trapezoidal, its anterior margin convex, without median concavity, sides concave, convergent posterad, deeply excavate in front of antennal scrobes, posterior margin rounded. Clypeal surface with short and sparse appressed to subdecumbent hairs, appears distinctly haired, anterior margin with a row of long setae and few short setae, the longest setae in the middle and in lateral corners, the longest anterior setae with length up to 0.162. Head with micropunctation, shiny, covered with very short and very sparse but well visible appressed pubescence not covering head surface, erected setae absent except single long, erected seta at anterolateral corners of frons. Scape short, approximately 0.9 times as long as width of head, thin, softly and regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed to subdecumbent pubescence, erected setae absent. Funicular segments 1-3 slightly elongate, thin, first segment approximately twice as long as wide and 1.4 times as long as second segment, third segment distinctly shorter than second, the rest of funicular segments approximately as long as broad (Fig. 15.3). Eyes small, almost circular, 0.13 length of head. Mandibles elongate, distinctly sculptured. **Mesosoma.** Moderately elongate, 1.7-1.9 times as long as wide, dorsally and laterally with diffused microreticulation but shiny, with short and sparse appressed pubescence (Figs 15.1, 2). In lateral view pronotum softly convex, mesonotum straight, propodeum placed slightly higher than mesonotum, rounded or subangulate, with oblique posterior face, mesonotal groove shallow but distinct. Mesosomal dorsum lacking erected setae. **Waist and gaster.** Petiolar scale in form of small, thin scale, with rounded apical margin, anterior face with very short suberect hairs. Gaster longer than mesosoma, tergites distinctly micropunctate and shiny interspaces, covered with long and

dense appressed pubescence partly covering the shiny background of tergites. First gastral tergite lacking erected setae, second tergite with a pair of long setae centrally and a single short seta laterally, third tergite with a row of four long erected setae in posterior half and a single long seta laterally, sternites without median keel. **Legs.** elongate, fore tibiae stout and broad, mid and hind tibiae slim, first segment of tarsi not longer than subsequent segments combined, surface of legs covered with long and dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne as in Figs 15.4-6, male as in Fig. 15.7.

Comparative remarks. *Bothriomyrmex communista* differs from the only Greek congener *B. corsicus* in very dense and long appressed pubescence of gastral tergites which makes the surface of tergites hardly visible from under the hair. It has also narrower clypeus with clypeal index ClyW/CS 0.773-0.820.

Biological notes. *Bothriomyrmex communista* is a thermophilous species, prefers open areas such as roadsides, lowland, mountain pastures and ruderal sites in tourists resorts. The species was collected also in various types of forests but always in sunny and open places. It is a pioneering species in burnt areas. Nesting under stones. It prefers lowland and upland areas located between 10-900 m, the highest locality was plced at the altitude 1540 m in mountains of Evritania (Sterea Ellas).

16. *Bothriomyrmex corsicus* Santschi, 1923

(Figs 16.1-3)

Bothriomyrmex meridionalis var. *corsica* Santschi, 1923 a: 136;
Bothriomyrmex corsicus var. *ligurica* Emery, 1925 a: 13;
Bothriomyrmex corsicus subsp. *gallicus* Emery, 1925 a: 13;
Bothriomyrmex menozzii Emery, 1925 a: 17;
Bothriomyrmex meridionalis subsp. *gibbus* Soudek 1925: 216;
Bothriomyrmex jannonei Menozzi, 1936: 295;
Bothriomyrmex meridionalis bernardi Bernard, 1950: 20 nomen nudum.

Distribution in Greece: Aegean Islands (Legakis 2011: 23 - as *Bothriomyrmex gibbus* and *B. syrius*); **Ionian Islands** (Collingwood 1993: 195 - as *Bothriomyrmex gibbus*); **Dodecanese** (Legakis 2011: 23 - as *Bothriomyrmex jannonei*); **Macedonia** (Borowiec & Salata 2012: 469); **Peloponnese** (Borowiec & Salata 2013: 351); **Thrace** (Bračko et al. 2016: 12).

Distribution in Europe and Mediterranean Basin: Austria; Bulgaria; Czech Republic; France: Corsica, mainland; Georgia; Greece: Aegean Is., Ionian Is.; Italy: mainland; Kosovo; Lichtenstein; Romania; Slovakia; Slovenia; Switzerland; Turkey.

Description. Small: HL: 0.587-0.651 (mean 0.632); HW: 0.521-0.595 (mean 0.570); SL: 0.460-0.524 (mean 0.511); EL: 0.076-0.083 (mean 0.080); ML: 0.59-0.68; MW: 0.37-0.41. **Color.** Whole body, including antennae and legs yellow (Figs 16.1-3). **Head.** Slightly elongate approximately 1.1 times as long as wide, on sides softly rounded, occipital corners rounded, occipital margin shallowly concave (Fig. 16.3). Clypeus with diffused microreticulation but shiny, trapezoidal, its anterior margin convex, without median concavity, sides concave, convergent posterad, deeply excavate in front of antennal scrobes, posterior margin

rounded**.** Clypeal surface with short and sparse appressed hairs, appears unhaired, anterior margin with a row of long setae and few short setae, the longest setae in the middle and in lateral corners, the longest anterior setae with length up to 0.159. Head with micropunctation, shiny, covered with very short and very sparse appressed pubescence not covering head surface, erected setae absent except single long, erected seta at anterolateral corners of frons. Scape short, approximately 0.9 times as long as width of head, thin, softly and regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments 1-3 slightly elongate, thin, first segment approximately twice as long as wide and 1.4 times as long as second segment, third segment distinctly shorter than second, the rest of funicular segments approximately as long as broad (Fig. 16.3). Eyes small, almost circular, 0.13 length of head. Mandibles elongate, distinctly sculptured. **Mesosoma.** Moderately elongate, 1.6-1.7 times as long as wide, dorsally and laterally with diffused microreticulation but shiny, with short and sparse appressed pubescence. In lateral view pronotum softly convex, mesonotum straight, propodeum in line with mesonotum with oblique posterior face, mesonotal groove in form of deep suture. Mesosomal dorsum lacking erected setae (Figs 16.1, 2). **Waist and gaster.** Petiolar scale in form of small, thin scale, with rounded apical margin. Gaster longer than mesosoma, tergites distinctly micropunctate and shiny interspaces, covered with moderately long and moderately dense appressed pubescence not covering the shiny background of tergites. First gastral tergite lacking erected setae, second tergite with a pair of long setae centrally and a single short seta laterally, third tergite with a row of four long erected setae in posterior half and a single long seta laterally, sternites without median keel. **Legs.** Moderately elongate, fore tibiae stout and broad, mid and hind tibiae slim, first segment of tarsi not longer than subsequent segments combined, surface of legs covered with moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Comparative remarks. *Bothriomyrmex corsicus* differs from the only Greek congener *B. communista* in sparser and shorter appressed pubescence of gastral tergites which makes the surface of tergites well visible from under the hair. It has also broader clypeus with clypeal index 0.736-0.771.

Biological notes. *Bothriomyrmex corsicus* is a thermophilous species, observed in pastures with shrubs and luminous deciduous forest. Nestsing under stones. It prefers lowland and upland areas located between 210-850 m.

Genus *Dolichoderus* Lund, 1831

Diagnosis. Monomorphic, moderately large, ML above 1.0 mm; mandibles with 5-6 teeth; palp formula 4:3; antennae 12-segmented, no antennal club; antennal scape short, shorter than width of head, without projected setae; antennal sockets close to the posterior clypeal margin; eyes large, almost circular, placed in front of the middle of head**;** ocelli absent; mesothorax softly constricted in the middle; mesonotal groove deep, metapleural gland present; propodeum unarmed but with excavate posterior margin; propodeal spiracle circular; petiole in form of a thick erect scale; acidopore absent, apex of gaster only with transverse slit**.**

In Greece only one species.

17. *Dolichoderus quadripunctatus* (Linnaeus, 1771)

(Figs 17.1-6)

Formica quadripunctata Linnaeus, 1771: 541;
Dolichoderus quadripunctatus var. *unicolor* Ruzsky, 1905: 471;
Dolichoderus (*Hypoclinea*) *quadripunctatus* var. *kratochvili* Novák, 1941: 47.

Distribution in Greece: Aegean Islands (Legakis 2011: 23, Salata & Borowiec 2017: 295, Borowiec & Salata 2018 c: 5); **Crete** (**new data:** Rethymno unit, Rethymno city, 8m, 3 X 2015, 35.36 / 24.47); **Dodecanese** (Borowiec et al. 2021: 18; **new data:** Kos, Paleo Pili, 362 m, 7 VII 2015, 36.8357 / 27.19018; Kos, Pili, 78 m, 7 VII 2015, 36.84185 / 27.1557; Kos, Zia, 328 m, 7 VII 2015, 36.84555 / 27.20493; Kos, Zia-Ag. Dimitrios rd., 301 m, 8 VII 2015, 36.85047 / 27.21447); **Epirus** (Legakis 1983: 4, 2011: 23, Borowiec & Salata 2018 a: 6, Salata & Borowiec 2019 b: 100); **Ionian Islands** (Legakis 2011: 23, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 7); **Macedonia** (Forel 1886: clxvii, Petrov & Legakis 1996: 31, Legakis 2011: 23, Borowiec & Salata 2012: 491, Salata & Borowiec 2019 b: 104-105, 2022: 7; **new data:** Pieria, 2 km W of Panteleimonas, 305 m, 15 V 2019, 39.98563 / 22.59513); **Peloponnese** (Forel 1886: clxvii, Legakis 2011: 23, Borowiec & Salata 2017 b: 208, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b: 7); **Sterea Ellas** (Borowiec & Salata 2017 a: 2, Borowiec & Salata 2018 e: 7, Salata & Borowiec 2019 b: 105-106); **Thessaly** (Borowiec & Salata 2012: 491, Borowiec & Salata 2018 b: 225, Salata & Borowiec 2019 b: 107); **Thrace** (Bračko et al. 2016: 18).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Denmark; Egypt; France: Corsica, mainland; Georgia; Germany; Gibraltar; Greece; Hungary; Iran; Italy: mainland, Sardinia, Sicily; Liechtenstein; Lithuania; Luxembourg; Moldova; Monaco; Montenegro; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Switzerland; Turkey; Ukraine.

Description. Moderately large: HL: 0.770-0.902 (mean 0.826); HW: 0.698-0.794 (mean 0.746); SL: 0.619-0.683 (mean 0.649); EL: 0.178-0.235 (mean 0.212); ML: 1.04-1.21; MW: 0.46-0.54. **Color.** Mandibles, anterior margin and lateral branches of clypeus yellowish, rest of head black; mesosoma in pale specimens uniformly yellowish red to red, in dark specimens with brown spots, especially on sides of propodeum, occasionally mostly reddish brown with black mesonotal suture, petiolar scale from uniformly yellowish to mostly brown; gaster predominantly black , first and second tergite in anterolateral sides with large yellow spot of various size, occasionally spots on first tergite indistinctly diffused or reduced to a small reddish dot; antennae yellow, sometimes funicle slightly infuscate, coxa brown to black, trochanters and narrowed basal part of femora yellowish to yellowish brown, rest of femora brown to black, tibiae and tarsi yellow (Figs 17.1-6). **Head.** Almost circular, sides and occipital part rounded (Fig. 17.3). Clypeus with large central, subtriangular plate and narrow lateral wings, its anterior margin straight with shallow median concavity, sides concave, surface distinctly microreticulated, with short and sparse appressed hairs, often appears unhaired, anterior margin with a row of short setae and a pair of long erected setae with length up to 0.095. Head distinctly microreticulated and coarse and moderately dense foveolae, distance between punctures mostly smaller than puncture's diameter, with short

and sparse appressed pubescence, two pairs of moderately long erected setae on frontal lateral margins and a pair of long setae in crown area, ventral side in gular area with numerous erected setae (Fig. 17.3). Scape short, 0.84- 0.89 times as long as width of head, stout, clearly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments short, stout, first segment twice as long as wide and 1.8 times as long as second segment, third segment slightly shorter than second segment (Fig. 17.3). Eyes big, placed in frontolateral surface of head, circular and convex, 0.26 length of head. Mandibles large, microreticulate but without striation. **Mesosoma.** Elongate, 2.2-2.3 times as long as wide, dorsally and laterally distinctly microreticulated and very coarse and dense foveloae, foveola almost touching each other thus surface of mesosoma partly appears rugulose, without appressed pubescence lacking erected setae (Fig. 17.1). Dorsal profile of mesosoma with deep cleft between mesonotum and propodeum, propodeum with emarginate lateral and posterior margins and appears bidentate posteriorly (Fig. 17.2). **Waist and gaster.** Petiole with long basal stem and short and stout scale, apex truncate, anterior face smooth and shiny, posterior microreticulate, sides punctate. Gaster longer than mesosoma, tergites distinctly microreticulated but surface shiny, covered with short and sparse appressed pubescence, distance between hairs mostly twice wider than length of hair. First two gastral tergites lacking erected setae, third tergite at base with a pair of long erected setae and on sides with single seta, sternites without median keel. **Legs.** Moderately long and moderately stout, first segment of tarsi not longer than subsequent segments combined, surface covered with very short and very sparse appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne as in Figs 17.4-6.

Comparative remarks. A very distinct species. Its body structure with very coarse punctation of head, very deep mesonotal groove, propodeum in profile with sharply angulate posterior angles, and characteristic coloration with black head, red mesosoma and black gaster with white maculae at base of first two gastral tergites is unique combination of characters. In field, workers of *D. quadripunctatus* may appear similar to bicoloured minor workers of *Colobopsis truncata* which is often observed foraging on the same tree trunks or branches.

Biological notes. *Dolichoderus quadripunctatus* is an arboreal species, and occurs in damp and shady habitats, often near streams and rivers. Observed in stream valleys with plane and oak forests, old olive plantations, deep humid gorges with stream, roadsides in *Quercus ilex* forests, pastures with fig trees, roadsides with Mediterranean shrubs, gardens in mountain villages, rarely also in mountain pastures with shrubs. Workers usually penetrate trunk and leaves of trees and shrubs, forage surrounding fig and olive trees, large stones on stream banks and rock walls in gorges. Nests are constructed in various deciduous trees, occasionally in pine trees or in rock crevices close to streams. Nests usually are located in dead wood or under bark of stems and branches, sometimes in dry stems or in stems of large herbs. It prefers lowland and upland areas located at altitude between 1 and 860 m.

Genus *Linepithema* Mayr, 1866

Useful identification keys, revisions and taxonomic papers: Wetterer et al. 2009.

Diagnosis. Monomorphic, moderately large, ML below 1.2; mandibles with 12-18 teeth; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape elongate, longer than width of head, without projected setae; antennal sockets close to the posteri-

or clypeal margin; eyes large, almost circular, placed distinctly in front of the middle of head; ocelli absent; mesothorax softly constricted in the middle; metapleural gland present; propodeum unarmed; propodeal spiracle circular; pectinate tibial spurs on meso- and metatibiae; petiole in form of a narrow erect scale, slightly inclined anteriorly; acidopore absent, apex of gaster only with transverse slit**.**

In Greece only one invasive species.

18. *Linepithema humile* (Mayr, 1868)

(Figs 18.1-5)

Hypoclinea humilis Mayr, 1868: 164;
Iridomyrmex humilis subsp. *angulatus* Emery, 1894 b: 165;
Iridomyrmex humilis r. *platensis* Forel, 1912: 46;
Iridomyrmex humilis r. *platensis* var. *transiens* Forel, 1913 b: 242 unavailable name;
Iridomyrmex humilis st. *angulata* var. *pertaesta* Santschi, 1916: 390;
Iridomyrmex humilis st. *scotti* Santschi, 1919 b: 52;
Iridomyrmex humilis var. *arrogans* Chopard, 1921: 237;
Iridomyrmex humilis st. *angulata* var. *pulex* Santschi, 1923 b: 68;
Iridomyrmex humilis st. *breviscapa* Santschi, 1929 b: 306 (= *Iridiomyrmex humilis* r. *platensis* v. *breviscapa* Forel, 1914: 286 unavailable name);
Dorymyrmex gallardoi Brèthes, 1914: 95.

Distribution in Greece: Crete (Wetterer et al. 2009, Borowiec 2014, Salata et al. 2019 a: 14, Salata et al. 2020 a: 20); **Ionian Islands** (Salata et al. 2019 a: 14, Borowiec & Salata 2021 a: 8); **Peloponnese** (Borowiec & Salata 2013: 358, Salata & Borowiec 2017: 299, Salata et al. 2019 a: 14); **Sterea Ellas** (Salata et al. 2019 a: 14).

Distribution in Europe and Mediterranean Basin: Algeria; Austria; Azores; Belgium; Bulgaria; Czech Rep.; France: Corsica, mainland; Germany; Gibraltar; Greece; Ireland; Italy: mainland, Sicily, Sardinia; Madeira; Malta; Monaco; Morocco; Netherlands; Poland; Portugal; Serbia; Spain: Baleares, Canary Is., mainland; Turkey; United Arab Emirates; Yemen - cosmopolitan.

Description. Large: HL: 0.648-0.746 (mean 0.706); HW: 0,567-0.683 (mean 0.622); SL: 0.651-0.771 (mean 0.712); EL: 0.159-0.192 (mean 0.245); ML: 0.82-1.03; MW: 0.36-0.44. **Color.** Head and gaster yellowish grey to yellowish brown, mesosoma yellowish or whole body yellowish grey to yellowish brown, antennae and legs yellow (Figs 18.1-4). **Head.** Slightly elongate, 1.1-1.2 times as long as wide, on sides softly rounded, occipital corners rounded, occipital margin shallowly concave (Fig. 18.3). Clypeus with diffused microreticulation but shiny, trapezoidal, its anterior margin straight with shallow median concavity, sides concave, convergent posterad, posterior margin truncate, mostly without appressed hairs but with sparse but long subdecumbent to decumbent hairs, anterior margin with a row of long setae and few short setae, close to base a pair of long erected setae with length up to 0.111. Head with diffused microreticulation, shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head with 2-4 erected setae. Scape moderately elongate, 1.1- 1.2 times longer than width of head, very thin, only slightly widened from base to apex, its surface microreticulate but

shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.1 times as long as wide, second segment 1.1 times as long as first and 1.4 times as third segment, the rest of funicular segments clearly longer than broad (Fig. 18.3). Eyes big, placed in frontal surface of head, almost circular, 0.25 length of head. Mandibles long, without striation. **Mesosoma.** Elongate, 2.2-2.6 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, with very short and very sparse appressed pubescence. In lateral view pronotum and mesonotum only slightly convex, propodeum softly convex, mesonotal groove moderately deep (Figs 18.1, 2). Mesosomal dorsum lacking erected setae. **Waist and gaster.** Petiolar scale in form of small, thin scale, with rounded apical margin. Gaster shorter than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and moderately dense appressed pubescence. First two gastral tergites lacking erected setae, third tergite at base with a pair of long erected setae, sternites with median keel. **Legs.** Long and slim, first segment of tarsi longer than subsequent segments combined, surface covered with moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne not studied, male as in Fig. 18.5.

Comparative remarks. Distinct species. *Linepithema humile* is similar to the members of the genus *Tapinoma* but differs in eyes placed distinctly in front of the middle of head (in *Tapinoma* in the middle), clypeus without median emargination, only with a broad shallow concavity (in *Tapinoma* with median emargination) and petiolar scale prominent and well visible from above and in profile (in *Tapinoma* petiolar scale is very small, hidden under produced anteriorly first gastral tergite).

Biological notes. In Greece, invasive species noted only from tourist resorts. Ants were collected on ground in botanical garden, grassland and small garden in urban area.

Genus *Liometopum* Mayr, 1861

Useful identification keys, revisions and taxonomic papers: Del Toro et al. 2009.

Diagnosis. Polymorphic, with strongly marked size-variation; mandibles with 7-10 teeth along masticatory margin, 3-5 teeth along basal margin; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape short, shorter than width of head**;** antennal sockets close to the posterior clypeal margin; eyes large, almost circular, placed on frontal surface distinctly in front of the middle of head with 90-140 ommatidia; ocelli present in major workers; metanotal groove reduced to a suture with the mesonotum and propodeum forming a continuous uninterrupted surface. All surfaces covered in dense pubescence; metapleural gland present; propodeum unarmed; propodeal spiracle circular; single tibial spurs on meso- and metatibiae; petiole in form of a narrow erect scale, hidden under anterior slope of first gaster tergite; acidopore absent, apex of gaster only with transverse slit**.**

In Greece only one species.

19. *Liometopum microcephalum* (Panzer, 1798)

(Figs 19.1-4)

Formica microcephala Panzer, 1798: 1652;
Formica austriaca Mayr, 1853 a: 144.

Distribution in Greece: Aegean Islands (Forel 1889: 256, Finzi 1939: 157, Collingwood 1993: 195, Legakis 2011: 23, Salata & Borowiec 2017: 296-298); **Epirus** (Legakis 1983: 5, 2011: 23, Salata & Borowiec 2017: 296-298, Borowiec & Salata 2018 a: 7); **Ionian Islands** (Legakis 2011: 23, Borowiec & Salata 2014 a: 516, Salata & Borowiec 2017: 296-298, Salata & Borowiec 2019 b: 100, Borowiec & Salata 2021 a: 9; **new data:** Cephalonia, Ainos Mts, 1512 m, 15 VI 2021, 38.12594 / 20.68345, Cephalonia, Kapandriti vic. loc. 2, 160 m, 9 VI 2019, 38.11361 / 20.73201; Cephalonia, 800 m S of Kateleios, 20 m, 9 VI 2019, 38.07066 / 20.75329; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005); **Macedonia** (Legakis 2011: 23, Borowiec & Salata 2012: 511); **Peloponnese** (Legakis 1984: 86, 2011: 23, Borowiec & Salata 2017 b: 214, Borowiec & Salata 2021 b: 9); **Sterea Ellas** (Forel 1886: clxvii, Forel 1889: 256, Legakis 2011: 23, Borowiec & Salata 2017 a: 2); **Thessaly** (Legakis 2011: 23, Borowiec & Salata 2012: 511, Borowiec & Salata 2018: 231); **Thrace** (Bračko et al. 2016: 21).

Distribution in Europe and Mediterranean Basin: Albania; Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Georgia; Greece; Hungary; Iran; Israel; Italy: mainland, Sardinia, Sicily; Moldova; Montenegro; North Macedonia; Romania; Russia; Serbia; Slovakia; Slovenia; Switzerland; Turkey; Ukraine.

Description. Polymorphic, with strongly marked size-variation**:** the smallest worker HLmin: 0.825; HWmin: 0,810; SLmin: 0.683; EL: 0.174; MLmin: 1.04-1.03; MWmin: 0.346; the largest worker HLmax: 1.508; HWmax: 1,540; SLmax: 1.175; EL: 0.302; MLmax: 1.94-1.03; MWmax: 0.946. **Color.** Head bicolor, clypeus, anterior third of gena and antennal sockets yellowish to yellowish red, clypeus often with brown spot in the middle, rest of head brown to dark brown, mesosoma yellowish to yellowish red, pronotum sometimes with two small obscure spots of diffused borders, occasionally pronotum mostly brown or whole mesosoma partly obscure, petiolar scale and gaster dark brown to black, antennae from yellow to completely brown, often scapus darker than funicle, coxa and femora usually brown, tibiae pale brown and tarsi yellowish, often femora and tibiae dark brown and tarsi yellowish brown (Figs 19.1-4). **Head.** Stout, as long as wide or slightly wider than long, on sides softly rounded, occipital corners rounded, occipital margin distinctly concave. (Fig. 19.3) Clypeus with diffused microreticulation but shiny, trapezoidal, lateral lobes slightly pronounced anterad, anterior margin straight or in major workers with shallow median excavation, sides concave, in the middle with deep excavation for antennal scrobes, posterior margin rounded; Clypeus with moderately long and moderately dense appressed hairs not covering clypeal background, anterior margin with 2-4 long setae in the middle and a row of short setae laterally, oblique row of three long setae in front of antennal scrobes and 2-4 short setae laterally, anterior long setae with length up to 0.142. Head with subtle microreticulation, shiny, with moderately long and moderately dense appressed pubescence not covering head surface, with a row of long erected setae on sides of frons, and several long erected setae in centre of frons, interocular and ocellar area and occipital margin, gena with only few long erected setae, sides of head with very short semierect hairs, ventral side of head with numerous erected setae. Scape short, 0.76- 0.84 times as long as width of head, stout, distinctly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence, upper margin with moderately dense, short erected setae, ventral surface with very short erected setae. Funicular segments 1-3 elongate, 4-10 only slightly longer than wide, thin, first segment 2.5 times as long as wide, second segment 0.75 times as long as first and 1.3 times as third segment (Fig. 19.3). Eyes big, placed in frontal surface

of head, almost circular, 0.2 length of head. Mandibles stout, distinctly sculptured tending to form a striation. **Mesosoma.** Elongate, 2.1-2.3 times as long as wide, dorsally and laterally with diffused microreticulation, shiny, with moderately long to long and moderately dense and dense appressed pubescence, partly covering body surface, especially on pronotum. In lateral view mesosoma forms regular arch, without mesonotal groove only with mesonotal suture, propodeum with softly declivous posterior slope (Fig. 19.2). Pronotal dorsum with very long erected setae, the longest with length up to 0.286, metanotum anteriorly with short erected setae, posteriorly with a group of long setae but shorter than in pronotum, propodeum only with short erected setae anteriorly. **Waist and gaster.** Petiolar scale narrow, narrowed from base to narrowly rounded apex, on anterior surface with dense pubescence on posterior surface smooth and shiny. Gaster longer than mesosoma, tergites distinctly microreticulated, covered with long and dense appressed pubescence mostly. First tergite with few erected setae on anterior slope, and several setae close to posterior margin, second tergite with several erected setae anteriorly and posteriorly and third tergite with several setae on the whole surface, sternites with median keel. **Legs.** Moderately long and stout, first segment of tarsi not or slightly longer than subsequent segments combined, surface covered with moderately long and dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne not studied.

Comparative remarks. *Liometopum microcephalum* is a very distinct species. Its bicolored body and mesosoma regularly convex in profile are unique characters in the subfamily Dolichoderinae. In field, members of this species look like large, bicolored workers of *Lasius emarginatus* or *L. illyricus* but both members of the subfamily Formicinae well differ in conical propodeum and deep mesonotal groove.

Biological notes. In Greece, *L. microcephalum* inhabits mainly oak forests, olive plantations and stream valleys with plane forests. Few samples were collected in pastures with large oaks or oak shrubs, small gorge with oak shrubs, area near a small lake in a moist, shaded valley of a small creek, gardens in tourist resorts, mountain pastures with limestones rocks, only one sample was from coniferous forest. Most records are from low altitude, the highest locality was placed at altitude of 1078 m. This species often forms large agglomerations of thousands of workers foraging on litter, tree trunks and shrubs, but does not belong to a group of true army ants.

Genus *Tapinoma* Förster, 1850

Useful identification keys, revisions and taxonomic papers: Seifert 1984, 2012 b.

Diagnosis. Usually monomorphic; metanotal groove shallow; antennal segments 8, 11, 12; antennal club: absent to gradual; palp formula: 6,4; Total number of dentas 5-20(+); spur formula: 1 simple-pectinate, 1 simple-pectinate; Eyes with more than100 ommatidia; scrobes absent; pronotal spines, mesonotal spines, propodeal spines,petiolar spines: absen; monomorphic; metaplural gland present.

From Greece recorded four species, but occurrence of two more species is also possible.

A key to species of the genus *Tapinoma*

1. Emargination on clypeus deep and parallelsided or slightly divergent (Figs 20.3, 21.3, 23.3, 24.3) ..... 2.

—. Emargination on clypeus shallow, semicircular or triangular (Figs 22.3, 25.3) ..... 5.

2. Emargination on clypeus very deep, extending to 0.35-0.39 length of clypeus, parallelsided (Figs 23.3, 24.3). Larger species, HW of major workers 0.929-1.246 (mean 1.032). Male genitalia as on Figs 23.4, 5 and 24.7, 8) ..... 3.

—. Emargination on clypeus deep, extending to 0.30-0.34 length of clypeus, sides usually slightly divergent (Figs 20.3, 21.3). Smaller species, HW of major workers 0.714-0.936 (mean 0.833). Male genitalia as on Figs 20.7, 8 and 21.5, 6) ..... 4.

3. Small setae around median clypeal emargination not protruding the margin of the excision. Male genitalia as on Figs 24.7, 8. Known from both continental and island Greece .... ***T. simrothi* Krausse**, p. 50

—. Small setae around median clypeal emargination protruding the margin of the excision. Male genitalia as on Figs 23.4, 5. Invasive species, known only from Dodecanese ....***T. magnum* Mayr**, p. 48

4. Slightly smaller species, mean HW of the largest workers 0.758, not larger than 0.810. Male genitalia as on Figs 21.5, 6. No reliable records from Greece but occurrence in norther provinces is highly possible ..... ***T. erraticum* (Latreille)**, p. 45

—. Slightly larger species, mean HW of the largest workers 0.889, up to 0.936. Male genitalia as on Figs 20.7, 8. Common in whole Greece ..... ***T.* cf. *erraticum*_BALC**, p. 43

5. Male genitalia as on Figs 25.7, 8. Emargination on clypeus deeper with less divergent lateral margins. Gyne small, HL 0.802-0.873, HW 0.825-0.889, MW 0.889-0.936. Northern species not recorded from Greece but possible to occur in northern provinces .. ..***T. subboreale* Seifert**, p. 51

—. Male genitalia as on Figs 22.7, 8. Emargination on clypeus very shallow with more divergent lateral margins. Gyne large, HL 1.063-1.150, HW 1.174-1.254, MW 1.183-1.333. Southern species known only from Greek islands north to Ionian Islands ..... ***T. festae* Emery**, p. 47

20. *Tapinoma* cf. *erraticum*_BALC

(Figs 20.1-9)

Tapinoma erraticum auct., part.

Distribution in Greece (in all published records noted as *Tapinoma erraticum*): **Aegean Islands** (Legakis 2011: 23); **Crete** (Emery 1894: 11, Legakis 2011: 23, Borowiec & Salata 2012: 537, Salata & Borowiec 2017: 296-299, Salata et al. 2020 a: 18); **Cyclades** (Forel 1889: 256, Salata & Borowiec 2017: 296-299); **Dodecanese** (Forel 1889: 256, Legakis 2011: 23, Borowiec et al. 2021: 25); **Epirus** (Legakis 1983: 5, 2011: 23, Borowiec & Salata 2018 a: 9); **Ionian Islands** (Emery 1898: 125, Legakis 2011: 23, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2018 d: 8, Salata & Borowiec 2019 b: 100-104, 114, Borowiec & Salata 2021 a: 10; **new data:** Cephalonia, 2 km SW of Poros, 50 m, 18 VI 2021, 38.13659 / 20.75968; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005; Cephalonia, Skala-Poros rd., 12 VI 2019, 38.12872 / 20.79576; Lefkada, Kavalikefta beach, 57 m, 12 VI 2021, 38.75366 / 20.59056; Lefkada, Lefkada town, 4 m, 11 VI 2021, 38.82645

/ 20.71254); **Macedonia** (Borowiec & Salata 2012: 5, Salata & Borowiec 2019 b: 104, Borowiec & Salata 2022: 10); **Peloponnese** (Legakis 2011: 23, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2017: 220, Salata & Borowiec 2019 b: 115, Borowiec & Salata 2021 b: 12); **Sterea Ellas** (Legakis 1984: 86, 2011: 23, Borowiec & Salata 2012: 537, Borowiec & Salata 2018 e: 10, Borowiec & Salata 2021 b: 12); **Thessaly** (Borowiec & Salata 2012: 537, Borowiec & Salata 2018 b: 235, Salata & Borowiec 2019 b: 107); **Thrace** (Bračko et al. 2016: 28).

Distribution in Europe and Mediterranean Basin: Little known, without doubts known from Albania, Bulgaria, Slovenia, Greece and Turkey, probably wide spread in the Balkan Peninsula.

Description. Small to large, polymorphic: the largest workers: HL: 0.889-0.968 (mean 0.942); HW: 0.802-0.920 (mean 0.889); SL: 0.806-0.905 (mean 0.872); EL: 0.215-0.246 (mean 0.233); ML: 1.05-1.24; MW: 0.55-0.62; the smallest workers: HL: 0.679-0.755 (mean 0.712); HW: 0.571-0.635 (mean 0.595); SL: 0.619-0.679 (mean 0.656); EL: 0.163-0.183 (mean 0.173); ML: 0.82-0.91; MW: 0.38-0.43. **Color.** Body brown to black, gena often slightly paler than rest of head, yellowish brown, antennae and legs brown, coxa often slightly paler brown than femora, in pale specimens tibiae yellowish brown, tarsi always paler than femora, yellow to yellowish brown (Figs 20.1, 2). **Head.** In major workers approximately as long as wide, in minor workers 1.2 times as long as wide, widest in basal 1/3 length then softly converging anterad, occipital corners rounded, occipital margin concave (Fig. 20.3). Clypeus microreticulated but shiny, triangularly extended to the front, in the middle moderately deep emarginate to 0.30-0.34 length of clypeus, sides of the emargination usually concave and divergent, only occasionally parallel; sides of clypeus deeply concave, posterior margin rounded, surface covered with moderately dense appressed hairs, explanate anterior margin close to median emargination with one or two pairs of erected setae and few decumbent short setae partly extending behind margin of clypeus but usually not extending behind margins of median emargination. Head distinctly microreticulated but shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head lacking erected setae. Scape elongate, in major workers 0.9-1.0 in minor workers 1.1- 1.2 times as long as width of head, very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and moderately dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.4 times as long as wide and 1.4 times as long as second segment which is 1.7 times as long as wide, the rest of funicular segments clearly longer than broad (Fig. 20.3). Eyes big, placed in the middle of frontal surface of head, almost circular, 0.24-0.25 length of head. Mandibles long, without striation, teeth of masticatory margin gradually smaller posterad. **Mesosoma.** Elongate, 1.8-2.1 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, with short and moderately dense appressed pubescence. In lateral view pronotum and mesonotum regularly convex, propodeum forms obtuse angle, mesonotal groove moderately deep. Mesosomal dorsum lacking erected setae (Fig. 20.2). **Waist and gaster.** Petiolar scale small, thin, hidden under protruding anterad anterior face of first gastral tergite. Gaster longer than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and dense appressed pubescence, first three tergites lacking erected setae, sternites with median keel. **Legs.** Moderately long, tibiae distinctly widened from base to apex, mid and hind tibiae with very long, sharp apical spur, first segment of tarsi longer than subsequent segments combined, surface covered with

moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gynes moderately large (Figs 20.4-6): HL: 0.937-0.968 (mean 0.949); HW: 0.952-0.984 (mean 0.965); SL: 0.857-0.889 (mean 0.866); ML: 1.73-1.86; MW: 0.94-1.05; HL/HW: 0.971-0,992 (mean 0.983); SL/HW: 0.871-0.921 (mean 0.8973); ML/MW: 1.755-1.866 (mean 1.814).

Male as in Fig. 20.9, male genitalia as in Figs 20.7, 8.

Comparative remarks. *Tapinoma* cf. *erraticum*_BALC and *T. erraticum* form a complex of species with median emargination of clypeus intermediate in depth between shallowly emarginate *T. festae* and *T. subboreale* and deeply emarginate *T. magnum* and *T. simrothi*. *Tapinoma subboreale* differs also in very small gynes while *T. festae*, *T. magnum* and *T. simrothi* differ in distinctly larger gynes. *Tapinoma erraticum* is the most similar and the best distinguishing character is structure of male genitalia (Figs 20.7, 8 and 21.5, 6). The difference in size of the largest workers is visible in nest samples, in *T.* cf. *erraticum*_BALC HL = 0.889-0.968 (mean 0.942) while in *T. erraticum* 0.794-0.865 (mean 0.844). *Tapinoma* cf. *erraticum*_BALC is common in the whole Greece while *T. erraticum* has no reliable records from Greece. But its occurrence in north Balkan countries suggests its possible occurrence in norther part of Greece.

Biological notes. *Tapinoma* cf. *erraticum*_BALC is a thermophilous species, it prefers strongly sun-exposed habitats. It was noted from mountain platos with limestones rocks, luminous oak and pine forests, pastures, shrubs on roadsides, stream valleys with plane trees, old olive plantations. It is common in gardens and grasslands in towns and tourist resorts. Nests are usually located under stones. In northern Greece most records of this species are from sea level to mid altitude of 1000 m, in southern Greece this species is common also at high altitude in mountains, the highest locality comes from Psiloritis Mts. on Crete placed at altitude of 1950 m.

21. *Tapinoma erraticum* (Latreille, 1798)

(Figs 21.1-7)

Formica erratica Latreille, 1798: 44;
Formica caerulescens Losana, 1834: 314;
Formica glabrella Nylander, 1849: 38;
Tapinoma collina Förster, 1850 a: 43;
Tapinoma erraticum var. *bononiensis* Emery, 1925 b: 55;
Tapinoma breve Emery, 1925 b: 60;
Tapinoma tauridis Emery, 1925 b: 59;
Tapinoma erraticum var. *platyops* Emery, 1925 b: 56;
Tapinoma tauridis subsp. *transcaucasica* Karavaiev, 1927: 337 (= *Tapinoma simrothi* subsp. *karavaievi* var. *transcaucasica* Karavaiev, 1926: 187 unavailable name).

Distribution in Greece: There is no reliable records of this species from Greece but its presence in northern part of Greece is highly possible. All historical and verified records of *T. erraticum* from Greece concern *Tapinoma* cf. *erraticum*_BALC.

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia;

Czech Rep.; Cyprus; Egypt; France: Corsica, mainland; Georgia; Germany; Gibraltar; Hungary; Iran; Israel; Italy: mainland, Sardinia, Sicily; Liechtenstein; Lithuania; Luxembourg; Madeira; Malta; Moldova; Monaco; Montenegro; Netherlands; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, Canary Is., mainland; Sweden; Switzerland; Turkey; Ukraine. Records from the Balkan Peninsula, especially from its southern part, need verification in great probability they concern *Tapinoma* cf. *erraticum*_BALC.

Description. Small to large, polymorphic but with intermediate forms between the smallest and the largest workers. The largest workers: HL: 0.794-0.873 (mean 0.844); HW: 0.714-0.800 (mean 0.758); SL: 0.786-0.810 (mean 0.802); EL: 0.198-0.209 (mean 0.204); ML: 0.97-1.06; MW: 0.52-0.53; the smallest workers: HL: 0.635-0.746 (mean 0.706); HW: 0.516-0.663 (mean 0.598); SL: 0.587-0.714 (mean 0.665); EL: 0.175-0.190 (mean 0.182); ML: 0.76-0.92; MW: 0.40-0.44. **Color.** Body dark brown to black, antennae and legs brown, coxa sometimes slightly paler brown than femora, in pale specimens tibiae yellowish brown, tarsi always paler than femora, yellow to yellowish brown (Figs 21.1-4). **Head.** In major workers 1.1 times as long as wide, in minor workers 1.2 times as long as wide, widest in basal 1/3 length then softly converging anterad, occipital corners rounded, occipital margin concave (Fig. 21.3). Clypeus microreticulated but shiny, triangularly extended to the front, in the middle deep emarginate to 0.27-0.32 length of clypeus, sides of the emargination usually concave and divergent, only occasionally parallel; sides of clypeus deeply concave, posterior margin rounded, surface covered with moderately dense appressed hairs, explanate anterior margin close to median emargination with one, occasionally two pairs of erected setae and few decumbent short setae partly extending behind margin of clypeus but usually not extending behind margins of median emargination. Head distinctly microreticulated but shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head lacking erected setae. Scape moderately elongate, in major workers as long as width of head, in minor workers 1.1- 1.2 times as long as width of head, very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and moderately dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.1-2.2 times as long as wide and 1.5-1.6 times as long as second segment which is 1.5 times as long as wide, the rest of funicular segments clearly longer than broad (Fig. 21.3). Eyes big, placed in the middle of frontal surface of head, almost circular, 0.24-0.26 length of head. Mandibles long, without striation, teeth of masticatory margin gradually smaller posterad. **Mesosoma.** Elongate, 1.9-2.1 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, with short and dense appressed pubescence. In lateral view pronotum and mesonotum regularly convex, propodeum forms obtuse angle, mesonotal groove deep. Mesosomal dorsum lacking erected setae (Fig. 21.2). **Waist and gaster.** Petiolar scale small, thin, hidden under protruding anterad anterior face of first gastral tergite. Gaster longer than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and dense appressed pubescence, first three tergites lacking erected setae, sternites with median keel. **Legs.** Moderately long, tibiae distinctly widened from base to apex, mid and hind tibiae with very long, sharp apical spur, first segment of tarsi longer than subsequent segments combined, surface covered with moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Male as in Fig. 21.7, male genitalia as in Figs 21.5, 6.

Comparative remarks. *Tapinoma* cf. *erraticum*_BALC and *T. erraticum* form a complex of species with median emargination of clypeus intermediate in depth between shallowly emarginate *T. festae* and *T. subboreale* and deeply emarginate *T. magnum* and *T. simrothi*. For distinguishing characters see comparative remarks under *Tapinoma* cf. *erraticum*_BALC.

Biological notes. There are no confirmed records of this species from Greece. In neighboring countries it was noted from strongly sun-exposed, very dry to moist open habitats. Nests usually located under stones.

22. *Tapinoma festae* Emery, 1925

(Figs 22.1-9)

Tapinoma simrothi subsp. *festae* Emery, 1925 b: 51.

Distribution in Greece: Aegean Islands (Collingwood 1993: 195, Legakis 2011: 24, Salata & Borowiec 2017: 296); **Crete** (Emery 1925: 58 - as *Tapinoma israelis*, Legakis 2011: 24, Salata et al. 2020 a: 19); **Cyclades** (**new data:** above Eggares, 60 m, 3 VII 2016, 37.116 / 25.4447; Naxos, Kouros of Milonas, 200 m, 3 VII 2016, 37.0847 / 25.4501); **Dodecanese** (Emery 1925: 58 - as *Tapinoma simrothi festae*, Legakis 2011: 24, Borowiec et al. 2021: 25); **Ionian Islands** (Collingwood 1993: 195, Legakis 2011: 24, Salata & Borowiec 2017: 296 – as *Tapinoma madeirense*, Salata & Borowiec 2019 b: 100-104).

Distribution in Europe and Mediterranean Basin: Greece; Turkey.

Description. Small to moderately large, polymorphic but with intermediate forms between the smallest and the largest workers: the largest workers: HL: 0.968-1.031 (mean 0.991); HW: 0.944-1.033 (mean 0.984); SL: 0.933-0.971 (mean 0.954); EL: 0.254-0.257 (mean 0.256); ML: 1.26-1.35; MW: 0.62-0.71; the smallest workers: HL: 0.738-0.928 (mean 0.808); HW: 0.619-0.873 (mean 0.707); SL: 0.689-0.827 (mean 0.736); EL: 0.198-0.235 (mean 0.209); ML: 0.89-1.13; MW: 0.43-0.57. **Color.** Body brown to black, gena often slightly paler than resto head, yellowish brown, antennae and legs brown, coxa often slightly paler brown than femora, in pale specimens tibiae yellowish brown, tarsi always paler than femora yellow to yellowish brown (Figs 22.1-4). **Head.** In major workers approximately as long as wide, in minor workers 1.1-1.2 times as long as wide, widest in basal 1/3 length then softly converging anterad, occipital corners rounded, occipital margin concave (Fig. 22.3). Clypeus microreticulated but shiny, triangularly extended to the front, in the middle moderately emarginate to 0.14-0.18 length of clypeus, shape of emargination semicircular to slightly triangular; sides of clypeus deeply concave, posterior margin rounded, surface covered with dense appressed hairs, explanate anterior margin close to median emargination with one or two pairs of erected setae and 2-4 long and several decumbent short setae mostly extending behind margin of clypeus but usually not extending behind margins of median emargination. Head distinctly microreticulated but shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head with0ut erected setae). Scape moderately elongate, in major workers 0.9-1.0 in minor workers 1.0- 1.1 times as long as width of head, very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and moderately dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.3 times as long as wide and 1.3 times as long as second segment which is 1.8 times as long as wide, the rest of

funicular segments s longer than broad (Fig. 22.3). Eyes big, placed in the middle of frontal surface of head, almost circular, 0.26 length of head. Mandibles long, without striation, teeth of masticatory margin gradually smaller posterad. **Mesosoma.** Elongate, 1.8-2.1 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, sometimes sides of propodeum with slightly dull background, with short and moderately dense appressed pubescence. In lateral view pronotum and mesonotum regularly convex, propodeum forms obtuse angle, mesonotal groove moderately deep. Mesosomal dorsum lacking erected setae (Fig. 22.2). **Waist and gaster.** Petiolar scale small, thin, hidden under protruding anterad anterior face of first gastral tergite. Gaster longer than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and dense appressed pubescence, first three tergites lacking erected setae, sternites with median keel. **Legs.** Moderately long, tibiae distinctly widened from base to apex, mid and hind tibiae with very long, sharp apical spur, first segment of tarsi longer than subsequent segments combined, surface covered withmoderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gynes large (Figs 22.5, 6): HL: 1.063-1.150 (mean 1.097); HW: 1.174-1.254 (mean 1.220); SL: 0.949-1.012 (mean 0.978); ML: 2.07-2.17; MW: 1.18-1.33; HL/HW: 0.860-0,941 (mean 0.899); SL/HW: 0.787-0.808 (mean 0.802); ML/MW: 1.625-1.747 (mean 1.681).

Male as in Fig. 22.9, male genitalia as in Figs 22.7, 8.

Comparative remarks. *Tapinoma festae* and *T. subboreale* form a complex of species with shallow and broad median emargination of clypeus. Workers are very difficult to determine based only on external characters and the best distinguishing character is structure of male genitalia (see Figs 22.7, 8 and 25.5, 7). Additionally, gynes well separate both species, in *T. festae* they are large with HL 1.063-1.150, HW 1.174-1.254, MW 1.183-1.333 while in *T. subboreale* gynes are the smallest within the Greek representatives of the genus *Tapinoma* with HL 0.802-0.873, HW 0.825-0.889, MW 0.889-0.936. Both species are also separated geographically, *T. festae* is southern species known only from islands north to the southern Ionian Islands. While *T. subboreale* is northern species not recorded from Greece but known from north Balkan countries. Thus its occurrence in northern provinces of Greece is possible.

Biological notes. *Tapinoma festae* is a thermophilous species and it prefers strongly sun-exposed habitats. It was noted from sandy beach areas, oak and pine forests, olive plantations, shores of artificial lakes, sandy river banks, ruderal places in tourist resorts and rarely in shaded valleys with small creeks. Nest were found under stones. In northern Greece, most its records are from low altitude up to 500 m, in southern Greece *T. festae* is common also at high altitude in mountains, the highest locality was from Psiloritis Mts. on Crete placed at altitude of 1650 m.

23. *Tapinoma magnum* Mayr, 1861

(Figs 23.1-6)

Tapinoma magnum Mayr, 1861: 41.

Distribution in Greece: Dodecanese (C. Lebas, letter information).

Distribution in Europe and Mediterranean Basin: Algeria; Belgium; France; Germany; Italy: mainland, Sardinia; Morocco; Netherlands; Spain; Tunisia.

Description. Small to large, polymorphic: the largest workers: HL: 1.048-1.238 (mean 1.138); HW: 1.007-1.246 (mean 1.116); SL: 0.952-1.105 (mean 1.038); EL: 0.254-0.289

(mean 0.268); ML: 1.35-1.47; MW: 0.67-0.79; the smallest workers: HL: 0.778-0.857 (mean 0.831); HW: 0.683-0.781 (mean 0.747); SL: 0.706-0.811 (mean 0.770); EL: 0.198-0.209 (mean 0.205); ML: 0.92-1.03; MW: 0.43-0.52. **Color.** Body brown to black, gena often slightly paler than rest of head, yellowish brown, antennae and legs brown to almost black, coxa often slightly paler brown than femora, in pale specimens tibiae yellowish brown, tarsi always paler than femora yellow to yellowish brown (Figs 23.1-3). **Head.** In major workers approximately as long as wide, in minor workers 1.1 times as long as wide, widest in basal 1/3 length then softly converging anterad, occipital corners rounded, occipital margin concave (Fig. 23.3). Clypeus microreticulated but shiny, triangularly extended to the front, in the middle deeply emarginate to 0.30-0.35 length of clypeus, sides of the emargination usually parallel; sides of clypeus deeply concave, posterior margin rounded, surface covered with moderately dense appressed hairs, explanate anterior margin close to median emargination with one or two pairs of erected setae and few decumbent long and short setae partly extending behind margin of clypeus and usually extending behind margins of median emargination. Head distinctly microreticulated but shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head with0ut erected setae. Scape moderately elongate, in major workers 0.9 times, in minor workers as long as width of head, very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and moderately dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.7-2.8 times as long as wide and 1.5 times as long as second segment which is 1.9 times as long as wide, the rest of funicular segments clearly longer than broad (Fig. 23.3). Eyes big, placed in the middle of frontal surface of head, almost circular, 0.24-0.25 length of head. Mandibles long, without striation, teeth of masticatory margin gradually smaller posterad. **Mesosoma.** Elongate, 1.9-2.2 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, with short and moderately dense appressed pubescence. In lateral view pronotum and mesonotum regularly convex, propodeum forms obtuse angle, mesonotal groove moderately deep. Mesosomal dorsum lacking erected setae (Figs 23.1, 2). **Waist and gaster.** Petiolar scale small, thin, hidden under protruding anterad anterior face of first gastral tergite. Gaster longer than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and dense appressed pubescence, first three tergites lacking erected setae, sternites with median keel. **Legs.** Moderately long, tibiae distinctly widened from base to apex, mid and hind tibiae with very long, sharp apical spur, first segment of tarsi longer than subsequent segments combined, surface covered with moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gynes large : HL: 1.143; HW: 1.174; SL: 0.952; ML: 2.04; MW: 1.10; HL/HW: 0.9974; SL/HW: 0.811; ML/MW: 1.863.

Male as in Fig. 23.6, male genitalia as in Figs 23.4, 5.

Comparative remarks. *Tapinoma magnum* and *T. simrothi* form a complex of species with deep, parallelsided median emargination of clypeus. They are difficult to determination using only external characters and the best distinguishing character is structure of male genitalia (see Figs 23.4, 5 and 24.7, 8). *Tapinoma magnum* has more setose anterior part of clypeus with longer marginal setae, some small setae reaching behind lateral and posterior margin of median emargination while in *T. simrothi* none or at most 2 of short setae reach

behind the margin of median emargination. *Tapinoma magnum* is an invasive species in Greece, it was recorded only from tourist area in one island of the Dodecanese Archipelago. While *T. simrothi* is widespread in continental and insular Greece, most likely sympatric with *T. magnum* on Dodecanese.

Biological notes. *Tapinoma magnum* is a thermophilous species, it prefers strongly sun-exposed, open habitats as sandy beach areas, rocky coasts of natural and artificial lakes, sandy and gravely river banks, gardens and ruderal places in tourist resorts. Nests are usually under stones. In Greece, it was noted only from a coastal area in one of Dodecanese islands.

24. *Tapinoma simrothi* Krausse, 1911

(Figs 24.1-9)

Tapinoma erraticum var. simrothi Krausse, 1911: 18;
Tapinoma simrothi var. *phoenicea* Emery, 1925 b: 50.

Distribution in Greece: Aegean Islands (Legakis 2011: 24; **Crete** (Legakis 2011: 24, Borowiec & Salata 2012: 538, Salata et al. 2020 a: 19); **Cyclades** (Finzi 1928: 790 - as *Tapinoma simrothi* var. *phoenicea*, Finzi 1939: 157 - as *Tapinoma simrothi* var. *phoenicea*, Legakis 2011: 24; **new data:** Naxos, Naxos City, 1 m, 29 VI 2016, 37.0938 / 25.3719); **Dodecanese** (Emery 1925: 51 - as *Tapinoma simrothi* var. *phoenicea*, Menozzi 1943: 4 - *Tapinoma simrothi* var. *phoenicia*, Legakis 2011: 24, Borowiec & Salata 2012: 538, Salata & Borowiec 2015 a: 68-69, Borowiec et al. 2021: 25); **Macedonia** (Legakis 2011: 24); **Peloponnese** (Emery 1925: 51 - as *Tapinoma simrothi* var. *phoenicea*, Finzi 1939: 157 - as *Tapinoma simrothi* var. *phoenicea*, Borowiec & Salata 2017: 220); **Thessaly** (Legakis 2011: 24, Borowiec & Salata, 2018: 236); **Thrace** (Bračko et al. 2016: 24).

Distribution in Europe and Mediterranean Basin: Algeria; Armenia; Cyprus; Egypt; France: mainland; Gibraltar; Greece; Italy: mainland; Sardinia; Sicily; Kuwait; Libya; Malta; Montenegro; Morocco; Oman; Portugal; Saudi Arabia; Serbia; Spain: Baleares, mainland; Turkey; United Arab Emirates; Yemen.

Description. Small to moderately large, polymorphic. The largest workers: HL: 1.016-1.048 (mean 1.036); HW: 0.929-1.003 (mean 0.969); SL: 0.905-0.968 (mean 0.933); EL: 0.222-0.253 (mean 0.239); ML: 1.18-1.43; MW: 0.60-0.68; the smallest workers: HL: 0.683-0.730 (mean 0.707); HW: 0.540-0.627 (mean 0.582); SL: 0.635-0.682 (mean 0.659); EL: 0.178-0.190 (mean 0.184); ML: 0.79-0.90; MW: 0.38-0.41. **Color.** Body brown to black, gena sometimes slightly paler than rest of head, yellowish brown, antennae and legs brown, coxa often slightly paler brown than femora, in pale specimens tibiae yellowish brown, tarsi always paler than femora, yellow to yellowish brown (Figs 24.1-4). **Head.** In major workers approximately as long as wide, in minor workers 1.2 times as long as wide, widest in basal 1/3 length then softly converging anterad, occipital corners rounded, occipital margin concave (Fig. 24.3). Clypeus microreticulated but shiny, triangularly extended to the front, in the middle deeply emarginate to 0.35-0.39 length of clypeus, sides of the emargination usually concave and divergent, only occasionally parallel; sides of clypeus deeply concave, posterior margin rounded, surface covered with moderately dense appressed hairs, explanate anterior margin close to median emargination with one or two pairs of erected setae and few decumbent short setae partly extending behind margin of clypeus but usually not extending behind

margins of median emargination. Head distinctly microreticulated but shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head with0ut erected setae. Scape moderately elongate, in major workers 1.0-1.1, in minor workers 1.1- 1.2 times as long as width of head, very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and moderately dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.5 times as long as wide and 1.4 times as long as second segment which is 1.7 times as long as wide, the rest of funicular segments clearly longer than broad (Fig. 24.3). Eyes big, placed in the middle of frontal surface of head, almost circular, 0.23-0.26 length of head. Mandibles long, without striation, teeth of masticatory margin gradually smaller posterad. **Mesosoma.** Elongate, 1.9-2.2 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, with short and moderately dense appressed pubescence. In lateral view pronotum and mesonotum regularly convex, propodeum forms obtuse angle, mesonotal groove moderately deep. Mesosomal dorsum lacking erected setae (Fig. 24.2). **Waist and gaster.** Petiolar scale small, thin, hidden under protruding anterad anterior face of first gastral tergite. Gaster longer than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and dense appressed pubescence, first three tergites lacking erected setae, sternites with median keel. **Legs.** Moderately long, tibiae distinctly widened from base to apex, mid and hind tibiae with very long, sharp apical spur, first segment of tarsi longer than subsequent segments combined, surface covered with moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gynes large (Figs 24.4-6): HL: 1.111-1.143 (mean 1.131); HW:1.144-1.222 (mean 1.176); SL: 0.971-1.016 (mean 1.003); ML: 2.10-2.13; MW: 1.16-1.22; HL/HW: 0.923-0,996 (mean 0.963); SL/HW: 0.831-0.888 (mean 0.853); ML/MW: 1.724-1.823 (mean 1.781).

Male as in Fig. 24.9, male genitalia as in Figs 24.7, 8.

Comparative remarks. *Tapinoma magnum* and *T. simrothi* form a complex of species with deep, parallelsided median emargination of clypeus. They are difficult to separate based only on external characters and the best distinguishing character is structure of male genitalia (see Figs 23.4, 5 and 24.7, 8). For other distinguishing characters see comparative remarks in *Tapinoma magnum*.

Biological notes. *Tapinoma simrothi* is a thermophilous species, it prefers strongly sun-exposed habitats especially with saline soil. It was noted from seashores and salines, pastures with limestones rocks and ruderal places in tourist resorts. Most localities are close to towns and tourist resorts and this suggests that perhaps it is a species introduced in historical times to Greece and it originates from Asia Minor or the Middle East. Its colonies were observed on the cliff walls and in the soil of salt pans. Most records are from low altitude up to 200 m, only in mountains of Peloponnese colonies were observed at higher altitude up to 1070 m.

25. *Tapinoma subboreale* Seifert, 2012

(Figs 29.1-9)

Tapinoma subboreale Seifert, 2012 b: 143.

Distribution in Greece: It has not been recorded from Greece but its occurrence in Bulgaria suggests that it can be found in northern provinces, especially in mountains.

Distribution in Europe and Mediterranean Basin: Albania; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; France: Corsica, mainland; Germany; Greece: mainland; Hungary; Italy: mainland; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Very small to large, polymorphic: the largest workers: HL: 0.806-817 (mean 0.812); HW: 0.698-0.703 (mean 0.701); SL: 0.746-0.748 (mean 0.747); EL: 0.198-0.219 (mean 0.209); ML: 1.01-1.02; MW: 0.49-0.51; the smallest workers: HL: 0.635-0.671 (mean 0.649); HW: 0.527-0.556 (mean 0.543); SL: 0.590-0.632 (mean 0.614); EL: 0.160-0.167 (mean 0.162); ML: 0.75-0.79; MW: 0.39-0.40. **Color.** Body brown to black, gena often slightly paler than res to head, yellowish brown, antennae and legs brown, coxa often slightly paler brown than femora, in pale specimens tibiae yellowish brown, tarsi always paler than femora yellow to yellowish brown (Figs 25.1-4). **Head.** In major workers 1.1, in minor workers 1.1-1.2 times as long as wide, widest in basal 1/3 length then softly converging anterad, occipital corners rounded, occipital margin concave (Fig. 25.3). Clypeus microreticulated but shiny, triangularly extended to the front, in the middle moderately emarginate to 0.18-0.25 length of clypeus, shape of emargination semicircular to slightly triangular**;** sides of clypeus deeply concave, posterior margin rounded, surface covered with moderately dense appressed hairs, explanate anterior margin close to median emargination with one pair of erected setae and few decumbent short setae partly extending behind margin of clypeus but usually not extending behind margins of median emargination. Head distinctly microreticulated but shiny, with moderately long and moderately dense appressed pubescence not covering head surface, erected setae absent, ventral side of head with0ut erected setae. Scape moderately elongate, in both major and minor workers 1.0- 1.1 times as long as width of head, very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and moderately dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.9-2.0 times as long as wide and 1.5-1.6 times as long as second segment which is 1.4-1.5 times as long as wide, the rest of funicular segments s longer than broad (Fig. 25.3). Eyes big, placed in the middle of frontal surface of head, almost circular, 0.25-0.26 length of head. Mandibles long, without striation, teeth of masticatory margin gradually smaller posterad. **Mesosoma.** Elongate, 1.9-2.1 times as long as wide, dorsally and laterally distinctly microreticulated but shiny, sometimes sides of propodeum with slightly dull background, with short and moderately dense appressed pubescence . In lateral view pronotum and mesonotum regularly convex, propodeum forms obtuse angle, mesonotal groove moderately deep. Mesosomal dorsum lacking erected setae (Fig 25.2). **Waist and gaster.** Petiolar scale small, thin, hidden under protruding anterad anterior face of first gastral tergite. Gaster longer than mesosoma, tergites distinctly microreticulated sometimes tending to form transverse sculpture, surface shiny, covered with moderately long and dense appressed pubescence, first three tergites lacking erected setae, sternites with median keel. **Legs.** Moderately long, tibiae distinctly widened from base to apex, mid and hind tibiae with very long, sharp apical spur, first segment of tarsi longer than subsequent segments combined, surface covered with moderately long and moderately dense appressed hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gynes very small (Figs 25.4-6): HL: 0.802-0.873 (mean 0.839); HW: 0.825-0.889 (mean 0.858); SL: 0.730-0.799 (mean 0.764); ML: 1.50-1.54; MW: 0.89-0.94; HL/HW:

0.972-0,982 (mean 0.977); SL/HW: 0.885-0.899 (mean 0.890); ML/MW: 1.628-1.699 (mean 1.671).

Male as in Fig. 25.9, male genitalia as in Figs 25.7, 8.

Comparative remarks. *Tapinoma subboreale* is the smallest species with the smallest gynes within Greek *Tapinoma*. Shallow, semicircular to triangular median emargination on clypeus places this species only close to *T. festae* but it differs distinctly in structure of male genitalia (see Figs 22.7, 8 and 25.7, 8). For other distinguishing characters see comparative remarks under *Tapinoma festae*. Both species are separated geographically, *T. festae* is southern species known only from islands north to the southern Ionian Islands while *T. subboreale* is northern species so far not recorded from Greece. However, its confirmed presence in north Balkan countries suggests that it can occur in northern provinces of Greece.

Biological notes. There is no confirmed data of this species from Greece. In other countries noted as thermophilous species, it prefers sun-exposed, sandy and gravelly ground. Noted from xerothermous grasslands, gravel quarries, light pine forests and dirty heathland. Nest were found under stones.

Subfamily Formicinae

In Greece 14 genera with at least 108 species.

A key to genera

1. Antennae 11-segmented ..... 2.

—. Antennae 12-segmented ..... 5.

2. Propodeum unarmed, rounded in profile or squamiform, dorsal margin of petiole not emarginate (Figs 51.2, 123.2) ..... 3.

—. Propodeum bispinose or bituberculate, dorsal margin of petiole emarginated (Figs 112.2, 113.2, 114.2, 10, 115.2, 6, 116.2) ..... ***Lepisiota*** **Santschi**, p. 225

3. Eyes large (Figs 27.4, 123.3, 124.3) …….. 4.

—. Eyes almost completely reduced (Figs 26.2, 3) ..... ***Acropyga*** **Roger**, p. 55

4. In dorsal view the mesonotum separated from the metanotum by a conspicuous transverse groove or impression, so that the metanotum forms a distinctly isolated sclerite on the dorsum (Fig. 123.1). Very small ants, legs and antennae short, hind femora not extending behind apex of gaster (Figs 123.1, 2) ..... ***Plagiolepis*** **Mayr**, p. 245

—. In dorsal view the mesonotum fused with the metanotum, the metanotum does not form an isolated sclerite on the dorsum (Fig. 27.1). Moderately large ants with very elongate legs and antennae, hind femora distinctly extending behind apex of gaster (Figs 27.1, 2) .... ***Anoplolepis*** **Santschi**, p. 56

5. Antennal insertions placed distinctly behind clypeal margin (Figs 29.6, 31.6, 50.9, 65.5) ..... 6.

—. Antennal insertions placed close to clypeal margin (Figs 63.4, 67.4, 85.4, 114.4, 120.4, 122.4, 123.4, 128.4) ..... 7.

6. Frontal carinae straight, slightly converging to the front (Fig. 65.5). In major workers head truncate anteriorly, plug-like (Fig. 65.6) ..... ***Colobopsis* Mayr**, p. 149

—. Frontal carinae arched, distinctly converging to the front (Figs 28.5, 31.6, 43.6, 50.9). In major workers head not modified (Figs 28.6, 38.6, 43.6, 50.9) ….. ***Camponotus* Mayr**, p. 57

7. Mandibles not modified, masticatory margin with distinct denticles (Figs 61.3, 66.4, 81.3, 121.4, 122.4, 132.4) ..... 8.

—. Mandibles modified, long and sickle-shaped, masticatory margin only minutely serrate (Fig. 128.4) ..... ***Polyergus* Latreille**, p. 253

8. Propodeal spiracle round to oval (Figs 67.2, 85.2, 120.2). Legs short to moderately long, HTL/CW < 1.50 ..... 9.

—. Propodeal spiracle elongate (Figs 61.14, 63.2, 64.2). Legs very long, HTL/CW > 1.50 .... ***Cataglyphis*** Förster, p. 138

9. Mesosoma not or only slightly constricted between mesonotum and propodeum (Figs 72.2, 83.2, 120.2, 122.2, 130.2). Ocelli in workers usually present, occasionally absent or rudimental ..... 10.

—. Mesosoma distinctly constricted between mesonotum and propodeum (Fig. 129.2). Ocelli in workers absent ..... ***Prenolepis* Mayr**, p. 255

10. Eyes situated at or in front of the midlength of the sides of head (Figs 120.3, 122.4) .....11.

—. Eyes situated distinctly behind the midlength of the sides of head (Figs 76.3, 86.6, 130.3) ..... 12.

11. Mandible unsculptured, with 6-7 teeth. Scape short, less than 1.5 times length of head (Fig. 120.3), body stout (Fig. 120.2) ..... ***Nylanderia* Emery**, p. 241

—. Mandible with longitudinal striation and 5 teeth. Scape long, more than 1.5 times length of head (Fig. 122.3), body elongate (Fig. 122.2) ..... ***Paratrechina* Motschoulsky**, p. 244

12. Apical tooth of mandible subequal to preapical tooth. Workers without distinct castes or with workers of different sizes but with gradual variability ….....…. 13.

—. Apical tooth of mandible distinctly longer than preapical tooth. Workers polymorphic with distinct major caste (Figs 130.1, 2 and 130.5, 6) …….. ***Proformica* Ruzsky**, p. 257

13. Hind coxa widely separated. Ortificie of propodeal spiracle circular or broadly oval. Mesosoma rather short and high, usually densely pubescent (Fig. 90.2). Size usually smaller, total length 2.5-5.0 mm .... ***Lasius* Fabricius and *Metalasius* Boudinot, Borowiec & Prebus**, p. 183

—. Hind coxa close together. Ortificie of propodeal spiracle elongate to sli-like. Mesosoma rather long and slender, usually sparsely pubescent (Fig. 75.2). Size larger, total length 4.5-9.0 mm ..... ***Formica* Linneaus**, p. 153

Genus *Acropyga* Roger, 1862

Diagnosis. Monomorphic; mandibles with 5-9 teeth, tooth 3 smaller than tooth 4; palp formula 5:4, 4:3, 3:3; antennae 11-segmented; antennal scape short, without projected setae but with decumbent pubescence; antennal sockets very close to the posterior clypeal margin; eyes very small, placed in front of the midlength of head; mesothorax not constricted immediately behind the pronotum; mesonotum without stout setae; propodeum lacking projected setae; gaster without stout projected setae; metapleural gland present; propodeum unarmed; propodeal spiracle circular; tibial spurs on meso- and metatibia absent; petiole in form of unarmed scale; acidopore with a seta-fringed nozzle.

In Greece only one species.

26. *Acropyga paleartica* Menozzi, 1936

(Figs 26.1-6)

Acropyga (*Rhizomyrma*) *paleartica* Menozzi, 1936: 298.

Distribution in Greece: Crete (Legakis 2011: 26, Salata et al. 2020 a: 30); **Dodecanese** (Menozzi 1936: 299, Legakis 2011: 26, Borowiec et al. 2021: 11); **Sterea Ellas** (Legakis 2011: 26); **Thessaly** (Legakis 2011: 26).

Distribution in Europe and Mediterranean Basin: Endemic to Greece.

Description. Very small: HL: 0.556-0.619 (mean 0.587); HW: 0.468-0.492 (mean 0.481); SL: 0.413-0.460 (mean 0.442); EL: 0.032-0.076 (mean 0.047); ML: 0.52-0.68; MW: 0.35-0.41. **Color.** Whole body and appendages uniformly yellow (Figs 26.1, 2). **Head.** Elongate, 1.2-1.3 times as long as wide, parallelsided, occipital margin concave (Fig. 26.3). Clypeus short and transverse, smooth and shiny, anterior margin straight with a row of setae, posterior margin straight in the middle, on sides emarginate by antennal sockets, surface without appressed hairs but with several long, suberect to erect setae, the longest anterior seta with length 0.048. Head micropunctate, interspaces smooth and shiny, without appressed pubescence but with short and dense decumbent hairs, erected setae absent, ventral side of head with short to moderately long, decumbent to semierect hairs. Scape short, 1.1- 1.2 times longer than width of head, stout, clearly widened from base to apex, its surface microreticulate but shiny, with short and dense subdecumbent pubescence, erected setae absent. Funicular segments short except last segment, first segment 1.8 times as long as wide, second segment very short, 1.8 times as wide as long and shorter than third segment, the rest of funicular segments transverse only last segment very long, 2.5 times as long as wide (Fig. 26.3). Eyes very small, in small workers almost rudimental, round or slightly transverse, 0.055 to 0.123 length of head. Mandibles large, without striation. **Mesosoma.** Stout, 1.5-1.8 times as long as wide, dorsally and laterally mostly with diffused microreticulation, partly smooth, shiny, without appressed pubescence but with short, dense, decumbent to suberect hairs. In lateral view pronotum and mesonotum softly convex, propodeum anteriorly flat then heavily sloping posteriorly, mesonotal groove very shallow. Mesosomal dorsum lacking erected setae (Figs 26.2). **Waist and gaster.** Petiole in form of small, thin scale, on top truncate, anterior slope with several decumbent to suberect moderately long hairs. Gaster longer than mesosoma, tergites with diffused microreticulation, surface shiny, covered with short and moderately dense subdecumbent to decumbent pubescence, sides with several elongate decumbent hairs

and posterolateral corners of tergites with 1-3 long erected setae. **Legs.** Short and stout, covered with short and dense subdecumbent hairs, erected setae absent, inner margin of tibiae lacking row of thorns.

Gyne as in Figs 26.1-3.

Comparative remarks. It looks like very small specimens of the subgenus *Cautolasius* but differs in 11-segmented antennae, very shallow mesonotal groove, short antennae and eyes placed distinctly in front of mid length of head. In field, workers may resemble members of *Solenopsis* (Myrmicinae) because of their very small size but well differ in characters of the subfamily Formicinae (pedicel with one segment in shape of scale and apex of gaster with circular nozzle-like acidopore, fringed with setae).

Biological notes. All specimens collected recently came from soil traps in open habitats with limestones rocks at altitude from 5 to 455 m.

Genus *Anoplolepis* Santschi, 1914

Diagnosis. Monomorphic; mandibles with 6-9 teeth, tooth 3 smaller than tooth 4; palp formula 6:4; antennae 11-segmented; antennal scape very long, with projected setae; antennal sockets close to the posterior clypeal margin; eyes large, placed behind the midlength of head; mesothorax constricted immediately behind the pronotum; mesonotum without projected setae; propodeum lacking projected setae; gaster without projected setae; metapleural gland present; propodeum unarmed; propodeal spiracle circular; tibial spurs on meso- and metatibia simple; petiole in form of unarmed node; acidopore with a seta-fringed nozzle.

In Greece was noted only one introduced species, but this record is doubtful and needs confirmation.

27. *Anoplolepis gracilipes* (Smith, 1857)

(Figs 27.1-4)

Formica longipes Jerdon, 1851: 122, not *Formica longipes* Latreille, 1802: 233;
Formica gracilipes Smith, 1857: 55;
Formica trifasciata Smith, 1858: 27.

Distribution in Greece: Recorded generally from Greece and Turkey by A. Radchenko (Fauna Europea Project) and was later repeated by Borowiec and Salata (2012, 2013). However, this record has no reference data and thus shuld be considered as doubtful.

Distribution in Europe and Mediterranean Basin: Germany, the Netherlands, United Arab Emirates; cosmopolitan tramp species.

Description. Moderately large: HL: 0.889-1.024 (mean 0.959); HW: 0.579-0.667 (mean 0.633); SL: 1.820-2.030 (mean 1.897); EL: 0.222-0.270 (mean 0.245); ML: 1.64-1.84; MW: 0.48-0.59. **Color.** Head, mesosoma, petiolar node, antennae and legs yellow, often anterior half of head lighter yellow colored than posterior half, occasionally antennal scapi slightly infuscate, gaster mostly yellowish brown to brown, anterior slope of first tergite usually yellow, paler than rest of tergites (Figs 27.1-4). **Head.** Elongate, 1.5-1.6 times as long as wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin convex (Fig. 27.3, 4). Clypeus with diffused microreticulation but shiny, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin concave in the middle, mostly without appressed hairs, anterior margin with a row of 5-6 long setae and few short setae,

close to base a pair of long erected setae, the longest anterior seta with length 0.206. Head with diffused microreticulation, shiny, mostly without appressed pubescence only on gena and sides of head with short and sparse hairs, interantennal and interocular area with three pairs of long erected setae, ocellar area with a pair of long erected setae and sometimes with 1-2 additional short setae, gena lacking erected setae, ventral side of head lacking erected setae. Scape very long, 3.0- 3.1 times longer than width of head**,** very thin, only slightly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.9-3.0 times as long as wide, second segment as long as first and shorter than third, the rest of funicular segments more than three times longer than broad (Fig. 27.3). Eyes big, elongate oval, 0.26 length of head. Mandibles long, without striation. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 3.0-3.4 times as long as wide, dorsally and laterally with diffused microreticulation, without appressed pubescence, shiny. In lateral view pronotum and mesonotum almost flat, propodeum regularly convex, mesonotal groove moderately deep. Mesosomal dorsum lacking erected setae except a single long setae behind propodeal spiracle (Figs 27.1, 2). **Waist and gaster.** Petiolar scale in form of high node, on top with shallow longitudinal impression, in lateral view rounded apically. Gaster shorter than mesosoma, tergites with diffused microreticulation sometimes tending to form transverse sculpture, surface shiny, covered with short and sparse appressed pubescence, distance between hairs several times longer than length of hairs. First gastral tergite only with few very long erected setae close to posterior margin, subsequent tergites also with a row of very long setae close to posterior margin and usually with a pair of long setae centrally. **Legs.** Very long and slim, covered with short and sparse appressed to slightly decumbent hairs, without setae, inner margin of tibiae lacking row of thorns.

Comparative remarks. Unique species. Its very slim and elongate body combined with extremely long and slim legs and very elonagted, 11-segmented antennae, big eyes and unarmed propodeum distinguish it well from other members of the subfamily Formicinae.

Biological notes. In tropical countries this species is noted from open areas with less friable soils. It is one of the most common ant species which tends honeydew-producing hemipterans in Indonesia. In many tropical and subtropical countries, it is a well-known pest species, because it protects aphids and coccids which injure tropical crops. In this role it has been rated a secondary agricultural pest. It is unlikely that this species will acclimatize permanently in Greece and, if the record from Fauna Europea is based on some reliable data, it can only be treated as an accidental and temporary introduction.

Genus *Camponotus* Mayr, 1861

Useful identification keys, revisions and taxonomic papers: Radchenko 1996 b, Ionescu-Hirsch 2010, Karaman & Aktaç 2013, Seifert 2019, Salata et al. 2019 b.

Diagnosis. Body not linear from small to very large, often polymorphic; clypeus broad with convex anterior margin, not armed with teeth; antennae 12-segmented, elongate; antennal scape moderately to very elongate, from slightly shorter to distinctly longer than width of head; antennal sockets in distance from posterior margin of clypeus; mandibles moderately elongate, masticatory margin with spiniform denticles of unequal size; palp formula 5,4 or 6,4; eyes large; promesonotal suture present, from shallow to deep; propodeum unarmed, but sometimes angulate or bituberculate; waist of one segment in form of moderately thick

to thin scale; first gastral segment not separated from subsequent segments by a deep suture; mid and hind tibiae each with one pectinate spur; acidopore with a seta-fringed nozzle.

In Greece 27 species divided into three subgenera.

A key to subgenera of *Camponotus*

1. Dorsal profile of mesosoma continuously convex (Figs 28.2, 29.2, 30.2, 31.2, 32.2, 39.2, 50.2, 51.2, 56.2) or with only shallow impression between mesonotum and propodeum (Figs 40.2, 4) ..... 2.

—. Dorsal profile of mesosoma with deep impression between mesonotum and propodeum. Propodeum always abruptly falling down to its caudal slope (Figs 33.2, 4, 34.2, 4, 36.2, 4, 37.2, 4, 42.2, 4, 43.2, 4) ..... ***Myrmentoma* Forel**, part, p. 66

2. Anterior margin of clypeus forms regular arch, without any protrusion and usually without median keel (Figs 28.5, 29.5, 30.5, 31.5, 32.5, 38.5) ..... 3.

—. Anterior margin of clypeus forms a lobiform protrusion and median keel present (Figs 50.8, 51.3, 53.5, 54.7) ..... ***Tanaemyrmex* Ashmead**, p. 110

3. Anterior margin of clypeus in both minor and major workers without median emargination (Figs 28.5, 6, 29.5, 6, 30.5, 6). Gastral tergites with long erect setae and shorter, dense appressed hair (Figs 28. 1, 29.1, 30.1). Head and mesosoma moderately sculptured from shiny to moderately dull (Figs 28.5, 6, 29.5, 6, 30.5, 6). Body large, HW in major workers up to 3.27 mm ..... ***Camponotus* s. str.**, p. 58

—. Anterior margin of clypeus in major workers usually with median emargination (Figs 38.6, 39.6). Gastral tergites with long erect setae and short and sparse appressed hair (Figs 39.4, 40.2), if appressed hair are dense then head and mesosoma strongly sculptured, appears distinctly dull (Figs 31.1, 2, 44.1, 2). Body distinctly smaller, HW in major workers at most to up 2.43 mm .....***Myrmentoma* Forel**, part, p. 66

Subgenus *Camponotus* s. str.

A key to species of the subgenus *Camponotus* s. str.

1. Erected pilosity of head, mesosoma and gaster sparse. Mesosoma completely or partly reddish only in the darkest specimens partly or mostly brown (Figs 28.1-4, 29.1-4) .... 2.

—. Erected pilosity of head, mesosoma and gaster profuse. Mesosoma completely black (Figs 30.1-4) ..... ***C. vagus* (Scopoli)**, p. 63

2. Gaster pubescence shorter and scarcer. Average length of 7 pubescence hairs from the central area of the dorsal plane of first tergite only 0.047-0.072 mm. Interspaces between the fine transverse microstriation of gastral tergites are smooth and shining .. .. ***C. ligniperda* (Latreille)**, p. 61

—. Gaster pubescence longer and denser. Average length of 7 pubescence hairs from the central area of the dorsal plane of first tergite 0.077-0.120 mm. Interspaces between the fine transverse microstriation of gastral tergites shoving a fine microsculpture ..... ***C. herculeanus* (Linnaeus)**, p. 59

Review of species

28. *Camponotus herculeanus* (Linnaeus, 1758)

(Figs 28.1-9)

Formica herculeana Linnaeus, 1758: 579;
Formica castanea Lepeletier, 1835: 215;
Formica intermedia Zetterstedt, 1838: 448;
Formica atra Zetterstedt, 1838: 450;
Camponotus herculeanus var. *shitkowi* Ruzsky, 1904: 292;
Camponotus herculeanus var. *montanus* Ruzsky, 1904: 293;
Camponotus herculeanus subsp. *shitkowi* var. *intermedius* Ruzsky, 1914: 100 unavailable name;
Camponotus herculeanus var. *vagus-herculeanus* Nadig, 1918: 340 nomen nudum;
Camponotus herculeanus var. *nadigi* Menozzi, 1922: 142;
Camponotus herculeanus var. *eudokiae* Ruzsky, 1926: 108;
Camponotus herculeanus caucasicus Arnoldi, 1967: 1822.

Distribution in Greece: Macedonia (Legakis 2011: 30); **Sterea Ellas** (Legakis 1984: 86, 2011: 30). These records need confirmation as no recent explorations confirmed presence of this species in Greece. Thus, they can be based on misdetermination and refer to *Camponotus ligniperda*.

Distribution in Europe and Mediterranean Basin: Andorra; Armenia; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Italy: mainland; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; ?North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Ukraine; Turkey.

Description. Large to very large, polymorphic; minor workers: HL: 1.381-1.960 (mean 1.701); HW: 1.048-1.560 (mean 1.327); SL: 1.413-2.070 (mean 1.796); EL: 0.357-0.492 (mean 0.438); ML: 2.03-2.78; MW: 0.95-1.24. **Color.** Head black, mandibles reddish brown to brown, sometimes also clypeus and anterior part of gena reddish brown to brown, antennal scapi brown, funicle yellowish brown to dark brown, mesosoma and petiolar scale reddish, occasionally sides of mesosoma and upper half of petiole indistinctly infuscated by brown spots with diffused borders, gaster predominantly black , only anterior face of first tergite with yellowish brown to reddish brown spot, sometimes this pale spot reduced to very small patch in the middle of anterior surface, anterior part of second and third tergite never reddish brown thus transparent white posterior margin is placed on black background and whole dorsal surface regularly black, coxa and femora reddish, tibiae reddish brown and tarsi mostly brown, in pale forms whole legs yellowish red, in dark forms whole tibiae and

tarsi brown (Figs 28.1, 2). **Head.** Approximately 1.3 times longer than wide, sides in front of eyes straight, softly converging anterad, behind eyes regularly rounded, posterior margin also rounded (Fig. 28.5). Clypeus pentagonal, transverse, its anterior margin convex with slightly crenulate anterior margin, on sides clypeal margin deeply emarginate and forms with gena obtuse angulation protruding anterad, sides of clypeus strongly convergent posterad, straight, posterior margin straight but in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface slightly shiny, covered with sparse and short, hardly visible appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae and between anterior long setae with very short seta, central plate with pair of long setae anterolaterally and a pair of long setae posterolaterally. Head distinctly microreticulate, from slightly shiny to slightly dull, the sculpture in posterior 1/3 length of head tends to form transverse striation, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with a row of long erected setae, vertex with two pairs of very long , occipitum, gena and sides of head lacking erected setae, ventral side of head with 2-4 s moderately long to long erected setae. Scape elongate, thin, 1.3-1.4 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.8 times as long as wide and approximately 1.5-1.6 times as long as second segment, third segment slightly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 28.5). Eyes large, elongate oval, 0.26 length of head. Mandibles stout, diffusely microreticulate and elongate punctate, surface shiny. **Mesosoma.** Elongate, 2.1-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, sculpture on sides of mesosoma tends to form longitudinal and oblique striation, surface shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum softly, broadly rounded. Surface of pronotal dorsum and mesonotum with short and scarce, hardly visible depressed hairs, lateral sides mostly unhaired, pronotum with 0-4, mesonotum 0-3, propodeum 2-5 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 6-10 very long standing setae (Figs 28.1, 2). Gaster shorter than mesosoma, tergites with transverse microstriation, interspaces between the fine transverse microstriation shoving a fine microsculpture thus surface of gaster dorsally and laterally appears indistinctly dull, covered with long and moderately dense appressed hairs not covering background of tergites, average length of 7 pubescence hairs from the central area of the dorsal plane of first tergite 0.077-0.120 mm; all tergites with several very long erected setae. **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae apically with row of thorns. Ventral surface of fore femora with up to two long erected setae.

Major workers: HL: 2.833-3.000 (mean 2.899); HW: 2.967-3.067 (mean 3.009); SL: 2.367-2.567 (mean 2.469); EL: 0.556-0.651 (mean 0.589); ML: 3.76-4.25; MW: 1.94-2.06. In body color and sculpture similar to minor workers but surface duller than in minor workers (Figs 28.3, 4). Head stouter, 0.9-1.0 times as long as wide, anterior margin of clypeus distinctly crenulate, central plate of clypeus with additional 2-4 short erected setae, frontal area of head and vertex with more numerous erected setae, but occipital part lacking erected setae, gular area with more than 10 short to long erected setae (Fig. 28.6). Scape proportion-

ally shorter, 0.8-0.9 times as long as width of head. Eyes proportionally smaller, 0.2 length of head. Propodeum in profile forms almost straight obtuse angle. Setation of all mesosomal parts more numerous, pronotum with up to 10, mesonotum to 6 and propodeum to 12 setae, petiolar crest with 12-16 long setae. Ventral surface of fore femora with 2-3 long erected setae.

Gyne as in Figs 28.7-9.

Comparative remarks. *Camponotus herculeanus* and *C. ligniperda* well differ from the third member of the nominative subgenus, *T. vagus*, in mesosoma partly reddish and sparser dorsal setation. They are very similar and differ in subtle characters. *Camponotus herculeanus* has longer and denser pubescence on gaster with average length of 7 pubescence hairs from the central area of the dorsal plane of first tergite 0.077-0.120 mm (while in *C. ligniperda* only 0.047-0.072 mm). In *C. herculeanus* interspaces between the fine transverse microstriation of gastral tergites show a fine microsculpture thus gaster appears indistinctly dull while in *C. ligniperda* interspaces between the fine transverse microstriation of gastral tergites are mostly smooth and shining without or with diffused secondary microsculpture – thus gaster appears indistinctly shiny. *Camponotus herculeanus* was recorded from only two localities in Macedonia and Sterea Ellas and its occurrence in Greece needs confirmation. While *C. ligniperda* is common in continental Greece, especially in mountains with fir forests.

Biological notes. No data from Greece. In neighboring countries this species is arboricolous mountain species which prefers coniferous or mixed forests, especially spruce forests. Nests are located in living and dead wood.

29. *Camponotus ligniperda* (Latreille, 1802)

(Figs 29.1-10)

Formica ligniperda Latreille, 1802 a: 88;
Camponotus (*Camponotus*) *ligniperda* ab. *afer* Stärcke, 1942 a: 28;
Camponotus ligniperdus var. *nigrescens* Gösswald, 1932: 147.

Distribution in Greece: Epirus (Legakis 1983: 5, 2011: 31, Borowiec & Salata 2018 a: 5; **new data:** Arta, Athamania-Theodoriana rd., 1155 m, 2 VI 2007, 39.39112 / 21.19797); **Ionian Islands** (Salata & Borowiec 2017: 298); **Macedonia** (Legakis 2011: 31, Borowiec & Salata 2012: 479; **new data:** Drama, Elatia, 1590 m, 7 X 1999, 41.4926 / 24.3165; Drama, Elatia Forest, 1590 m, 10 VIII 1999, 41.4926 / 24.3165; Drama, Kara Ntere, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 / 24.2835; Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 / 24.0948; Kastoria, Ag. Antonios vic., 1350 m, 2 VI 2007, 40.63806 / 21.31685; Kastoria, Kotili vic., 1560 m, 16 VI 2008, 40.34087 / 20.99719; Kastoria, Vitsi n. Ag. Antonios, 1350 m, 2 VI 2007, 40.65114 / 21.33816); **Sterea Ellas** (Forel 1886: clxvii, Forel 1889: 255, Legakis 1984: 86, 2011: 31); **Peloponnese** (Borowiec & Salata 2013: 352, Borowiec & Salata 2017: 206, Borowiec & Salata 2021 b: 5; **new data:** Arkadia, Langadia, Valtessiniko, 1200 m, 7 VI 2007, 37.7011 / 22.11196); **Thessaly** (Borowiec & Salata 2018 a: 223; **new data:** Larissa, Kalipefki, 1120 m, 16 V 2019, 39.97026 / 22.45771).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia;

Finland; France: Corsica, mainland; Germany; Greece; Hungary; Italy: mainland; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Ukraine; Turkey.

Description. Large to very large, polymorphic; minor workers HL: 1.940-2.183 (mean 2.037); HW: 1.520-1.817 (mean 1.669); SL: 1.980-2.133 (mean 2.043); EL: 0.480-0.563 (mean 0.515); ML: 2.94-3.23; MW: 1.26-1.51. **Color.** Head black, mandibles reddish brown to brown, sometimes also clypeus and anterior part of gena reddish brown to brown, antennal scapi brown, funicle yellowish brown to dark brown, mesosoma and petiolar scale reddish, occasionally sides of mesosoma and upper half of petiole indistinctly infuscated by brown spots with diffused borders (Figs 29.1, 2, 5), in melanistic specimens mesosoma mostly brown to black with reddish brown spots, gaster mostly dark brown to black (Fig. 29.7), anterior face of first tergite with yellowish brown to reddish brown spot, often this pale spot occupies also anterior part of dorsal surface of the first tergite, anterior margin of second and third tergite often reddish brown thus transparent white posterior margin is placed on paler background then surface of tergites appears transversely yellow striped, coxa and femora reddish, tibiae reddish brown and tarsi mostly brown, in pale forms whole legs yellowish red, in dark forms whole tibiae and tarsi brown. **Head.** 1.2-1.3 times longer than wide, sides in front of eyes straight, softly converging anterad, behind eyes regularly rounded, posterior margin also rounded (Fig. 29.5). Clypeus pentagonal, transverse, its anterior margin convex with slightly crenulate anterior margin, on sides clypeal margin deeply emarginate and forms with gena obtuse angulation protruding anterad, sides of clypeus strongly convergent posterad, straight, posterior margin straight but in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface slightly shiny, covered with sparse and short, hardly visible appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae and between anterior long setae with very short seta, central plate with pair of long setae anterolaterally and a pair of long setae close to frontal triangle. Head distinctly microreticulate, from slightly shiny to slightly dull, the sculpture in posterior 1/3 length of head tends to form transverse striation, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with a row of 2-3 long erected setae, vertex with 2-4 very long , occipitum, gena and sides of head lacking erected setae, ventral side of head with 2-4 moderately long to long erected setae. Scape elongate, thin, 1.2-1.3 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.7 times as long as wide and 1.4-1.5 times as long as second segment, third segment slightly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 29.5). Eyes large, elongate oval, 0.25 length of head. Mandibles stout, diffusely microreticulate and elongate punctate, surface shiny. **Mesosoma.** Elongate, 2.1-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, sculpture on sides of mesosoma tends to form longitudinal and oblique striation, surface shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum broadly rounded. Surface of pronotal dorsum and mesonotum with short and scarce, hardly visible depressed hairs, lateral sides mostly unhaired, pronotum with 0-4, mesonotum 0-3, propodeum 2-6 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiolein form of broad, thick scale with convex anterior and flat posterior face, apex regularly

rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 6-12 very long erected setae (Fig. 29.2). Gaster shorter than mesosoma, tergites with transverse microstriation, interspaces between the fine transverse microstriation without or with diffused additional microsculpture thus surface of gaster dorsally and laterally appears indistinctly shiny, covered with short and scarce appressed hairs not covering background of tergites, average length of 7 pubescence hairs from the central area of the dorsal plane of first tergite 0.047-0.072 mm; all tergites with several very long erected setae. **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae apically with row of thorns. Ventral surface of fore femora with up to two long erected setae.

Major workers: HL: 2.967-3.183 (mean 3.096); HW: 3.100-3.466 (mean 3.271); SL: 2.466-2.533 (mean 2.511); EL: 0.651-0.682 (mean 0.669); ML: 4.15-4.27; MW: 2.08-2.26. In body color and sculpture similar to minor workers but surface duller than in minor workers (Figs 29.3, 4, 6). Head stouter, 0.9-1.0 times as long as wide, anterior margin of clypeus distinctly crenulate, central plate of clypeus sometimes with additional 2-4 short erected setae, frontal area of head and vertex with more numerous erected setae, but occipital part lacking erected setae, gular area with more than 10 short to long erected setae (Fig. 29.6). Scape proportionally shorter, 0.7-0.8 times as long as width of head. Eyes proportionally smaller, 0.22 length of head. Propodeum in profile forms almost straight obtuse angle. Setation of all mesosomal parts more numerous, pronotum with up to 10, mesonotum to 6 and propodeum to 12 setae, petiolar crest with 12-16 long setae. Ventral surface of fore femora with 1-3 long erected setae.

Gyne as in Figs 29.8-10.

Comparative remarks. *Camponotus ligniperda* and *C. herculeanus* well differ from the third member of the nominative subgenus, *T. vagus*, in mesosoma partly reddish and sparser dorsal setation. They are very similar and differ in subtle characters. For detailed distinguishing characters see comparative remarks under *C. herculeanus*.

Biological notes. *Camponotus ligniperda* is generally a mountain arboricolous species, it prefers sunny places inside mountain forests. It was noted from all types of forests, but most records are from coniferous forests, occasionally it was observed in mountain pastures with shrubs. Foraging workers are most often found on tree trunks, on litter or on rocks. Nests were located in living and dead wood. Most records are from an altitude above 1000 m up to 1720 m, the lowest locality comes from Cephalonia island, from fir forest at the altitude 540 m.

30. *Camponotus vagus* (Scopoli, 1763)

(Figs 30.1-6)

Formica vaga Scopoli, 1763: 312;
Formica pubescens Fabricius, 1775: 392;
Formica fuscoptera Geoffroy, 1785: 452;
Camponotus vagus var. *kodorica* Forel, 1913 a: 145;
Camponotus vagus subsp. *ifranensis* Cagniant, 1987: 117.

Distribution in Greece: Epirus (Legakis 1983: 5, 2011: 33, Borowiec & Salata 2018 a: 5, Salata & Borowiec 2019 b: 100); **Ionian Islands** (Emery, 1901: 57, Legakis 2011:

33, Borowiec & Salata 2014 a: 515, Borowiec & Salata 2021 a: 6; **new data:** Cephalonia, Ainos Mts. loc. 4, 1135 m, 8 VI 2019, 38.1571 / 20.62602; Cephalonia, Ainos Mts, 1430 m, 15 VI 2021, 38.12251 / 20.68765; Cephalonia, 3.8 km W of Tzanata, 759 m, 14 VI 2021, 38.1355 / 20.70529); **Macedonia** (Legakis 2011: 33, Borowiec & Salata 2012: 483, Salata & Borowiec 2019 b: 105; **new data:** Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 / 24.6966; Pieria, Kastri, 2 m, 39.962 / 22.686; Pieria, Nei Pori, 1 m, 13-20 VI 2013, 39.964 / 22.648; Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971; Pieria, P. Poroi, 510 m, 17 V 2019, 39.96797 / 22.58846); **Peloponnese** (Forel 1886: clxvii - as *Camponotus pubescens*, Legakis 1984: 86, 2011: 33, Borowiec & Salata 2017: 207, Salata & Borowiec 2019 b: 120, Borowiec & Salata 2021 b: 6); **Sterea Ellas** (Legakis 1984: 86, 2011: 33, Borowiec & Salata 2012: 483, Borowiec & Salata 2018 e: 6, Salata & Borowiec 2019 b: 106); **Thessaly** (Borowiec & Salata 2012: 483, Borowiec & Salata 2018 b: 224); **Thrace** (Bračko et al. 2016: 15).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Finland; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Italy: mainland, Sardinia, Sicily; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Morocco; Netherlands; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Sweden; Switzerland; Ukraine; Turkey.

Description. Large to very large, polymorphic; minor workers HL: 1.634-1.950 (mean 1.806); HW: 1.290-1.660 (mean 1.450); SL: 1.792-2.080 (mean 1.936); EL: 0.381-0.441 (mean 0.408); ML: 2.43-2.80; MW: 1.10-1.32. **Color.** Whole body black, only mandibles sometimes partly reddish brown to brown, occasionally also clypeus anterior part of gena reddish brown to brown, antennae from dark brown to completely black, coxa black, rest of legs from dark brown to black (Figs 30.1, 2, 5). **Head.** 1.2-1.3 times longer than wide, sides in front of eyes straight, softly converging anterad, behind eyes regularly rounded, posterior margin also rounded (Fig. 30.5). Clypeus pentagonal, transverse, its anterior margin convex with slightly crenulate anterior margin, on sides clypeal margin deeply emarginate and forms with gena angulation protruding anterad, sides of clypeus strongly convergent posterad, slightly concave, posterior margin straight but in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface from slightly shiny to slightly dull, covered with sparse and short, hardly visible appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae, central plate with pair of long setae anterolaterally and a pair of long setae close to frontal triangle. Head distinctly microreticulate, appears indistinctly dull, the sculpture in posterior 1/3 length of head tends to form transverse striation, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with a row of long erected setae, vertex with two very long and occipital corners with 1-2 short erected setae, gena and sides of head and central part of occipital part of headlacking erected setae, gular area with 4-8 short to moderately long erected setae. Scape elongate, thin, 1.3-1.4 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence and in apical half with slightly decumbent hairs. Funicular segments elongate, thin, first segment 2.5 times as long as wide and approximately 1.3-1.4 times as long as second segment, third segment as long as to slightly shorter than second, the rest of

funicular segments distinctly longer than broad (Fig. 30.5). Eyes moderately large, elongate oval, 0.23 length of head. Mandibles stout, microreticulate and elongate punctate, surface indistinctly shiny. **Mesosoma.** Elongate, 2.1-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, sculpture on sides of mesosoma tends to form longitudinal and oblique striation, surface from slightly shiny to slightly dull. In lateral view dorsum form regular arch, without mesonotal groove, propodeum softly, broadly rounded. Surface of pronotal dorsum and mesonotum with short and scarce, hardly visible depressed hairs, lateral sides mostly unhaired, pronotum with 10-14, mesonotum 4-8, propodeum 7-12 long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 2-8 very long erected setae (Figs 30.1, 2). Gaster shorter than mesosoma, tergites with transverse microstriation, dorsally and laterally indistinctly dull, covered with long but scarce appressed hairs not covering background of tergites; all tergites with numerous very long erected setae). **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae apically with row of thorns. Ventral surface of fore femora with 3-6 long erected setae.

Major workers: HL: 2.750-3.233 (mean 3.013); HW: 3.017-3.433 (mean 3.225); SL: 2.573-2.733 (mean 2.668); EL: 0.587-0.634 (mean 0.609); ML: 3.85-4.41; MW: 2.08-2.23. In body color and sculpture similar to minor workers but sculpture on sides of mesosoma mostly reticulate and duller than in minor workers (Figs 30.3, 4). Head stouter, 0.9 times as long as wide, anterior margin of clypeus distinctly crenulate, central plate of clypeus with additional 2-4 short erected setae, frontal area of head and vertex with more numerous erected setae, also occipital part on the whole surface with erected setae, gular area with more than 10 short to long erected setae. Scape proportionally shorter, 0.8-0.9 times as long as width of head (Fig. 30.6). Eyes proportionally smaller, 0.2 length of head. Setation of all mesosomal parts more numerous, especially on pronotum and propodeum more than 20 setae, petiolar crest with 12-22 long setae.

Gyne as in Figs 30.7-9, male as in Fig. 30.10.

Comparative remarks. *Camponotus vagus* differs from two other members of the nominative subgenus in body completely black and very abundant erected setae on head and mesosoma. Major workers of *C. vagus* have profile of propodeum broadly rounded while in both relatives the profile is obtusely angulate. Dark forms of *C. herculeanus* and *C. ligniperda* appear similar to *C. vagus* but differ in mesosoma at least partly reddish and in less abundant dorsal setation.

Biological notes. Ubiquistic species, noted from woodlands and open habitats. Noted from all types of forests and olive plantations usually on sunny places. Often recorded from beaches and xerothermic meadows or stream valleys with plane trees. Foraging workers regularly observed on dirt roads, mountain pastures with limestone rocks, shrubs around the ancient buildings and old monasteries. Occasionally observed in gardens and parks in tourist resorts. Nests in dead wood. It avoids high, cool mountains, most of the sites come from lowlands or warm mountain locations up to 1000 m, the highest location was from an altitude of 1370 m.

Subgenus *Myrmentoma* Forel, 1912

A key to species of the subgenus *Myrmentoma*

1. Sculpture of mesosoma and head strong, sometimes sculpture partially reduced on the lateral sides of mesosoma but body appears indistinctly to distinctly dull (Figs 31.1-6, 32.1-6, 35.1-6, 42.1-6, 44.1-6, 45.1-6) ……..……. 2.

–. Sculpture of mesosoma and head weak, body appears mostly shiny (Figs 33.1-6, 34,1-6, 36.1-6, 37.1-8, 38.1-6, 39.1-6, 40.1-6, 41.1-6, 43.1-12, 46.1-6, 47.1-6, 49.1-6 ..... 8.

2. Mesosoma in lateral view forms a regular arch; metanotal groove absent (Figs 31.2, 4, 32.2, 4, 44.2, 4) ..... 3.

–. Mesosoma in lateral view with shallow to moderately deep metanotal groove (Figs 35.2, 4, 42.2, 4, 45.2, 4, 48.2, 4) ..... 5.

3. Legs mostly yellowish to reddish-brown, gaster yellowish-brown. Setation of head, mesosoma, and gaster short and sparse (Figs 32.1-4). Not known from Greece but noted from eastern, western and central Turkey ..... ***C. aktaci* Karaman**, p. 71

–. Legs and gaster mostly brown to black. Setation of head, mesosoma, and gaster long and dense (Figs 31.1, 2, 44.1, 2) ..... 4.

4. Petiolar scale thin, PI > 1.50 (Fig. 31.2). Northeastern Greece, Eastern Aegean Islands and western Turkey (Figs 31.2, 4) ..... ***C. aegaeus* Emery**, p. 69

– Petiolar scale thick, PI < 1.42 (Figs 44.2, 4). Not recorded from Greece but known from Cyprus and the Middle East ..... ***C. libanicus* André**, p. 98

5. Posterior margin of propodeum with well developed, lateral dentate protrusions (Figs 42.1-4). Base of antennal scape with lobes. Northeastern, eastern and southern Greece and western Turkey ..... ***C. kiesenwetteri* (Roger)**, p. 91

–. Posterior margin of propodeum without or with weakly developed, indistinct protrusions (Figs 35.1-4, 45.1-4, 48.1-4). Base of antennal scape lacking or with indistinct lobes ..... 6.

6. Surface of mesosoma more strongly sculptured, reticulate and granulate with indistinctly dull background; posterior margin of propodeum sometimes with weakly-developed, indistinct protrusion (Figs 35.1-4). Base of antennal scape lacking lobe. Peloponnese, Crete, southern and eastern Aegean islands and western Turkey ..... ***C. boghossiani* Forel**, p. 76

–. Surface of mesosoma weaker sculptured, especially sides of mesosoma appear indistinctly shiny; posterior margin of propodeum without protrusions (Figs 45.1-4, 48.1-4). Base of antennal scape sometimes with lobes ..... 7.

7. Base of antennal scape with extension. Petiolar scale thick, PI: 1.26–1.33 (Figs 48.2, 4). Not recorded from Greece but known from western Turkey .... ***C. schulzi* Salata, Loss, Kiran, Karaman & Borowiec**, p. 107

–. Base of antennal scape lacking lobes. Petiolar scale thin, PI: 1.54–1.74 (Figs 45.2, 4). Cephalonia Island, western Sterea Ellas and Peloponnese ..... ***C. nitidescens* Forel**, p. 100

8. Mesosoma in profile regularly arched without metanotal groove (Figs 38.2, 4, 39.2, 4, 49.2, 4) or with shallow mesonotal groove (Figs 40.2, 4) ..... 9.

–. Mesosoma in profile with deep mesonotal groove (Figs 33.2, 4, 8, 37.2, 4, 6, 41.2, 4, 43.2, 4, 8, 10, 46.2, 4, 47.2, 4), if the groove moderately deep than propodeum with flat dorsal surface saddle-form (Figs 34.2, 4) ..... 12.

9. Genae with erected setae (Figs 39.5, 6, 40.5, 6, 49.5, 6). Anteromedian clypeal margin straight or with very shallow emargination. Propodeum in lateral view forming a blunt angle (Figs 39.2, 4, 40.2, 4, 49.2, 4) ..... 10.

–. Genae lacking erected setae (Figs 38.5, 6). Anteromedian clypeal margin usually with distinct emargination, occasionally without or with very shallow emargination in small workers. Propodeum in lateral view forms more continuous convexity (Figs 38.2, 4) ..... ***C. fallax* (Nylander)**, p. 84

10. Mesosoma in profile forms a regular arch or with only very shallow metanotal groove (Figs 39.2, 4, 49.2, 4) ..... 11.

–. Mesosoma in profile with shallow but distinct metanotal groove (Figs 40.2, 4) .... ***C. gestroi creticus* Forel**, p. 86

11. Legs dark colored, femora dark brown to completely black (Figs 39.2, 4) .... ***C. gestroi gestroi* Emery**, p. 86

–. Legs pale colored, femora yellow (Fig 49.2, 4) …….. ***C. tergestinus* Müller**, p. 108

12. Head predominantly black (Figs 34.5, 6, 36.5, 6, 37.7, 41.5, 6, 46.5, 6). Mesosoma completely black (Figs 34.2, 36.4, 37.6, 41.4, 46.2) or only pronotum with yellow to reddish spots (Figs 36.2, 37.2, 41.2) or pronotum completely yellow to red, occasionally also sides of mesonotum and propodeum partly or mostly reddish (Figs 37.3-5) ..... 13.

–. Head reddish to brown (Figs 33.5, 43.5, 6, 11, 12, 47.5, 6) if predominantly black (Figs 33.6, 37.8) then mesosoma partly to completely yellowish to red (Fig. 37.4). Mesosoma reddish to brown, never completely black ..... 19.

13. Propodeal dorsum on the whole surface with erected setae (Figs 34.4, 36.2, 4, 46.2) ..... 14.

–. Propodeal dorsum with erected setae only at posterior margin (Figs 37.2, 6). Microsculpture of head and mesosomal dorsum stronger, the head and mesosomal dorsum often appears slightly mat with a leather-like texture (Figs 37.2, 6) .... ***C. dalmaticus* (Nylander)** – dark forms, p. 80

14. Body completely black (Figs 34.2, 4, 36.4, 41.4, 46.2, 4) ..... 15.

–. Pronotum with reddish spots laterally or mostly reddish (Figs 36.2, 41.2 ..... 18.

15. Scape short, SL/CS usually below 1.000 (at most to 1.044) ..... 16.

–. Scape long, SL/CS 1.069 ± 0.024 [1.014,1.115]. The distribution is limited to the Ionian Islands, Epirus and southern Macedonia ..... ***C. heidrunvogtae* Seifert**, p. 89

16. Mesonotal groove deep, propodeum high (Figs 36.4, 46.2, 4). Southern or more widely distributed species ..... 17.

–. Mesonotal groove shallow, propodeum low (Figs 34.2, 4). Northern distributed species, Epirus, Macedonia, Thrace, south to northern Thessaly ..... ***C. atricolor* (Nylander)**, p. 74

17. See discriminant characters in Seifert's (2019: p. 14) key. Scapus at base with slightly marked horizontal extension. Common in continental Greece, Ionian Islands and

northern Aegean Islands, rare in Crete, absent in southern Aegean Islands .... ***C. piceus*** **(Leach)**, p. 102

–. See discriminant characters in Seifert's (2019: p. 14) key. Scapus at base without horizontal extension. Common in Crete and southern Aegean Islands, not recorded from continental Greece ..... ***C. candiotes*** **Emery** – rare uniformly black form, p. 78

18. Scape long relative to width of mesosoma and dorsal propodeal plane, SL/CS (referring to CS = 1.25 mm) 1.069 ± 0.024 [1.014,1.115]. The distribution is limited to the Ionian Islands , Epirus and southern Macedonia ..... ***C. heidrunvogtae*** **Seifert**, p. 89

–. Scape clearly shorter relative to width of mesosoma and dorsal propodeal plane, SL/CS (referring to CS = 1.25 mm) 0.960 ± 0.024 [0.918,1.026]. Common in Crete and southern Aegean Islands, not recorded from continental Greece .... ***C. candiotes*** **Emery** – common form, p. 78

19. Propodeal dorsum on the whole surface with erected setae (Figs 33.2, 4, 8, 43.8, 10) ..... 20.

–. Propodeal dorsum with erected setae only at posterior margin (Figs 37.5, 43.2, 4, 47.2, 4) ..... 21.

20. Propodeal dorsum in dorsal view trapezoid, posterior part much wider than anterior (Figs 33.1, 3, 7). Head and mesonotum strongly setose (Figs 33.5, 6). First gastral tergite yellow, distinctly paler than subsequent tergites. Not recorded from Greece but known from Aegean Turkey ..... ***C. anatolicus*** **Karaman & Aktaç**, p. 72

–. Propodeal dorsum in dorsal view rectangular, posterior part not or only slightly wider than anterior (Figs 37.3, 43.1, 3, 47.1, 3). Head and mesonotum less setose (Figs 37.8, 43.5, 6, 47.5, 6). First gastral tergite the same color as subsequent tergites. Common in whole Greece ..... ***C. lateralis*** **(Olivier)** – setose form, p. 94

21. Microsculpture of head and mesosoma fine, the surface perfectly shiny. Mesonotal groove deep (Figs 43.2, 4, 47.2, 4) ..... 22.

–. Microsculpture of head and mesosoma strong, the head and mesosomal dorsum often appears slightly mat with a leather-like texture. Mesonotal groove slightly shallower (Fig. 37.5) ..... ***C. dalmaticus*** **(Nylander)** – pale forms, p. 80

22. Propodeum low and long, less convex in profile, mesonotal groove shallow (Figs 47.2, 4). Transverse microripples on first gastral tergite deeper and denser, RipD 7.1–9.5 μm. Crete and Dodecanese only ..... ***C. rebeccae*** **Forel**, p. 105

–. Propodeum high and short, more convex in profile, mesonotal groove deep (Figs 43.2). Transverse microripples on first gastral tergite shallower and sparser, RipD 9.1–13.7 μm. Common in whole Greece ..... ***C. lateralis*** **(Olivier)** – typical form, p. 94

Review of species

31. *Camponotus aegaeus* Emery, 1915

(Figs 31.1-8)

Camponotus (*Orthonotomyrmex*) *libanicus* var. *aegaea* Emery, 1915: 4.

Distribution in Greece: Aegean Islands (Salata & Borowiec 2017: 296, Borowiec & Salata 2018 c: 4; **new data:** Ikaria, Chalaris Canyon, 12 VI 2013, 37.61666 / 26.05; Lesbos, Eftalou, 60 m, 2 VIII 2009, 39.37833 / 26.21833; Samos, Ireo, 4 m, 5 X 2019, 37.66552 / 26.8843; Samos, Kokkari, 8 m, 8 VI 2013, 37.76666 / 26.88333; Samos, Kokkari vic., 5 m, 7 X 2019, 37.77851 / 26.89155; Samos, Nightingale Valley, 50-100 m, 9 VI 2013, 37.78333 / 26.81666; Samos, Pythagorio, 20 m, 5 VI 2013, 37.68333 / 26.93333; Samos, Zoodochos Pigi, 322 m, 6 X 2019, 37.76916 / 27.02811); **Dodecanese** (Forel 1889: 256 - as *Camponotus libanicus* var., Emery, 1915: 4 - as *Camponotus libanicus* var. *aegaeus*, Menozzi 1936: 304, Legakis 2011: 28, Borowiec & Salata 2012: 470, Salata & Borowiec, 2016: 199, Borowiec et al. 2021: 13); **Macedonia** (Borowiec & Salata 2012: 470, 2022: 5); **Thrace** (Bračko et al. 2016: 13).

Distribution in Europe and Mediterranean Basin: Bulgaria; Greece; North Macedonia; Turkey.

Description. Large, polymorphic; minor worker: HL: 1.170-1.302 (mean 1.229); HW: 0.960-1.135 (mean 1.039); SL: 1.143-1.302 (mean 1.206); EL: 0.302-0.329 (mean 0.315); ML: 1.78-1.98; MW: 0.97-1.127. **Color.** Body black, only anterior margin of pronotum and apical half of mandibles yellowish to yellowish brown and posterior margins of gastral tergites whitish yellow; antennae yellow, sometimes apical 2-4 segments of funiculus slightly infuscate; coxa, femora and tibiae brown, dark brown to almost black, apex of tibiae often yellowish to yellowish brown, tarsi from yellow to brown, basitarsus often darker than subsequent tarsomeres (Figs 31.1, 2, 5). **Head.** Stout, 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin slightly convex (Fig. 31.5). Clypeus trapezoidal, with anterior margin slightly convex and slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface opalescent dull, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 6-8 very long setae and between long setae with very short setae, whole Clypeus with several moderately long and long erected setae. Head distinctly microreticulate, surface opalescent dull, frons with well-marked impunctate line, whole surface, including gena and sides of head with sparse and short, hardly visible appressed hairs and long erected setae but occipital area lacking erected setae, ventral side of head with several moderately long to long erected setae. Scape moderately long, 1.1-1.2 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with very short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.8 times as long as wide and approximately 1.7 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 31.5). Eyes moderately big, almost round, 0.26 length of head. Mandibles stout, elongate punctate, surface shiny. **Mesosoma.** Moderately elongate, 1.7-1.9 times as long as wide, dorsally and laterally with strong microsculpture, surface opalescent dull. In lateral view dorsum form regular arch, without mesonotal groove, propodeum forms distinct, almost straight angle, posterior face of propodeum shallowly excavate (Fig. 31.2). Surface of mesosoma with short and scarce depressed hairs, pronotum with 6-14 erected setae, mesonotum with 4-12, propodeum with more than 20 long to long erected setae, the longest with length to 0.270. **Waist and gaster.** Petiolar scale thin and broad in anterior view, PI > 1.50, with convex anterior and flat posterior face, apex rounded; anterior and posterior surface

microreticulate, sculpture tends to form transverse striation, without pubescence, apical crest with 4-10 very long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation, surface opalescent dull, covered with moderately long but scarce appressed hairs; each tergite with numerous, very long erected setae. **Legs.** Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 4-6 thorns. Ventral surface of fore femora with 5-6 long erected setae.

Major worker: Large, HL: 2.040-2.200 (mean 2.123); HW: 1.967-2.217 (mean 2.053); SL: 1.429-1.520 (mean 1.476); EL: 0.412-0.441 (mean 0.425); ML: 2.65-2.85; MW: 1.44-1.62. Body color and sculpture as in minor workers but apex of antennal scapus and apical half of funiculus often indistinctly infuscated (Figs 31.3, 4, 6). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin often straight. Scapus shorter, approximately 0.7 times as long as width of head (Fig. 31.6). Eyes relatively smaller, 0.2 times as long of head. Setation more numerous than in minor workers, present also in occipital corners. Setae on all mesosomal segments numerous. more than 20, petiolar crest with 14-16 very long setae. Ventral surface of fore femora with 8-12 long erected setae.

Gyne as in Figs. 31.7-8.

Comparative remarks. *Camponotus aegaeus* belongs to the complex of species within the subgenus *Myrmentoma* with distinctly dull body, strongly sculptured mesosoma and head with regularly arched mesosoma lacking metanotal groove. In the eastern part of the Mediterranean basin only three species have this combination of characters: *C. aegaeus*, *C. aktaci* and *C. libanicus*, and only *C. aegaeus* was recorded from Greece. *Camponotus aktaci* is the most distinct species of this complex and differs in distinctly bicolored body with mostly yellowish to reddish-brown legs and yellowish-brown gaster, and short and sparse setation of head, mesosoma, and gaster. Both relatives have legs and gaster mostly brown to black and long and dense setation of head, mesosoma and gaster. *Camponotus libanicus* is similar to *C. aegaeus* and the best distinguishing characters is petiolar index. In *C. libanicus* petiole is thick with PI < 1.42 while in *C. aegaeus* petiole is thin with PI > 1.50. Additionally, *C. libanicus* has slightly more convex mesosoma in profile and its excavation of posterior face of propodeum is slightly deeper than in *C. aegaeus*. *Camponotus libanicus* is more eastern species, known from Cyprus, south-eastern Turkey, Lebanon, Israel and Iran and its records from Aegean Turkey and Greece with no doubts are based on misidentifications. While *C. aegaeus* is more western species and was recorded from Bulgaria, Greece, North Macedonia and western Turkey east to the Kirikkale province of Central Anatolia.

Biological notes. Thermophilous species, prefers luminous pine forests and habitats with Mediterranean shrubs, rarely observed in luminous deciduous forests or in xerothermic meadows. Foraging workers regularly observed on Apiaceae inflorescences, on trunks of pine trees or leaves of fig trees, especially fig trees infected with Homopteran insects producing honeydew. Nests under stones. Absent in high mountains, most records are from an altitude below 500 m, the highest location was from an altitude of 770 m.

32. *Camponotus aktaci* Karaman, 2013

(Figs 32.1-6)

Camponotus (*Myrmentoma*) *aktaci* Karaman in Karaman & Aktaç, 2013: 37.

Distribution in Greece: No records from Greece but its occurrence in the Aegean Turkey suggests that it may occur in Greek Aegean Islands.

Distribution in Europe and Mediterranean Basin: Turkey.

Description (partly after Karaman & Aktaç, 2013). Moderately large, polymorphic; minor worker: HL: 1.080-1.1600 (mean 1.300); HW: 0.950-1.480 (mean 1.140); SL: 1.100-1.500 (mean 1.300); EL: 0.300-0.400 (mean 0.350); ML: 1.63-2.15; MW: 0.96-1.25. **Color.** Head, mesosoma and petiolar scale black, only anterior margin of pronotum and apical half of mandibles yellowish to yellowish brown and posterior margins of gastral tergites whitish yellow, sometimes also anterior margin of clypeus yellowish to reddish, gaster yellowish brown or reddish brown; antennae yellow; coxa and femora rusty yellow to yellowish brown, tibiae and tarsi yellowish to reddish (Figs 32.1, 2). **Head.** Stout, 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin slightly convex (Fig 32.5). Clypeus trapezoidal, with anterior margin slightly convex, simple or slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface opalescent dull, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 5-7 very long setae and between long setae with very short setae, whole Clypeus with several moderately long and long erected setae. Head strongly microreticulate, surface opalescent dull, frons with well-marked impunctate line, whole surface, including gena and sides of head with sparse and short, hardly visible appressed hairs and long erected setae but occipital area lacking erected setae, ventral side of head with few moderately long to long erected setae. Scape moderately long, 1.1-1.2 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with very short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.3 times as long as wide and approximately 1.5 times as long as second segment, third as long as second, the rest of funicular segments distinctly longer than broad (Fig. 32.5). Eyes moderately big, almost round, 0.26 length of head. Mandibles stout, elongate punctate, surface shiny. **Mesosoma.** Moderately elongate, 1.7 times as long as wide, dorsally and laterally with strong microsculpture, dorsal surface slightly dull, sides from slightly shiny to slightly dull. In lateral view dorsum form regular arch, without mesonotal groove, propodeum forms distinct, almost straight angle. Surface of mesosoma with very short and scarce depressed hairs, pronotum with 4-8 erected setae, mesonotum with 4-6, propodeum with 6-10 moderately long to long erected setae. **Waist and gaster.** Petiolar scale moderately thick, broad in anterior view, PI below 1.50, with convex anterior and flat posterior face, apex rounded; anterior and posterior surface microreticulate, sculpture tends to form transverse striation, without pubescence, apical crest with 4-8 very long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation partly tending to form transverse striation, surface from slightly shiny to slightly dull, covered with short and scarce appressed hairs; each tergite with several moderately long erected setae and a row of erected setae on posterior margin. **Legs.** Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 4-6 thorns. Ventral surface of fore femora with 2-5 long erected setae.

Major worker: HL: 1.810-2.130 (mean 2.010); HW: 1.680-2.080 (mean 1.940); SL: 1.630-1.660 (mean 1.650); EL: 0.400-0.500 (mean 0.450); ML: 2.30-2.66; MW: 1.23-1.51. Body color and sculpture as in minor workers but clypeus always completely black (Figs

32.2, 3, 6). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight, scape 0.78 times as long as head width (Fig. 32.6). Setation more numerous than in minor workers, but occipital corners sometimes with 1-2 erect setae. Setae on all mesosomal segments numerous, pronotum with 10-12, mesonotum 8-10, and propodeum more than 10 setae in posterior part, petiolar crest with 10-12 very long setae. Ventral surface of fore femora with 5-8 long erected setae.

Gyne unknown.

Comparative remarks. *Camponotus aktaci* belongs to the complex of species within the subgenus *Myrmentoma* with distinctly dull body strongly sculptured mesosoma and head with reguraly arched mesosoma lacking metanotal groove. In the eastern part of the Mediterranean basin only three species have this combination of characters: *C. aktaci*, *C. aegaeus* and *C. libanicus*, and only the second species has confirmed records from Greece. *Camponotus aktaci* is the most distinct and differs from both relatives in distinctly bicolored body with legs mostly yellowish to reddish-brown and gaster yellowish-brown to brown, and short and sparse setation of head, mesosoma, and gaster. While *C. aegaeus* and *C. libanicus* have legs and gaster mostly brown to black and long and dense setation of head, mesosoma and gaster. *Camponotus aktaci* was recorded from Aegean Region only from the western Turkey and its distribution in Greece is possible in Dodecanese because the westernmost locality in Turkey is placed only 19 km east of the island Kos.

Biological notes. Biology of this species is little known, ants were collected from the *Pinus nigra* Arnold forest and orchards of *Prunus dulcis* (Mill.) D.A. Webb between an altitude 1050 m and 1550 m.

33. *Camponotus anatolicus* Karaman & Aktaç, 2013

(Figs 33.1-4)

Camponotus (*Myrmentoma*) *anatolicus* Karaman & Aktaç, 2013: 42.

Distribution in Greece: No records from Greece but its occurrence in the Aegean Turkey suggests that it may occur in Greek Aegean Islands. The nearest locality in Turkey is placed 105 km east of Rhodes Island.

Distribution in Europe and Mediterranean Basin: Turkey.

Description (partly after Karaman & Aktaç, 2013). Moderately large, polymorphic; minor worker: HL: 0.850-1.200 (mean 0.920); HW: 0.710-1.080 (mean 0.810); SL: 0.850-1.050 (mean 0.930); EL: 0.210-0.280 (mean 0.230); ML: 1.24-1.65; MW: 0.55-0.83. **Color.** Head reddish, sometimes with vertex and clypeus partly brownish red; mesosoma and petiolar scale yellowish red to reddish brown; first gastral tergite reddish to reddish brown, rest of gaster brown to almost black; antennae and legs yellowish red to reddish brown (Figs 33.1-5). **Head.** Stout, 1.2 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 33.5). Clypeus trapezoidal, with anterior margin straight to slightly convex, simple, without or with shallow median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, appears shiny, covered with short and very sparse appressed hairs, anterior margin with a row of 4-6 long setae centrally and 2-4 short setae on sides, whole Clypeus with several moderately long erected setae. Head diffusely to distinctly microsculptured, anterior half mostly microreticulate, occipital and temporal area mostly

with transverse or circular striation, surface with short and sparse appressed pubescence, appears shiny, gena, frons and anterior part of occipitum with short to long erected setae, only occipital corners without setae, ventral side of head with 1-2 moderately long to long erected setae. Scape moderately elongate, 1.0-1.1 times as long as width of head, at apex only slightly wider than in base, basal part with slightly marked horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, with 1-3 short erected setae. Funicular segments elongate, thin, first segment 2.5 times as long as wide and 1.7-1.8 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 33.5). Eyes moderately big, almost round, 0.25 length of head. Mandibles stout, diffusely microreticulate, surface shiny with numerous erected setae. **Mesosoma.** Moderately elongate, 1.9-2.2 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation diffused, whole surface shiny. In lateral view dorsum with deep mesonotal groove, propodeum short and high, with flat dorsum which is 1.3 times as long as wide, posterior margin truncate, in dorsal view propodeum trapezoidal, with sides distinctly converging anterad, posterior margin approximately 1.6 times wider than anterior margin, in lateral view posterior face and dorsum form distinct angle, posterior face shallowly excavate (Figs 33.2, 4, 8). Surface of mesosoma with very short and scarce depressed hairs, pronotum posterolaterally with 4-6 long erected setae, mesonotum with 4-8 long erected setae, propodeum on the whole surface with 8-12 long semierect to erected setae; the number of erected setae increases with body length, the longest setae with length to 0.270. **Waist and gaster.** Petiolar scale thick and low, broad in anterior view, PI = 2.0, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with fine and moderately dense transverse microstriation, microripples on first gastral tergite with RipD above 9.5 μm, surface shiny, covered with short and very scarce appressed hairs; each tergite with row of, very long serected setae across middle and close to posterior margin, sometimes with few additional erected setae between main rows. **Legs.** Elongate, hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed to decumbent hairs, inner margin of hind tibiae with row of 1-3 thorns. Ventral surface of fore femora with 6-9 long erected setae.

Major worker: Large, HL: 1.280-1.630 (mean 1.450); HW: 1.110-1.480 (mean 1.290); SL: 1.080-1.350 (mean 1.150); EL: 0.280-0.350 (mean 0.300); ML: 1.65-2.03; MW: 0.88-1.09. Body color usually darker than in minor workers, head often partly to mostly brown with yellowish brown clypeus and gena, mesosoma and petiolar scale often partly reddish brown to brown, coxa often brown (Figs 33.6-8). Head stouter, approximately as long as or 1.1 times longer than wide, sides of head softly convex, posterior margin straight (Fig. 33.6). Anterior margin of clypeus slightly serrulate, in the middle with deep triangular or semicircular emargination. Scapus shorter, 0.8-0.9 times as long as width of head. Eyes relatively smaller, 0.21 times as long of head. Frons and genae with large setose punctures, setation on head and whole dorsum more numerous than in minor workers, occipital part with 6-8 erected setae, ventral sides of head with abundant short to long erected setae, petiolar crest with 8 very long setae. Ventral posterior surface of fore femora with abundant long erected setae.

Gyne unknown.

Comparative remarks. *Camponotus anatolicus* with *C. lateralis* and *C. rebeccae* forms a complex of species with deep mesonotal groove, saddle-shaped propodeum, shiny body surface, and usually yellowish to rusty red head , and usually yellow to rusty red mesosoma, that only occasionally has brownish to blackish spots. *Camponotus anatolicus* differs from both relatives in never dark brown or black first gastral tergite that is never darker than mesosoma, and more setose head and mesosoma. From *C. rebeccae* it differs also in short and high propodeal saddle and finer and sparser microripples on first gastral tergite with RipD above 9.5 μm. Setosity of *C. lateralis* appears very similar to this one of *C. anatolicus* but differs in lower number of setae on propodeal dorsum and its anterior part of propodeum bears only short to long decumbent or semierect setae and is lacking long erected setae.

Biological notes. Biology of this species is little known, ants were collected between 282 m and 886 m altitude from the brook side, *Pinus brutia* Ten., *Quercus coccifera* L., and mixed forest (*Quercus* spp. and *Pinus brutia*) habitats.

34. *Camponotus atricolor* (Nylander, 1849)

(Figs 34.1-6)

Formica atricolor Nylander, 1849: 36;
Camponotus lateralis var. *rectus* Forel, 1892 b: 306 unavailable name.

Distribution in Greece: ?**Aegean Islands** (Collingwood 1993: 195, Legakis 2011: 28, probably misidentification); **Epirus** (Salata & Borowiec 2017: 298, Borowiec & Salata 2018 a: 4); **Macedonia** (Legakis 2011: 28, Borowiec & Salata 2012: 472, Seifert 2019: 23, Borowiec & Salata 2022: 5; **new data:** Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971); **?Peloponnese** (Legakis 2011: 28, probably misidentification); **Thessaly** (Seifert 2019: 23; **new data:** Larissa, Mt. Olympus, Vrisopoules loc. 4, 1315 m, 15 V 2019, 40.02392 / 22.30774); **Thrace** (Bračko et al. 2016: 13, Seifert 2019: 23).

Distribution in Europe and Mediterranean Basin: Austria; Azerbaijan; Bulgaria; Greece; Hungary; North Macedonia; Romania.

Description. Moderately large, polymorphic; minor worker: HL: 0.920-1.016 (mean 0.964); HW: 0.714-0.809 (mean 0.756); SL: 0.913-1.017 (mean 0.977); EL: 0.230-0.244 (mean 0.236); ML: 1.35-1.51; MW: 0.67-0.73. **Color.** Body completely black except yellowish explanate anterior margin of pronotum, pronotum never with reddish brown spots laterally, occasionally with yellowish-brown posterolateral corners; usually gena apically with very small yellowish to reddish spot, gaster sometimes brown; antennal scapus yellow, funicle usually with basal 1-3 segments yellowish then subsequent segments gradually darker; coxa brown to black, trochanters mostly brown, femora mostly brown to almost black except yellowish apices, tibiae occasionally yellow, usually yellowish brown to brown, tarsi yellowish to brown (Figs 34.1, 2, 5). **Head.** Stout, 1.2-1.3 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 34.5). Clypeus trapezoidal, with anterior margin straight to slightly convex, simple or slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface with diffused microreticulation, appears shiny, covered with short and sparse appressed to decumbent hairs, anterior margin with a row of 6-8 long setae centrally and 4-8 short setae on sides, whole Clypeus with several moderately long erected setae grouping on sides and base of clypeus. Head diffusely to dis-

tinctly microsculptured, frontal area microreticulate, occipital and temporal area mostly with transverse or circular striation, surface with short and sparse appressed pubescence, appears shiny, gena, frontal and frons and anterior part of occipitum with short to long erected setae, only occipital and temporal areas without setae, ventral side of head with 0-4 moderately long to long erected setae. Scape moderately elongate, approximately 1.3 times as long as width of head, at apex only slightly wider than in base, basal part without horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.1 times as long as wide and 1.8 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 34.5). Eyes moderately big, almost round, 0.24 length of head. Mandibles stout, diffusely microreticulate, surface shiny. **Mesosoma.** Moderately elongate, 1.9-2.1 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation often diffused, whole surface shiny. In lateral view dorsum with shallow mesonotal groove, often dorsal profile almost linear with only indistinctly marked mesonotal groove, propodeum with flat dorsum approximately 1.5 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle posterior face not excavate (Figs 34.2, 4). Surface of mesosoma with short and scarce depressed to decumbent hairs, pronotum posterolaterally with 2-6 long erected setae, mesonotum with 10-16 moderately long to long erected setae, propodeum on the whole surface with 12-22 short to moderately long erected setae; the number of erected setae increases with body length, the longest setae with length to 0.224. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI = 2.0-2.2, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-8 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, surface shiny, covered with moderately long but scarce appressed hairs; each tergite with row of, very long erected setae across middle and close to posterior margin, occasionally with few additional erected setae between main rows. **Legs.** Elongate, hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed hairs, inner margin of hind tibiae with row of 2-3 thorns. Ventral surface of fore femora with 3-6 long erected setae.

Major worker: Large, HL: 1.760-1.900 (mean 1.830); HW: 1.740-1.924 (mean 1.832); SL: 1.311-1.349 (mean 1.330); EL: 0.349-0.365 (mean 0.357); ML: 2.19-2.30; MW: 1.21-1.33. Body color and sculpture as in minor workers but antennae darker , with scapus mostly brown, tarsi often as dark colored as tibiae (Figs 34.3, 4). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight (Fig. 34.6). Anterior margin of clypeus slightly serrulate, in the middle with deep semicircular or triangular emargination. Scapus shorter, 0.7-0.8 times as long as width of head. Eyes relatively smaller, 0.20 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, occipital and temporal part of head often with few erected setae, petiolar crest with 8-10 very long setae. Propodeal flat dorsum shorter, approximately 1.3 times as long as wide. Ventral posterior surface of fore femora with 6-10 long erected setae.

Comparative remarks. *Camponotus atricolor* belongs to the complex of species with predominantly shiny body, well marked or deep mesonotal groove and predominantly

black head. This complex comprises also *C. candiotes*, *C. dalmaticus*, *C. heidrunvogtae* and *C. piceus*. *Camponotus atricolor* differs from all relatives in very shallow mesonotal groove. *Camponotus candiotes*, *C. dalmaticus* and *C. heidrunvogtae* differ additionally in mesosoma often partly yellowish or reddishor with at least pale spots on pronotal sides. Black form of *C. dalmaticus* differs from *C. atricolor* also in slightly marked horizontal extension on base of scapus. *C.amponotus piceus* with predominantly black body is the most similar but differs in presence of deep mesonotal groove.

Biological notes. Forest species preferring luminous deciduous forests, noted also from olive plantations, beaches with several large deciduous trees e.g. poplars, rarely collected on leaves of shrubs in gardens inside tourist resorts. Nests under stones or in soil on the slopes of clay-slate ravines. Most sites are from low altitude to 500 m, the highest confirmed location was from southern slope of Mt. Olympus, a single speciemns was found on limestones rock on mountain pasture at an altitude 1315 m but perhaps it was an individual transported to so high altitude by the wind.

35. *Camponotus boghossiani* Forel, 1911

(Figs 35.1-9)

Camponotus boghossiani Forel, 1911 a: 357;

Camponotus boghossiani var. *stenotica* Emery, 1915: 7 (= *Camponotus kiesenwetteri* r. *angustatus* Forel, 1889: 261 not *Camponotus angustata* Mayr, 1870: 942).

Distribution in Greece: Aegean Islands (Forel 1889: 255, 261 - as *Camponotus kiesenwetteri* r. *angustatus*, Legakis 2011: 33 - as *Camponotus stenoticus*, Borowiec & Salata 2018 c: 4, Salata & Borowiec 2018 a: 9; **new data:** Samos, Cave Pythagorio, 300 m, 5 X 2019, 37.72759 / 26.66018; Samos, Drakei, 290 m, 8 VI 2013, 37.76666 N / 26.63333 E; Samos, Nightingale Valley, 50-100 m, 9 VI 2013, 37.78333 / 26.81666; Samos, Vigla, 15 m, 6 VI 2013, 37.7 N / 26.63333 E); **Crete** (Legakis 2011: 33 - as *Camponotus stenoticus*, Salata & Borowiec 2018 a: 7, Salata et al. 2020 a: 33); **Cyclades** (Salata & Borowiec 2018 a: 7); **Dodecanese** (Legakis 2011: 33 - as *Camponotus stenoticus,* Borowiec & Salata 2012: 472, Salata & Borowiec, 2016: 198-199, Salata & Borowiec 2017 a: 299, 304, Salata & Borowiec 2018 a: 7-9, Borowiec et al. 2021: 14); **Peloponnese** (Salata & Borowiec 2017 a: 299, 304, Borowiec & Salata 2017 b: 203, Salata & Borowiec 2018 a: 9-10, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b: 4).

Distribution in Europe and Mediterranean Basin: Greece, Turkey.

Description. Moderately large, polymorphic; minor worker: HL: 1.111-1.198 (mean 1.136); HW: 0.904-1.127 (mean 0.934); SL: 1.127-1.214 (mean 1.172); EL: 0.254-0.276 (mean 0.266); ML: 1.54-1.83; MW: 0.84-0.89. **Color.** Body black, only anterior margin of pronotum and apical half of mandibles yellowish to reddish brown and posterior margins of gastral tergites whitish yellow; antennae brown, base and apex of scapus usually paler than rest of surface, yellowish to reddish brown, only occasionally scapus mostly yellowish with obscure broadened apical part, in extreme case scapus almost completely black and funiculus dark brown; coxa, femora and tibiae brown to dark brown, trochanters and extreme apex of femora and tibiae often partly yellowish, tarsi from yellow to brown, basitarsus often darker than subsequent tarsomeres (Figs 35.1, 2, 5). **Head.** Stout, 1.2 times longer than wide, in

front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin slightly convex (Fig. 35.5). Clypeus trapezoidal, with anterior margin slightly convex and slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface opalescent dull, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 4-6 very long setae and between long setae often with few very short setae, whole Clypeus with several moderately long and long erected setae. Head distinctly microreticulate, surface opalescent dull, frons with well-marked impunctate line, whole surface , including gena and sides of head with sparse and short, hardly visible appressed hairs and long erected setae including occipital area, ventral side of head with 4-8 moderately long to long erected setae. Scape moderately long, 1.2-1.3 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae; base of scapus without horizontal extension. Funicular segments elongate, thin, first segment 2.8 times as long as wide and 1.7-1.8 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 35.5). Eyes moderately big, almost round, 0.23 length of head. Mandibles stout, microreticulate and elongate punctate, surface shiny. **Mesosoma.** Moderately elongate, 1.9-2.1 times as long as wide, dorsally and laterally with strong microsculpture, surface in Greek populations appears opalescent dull, in populations from Aegean Turkey the microreticulation is also very distinct but background is lass opalescent and size of mesosoma often appears slightly shiny. In lateral view dorsum with distinct mesonotal groove, propodeum saddle-shaped with flat dorsum and truncate posterior margin, posterior face distinctly excavate with well-marked but not protruding posterad dorsal angles (Fig. 35.2). Surface of mesosoma with short and scarce depressed to decumbent hairs, whole dorsum with numerous moderately long to long erected setae, the longest with length to 0.254. **Waist and gaster.** Petiolar scale thin, broad in anterior view, PI > 1.80, with convex anterior and flat posterior face, apex rounded; anterior and posterior surface microreticulate, sculpture tends to form transverse striation, without pubescence, apical crest with 6-10 very long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation, surface opalescent dull, covered with moderately long but scarce appressed to decumbent hairs; each tergite with numerous, very long erected setae. **Legs.** Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 1-3 thorns. Ventral surface of fore femora with 5-6 long erected setae.

Major worker: Large, HL: 1.910-2.030 (mean 1.965); HW: 1.864-2.064 (mean 1.981); SL: 1.444-1.556 (mean 1.508); EL: 0.349-0.428 (mean 0.392); ML: 2.37-2.54; MW: 1.27-1.37. Body color and sculpture as in minor workers but antennae and legs usually darker, dark brown to black and apex of tibiae brown, and tarsi as dark colored as tibiae (Figs 35.3, 4). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin often straight. Clypeus in the middle with indistinctly marked emargination. Scapus shorter, 0.7-0.8 times as long as width of head. Eyes relatively smaller, 0.2 times as long of head (Fig. 35.6). Setation on head and whole dorsum more numerous than in minor workers, petiolar crest with 12-16 very long setae. Ventral surface of fore femora with 10-12 long standing setae.

Gyne as in Figs 35.7-9.

Comparative remarks. *Camponotus boghossiani* belongs to the complex of species with strong microsculpture of head and at least mesosomal dorsum, with distinct mesonotal groove. This group comprises also *C. kiesenwetteri*, *C. nitidescens* and *C. schulzi*. The two last species differ in weaker microsculpture of head and especially mesosoma with shiny lateral sides while in *C. boghossiani* and *C. kiesenwetteri* the microsculpture is strong and surface of the whole mesosoma appears opalescent dull. Only some populations of *C. boghossiani* from Aegean Turkey have weaker sculpture on sides of mesosoma but their sculpture is always stronger than this one observed in *C. nitidescens* and *C. schulzi*. *Camponotus schulzi* differs from *C. boghossiani* in presence of horizontal extension on base of scapus. *Camponotus kiesenwetteri* appears very similar to *C. boghossiani* but differs in presence of horizontal extension on base of scapus and indistinctly marked emargination on posterior margin of propodeum and posterior angles of propodeum forming blunt tooth protruding posterad.

Biological notes. Thermophilous species, prefers luminous forests, both coniferous and deciduous. Noted from streams with plane tree trees, small pine trees inside olive plantations, roadsides in pine forests, dry gorges, deep canyons with oak forests, pastures with frygana, single record comes from agricultural area. Nests under stones. Most of its records are from an altitude below 700 m, the highest location was from Parnon Mts., Peloponnese from an altitude of 1700 m.

36. *Camponotus candiotes* Emery, 1894

(Figs 36.1-8)

Camponotus lateralis var. *candiotes* Emery, 1894 a: 10.

Distribution in Greece: Aegean Islands (Legakis 2011: 29, Borowiec & Salata 2018 c: 4); **Crete** (Emery 1894: 10 - as *Camponotus lateralis* var. *candiotes*, Legakis 2011: 29, Borowiec & Salata 2012: 473, Borowiec & Salata 2015: 25, Salata & Borowiec 2017: 297, Seifert 2019: 25, Salata et al. 2020 a: 34); **Dodecanese** (Emery 1915: 2 - as *Camponotus lateralis* var. *candiotes*, Menozzi 1936: 304, Collingwood 1993: 195, Legakis 2011: 29, Borowiec & Salata 2012: 473, Seifert 2019: 25, Borowiec et al. 2021: 14); **Macedonia**: (Seifert 2019: 25, probably misidentification). Records from Ionian Islands (Collingwood 1993: 195 and Legakis 2011: 29) concern *Camponotus heidrunvogtae* Seifert.

Distribution in Europe and Mediterranean Basin: Azerbaijan; Greece; Turkey.

Description. Moderately large, polymorphic; minor worker: HL: 0.968-1.016 (mean 0.995); HW: 0.778-0.849 (mean 0.816); SL: 0.952-1.016 (mean 0.980); EL: 0.243-0.302 (mean 0.267); ML: 1.43-1.51; MW: 0.69-0.77. **Color.** Head completely black, often gena apically and sides of clypeus with small reddish spots, mesosoma only occasionally completely black (in Greek populations only 15 % of examined specimens), usually at least pronotum brown or reddish brown with obscure spot or two spots on dorsum , occasionally whole pronotum reddish, mesonotum from mostly reddish brown to predominantly blakc , often only anterior and lateral margins reddish to brown, propodeum usually black, occasionally reddish brown or only posterior face reddish, gaster black except yellowish white posterior margin, occasionally first gastral tergite brown; antennal scapus yellow, funicle from uniformly yellow to mostly infuscate, usually basal 1-3(5) segments yellowish then subsequent segments gradually darker, yellowish brown to brown; coxa brown to black, trochanters partly brown partly yellowish, femora mostly brown to almost black except yellow-

ish apices, in the palest specimens apical 1/3 of femora yellowish, in the darkest specimens almost whole femora brown, tibiae from yellow to yellowish brown with yellow apex, tarsi yellow, in the darkest forms tibiae mostly to almost completely brown, occasionally whole femora and tibiae yellow (Figs 36.1, 2, 5). **Head.** Stout, 1.2 times as long as wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 36.5). Clypeus trapezoidal, with anterior margin straight to slightly convex, simple or slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface with diffused microreticulation, appears shiny, covered with short and sparse appressed to decumbent hairs, anterior margin with a row of 6-8 long setae centrally and 4-8 short setae on sides, whole Clypeus with several moderately long erected setae grouping on sides and base of clypeus. Head diffusely to distinctly microsculptured, frontal area microreticulate, occipital and temporal area mostly with transverse or circular striation, surface with short and sparse appressed pubescence, appears shiny, gena, frons and anterior part of occipitum with short to long erected setae, only occipital and temporal areas without setae, ventral side of head with 6-12 moderately long to long erected setae. Scape moderately elongate, 1.1-1.2 times as long as width of head, at apex only slightly wider than in base, basal part without horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.2-2.3 times as long as wide and 1.8-1.9 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 36.5). Eyes moderately big, almost round, 0.27 length of head. Mandibles stout, diffusely microreticulate to almost smooth, surface shiny. **Mesosoma.** Moderately elongate, 1.9-2.1 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation often diffused, whole surface shiny. In lateral view dorsum with distinct mesonotal groove, propodeum with flat dorsum which is 1.6-1.7 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle posterior face not excavate. Surface of mesosoma with short and scarce depressed to decumbent hairs, pronotum posterolaterally with 2-4 long erected setae, mesonotum with 6-8 moderately long to long erected setae, propodeum on the whole surface with 8-12 short to moderately long erected setae; the number of erected setae increases with body length, the longest setae with length to 0.208. **Waist and gaster.** Petiolar scale moderately thick, broad in anterior view, PI = 2.5-2.8, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, surface shiny, covered with moderately long but scarce appressed hairs; each tergite with row of, very long erected setae across middle and close to posterior margin, sometimes with few additional erected setae between main rows, anterior row of setae on first gastral tergite sometimes reduced to only two setae or completely absent. **Legs.** Elongate, hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed hairs, inner margin of hind tibiae with row of 2-4 thorns. Ventral surface of fore femora with 3-5 long erected setae.

Major worker: Large, HL: 1.397; HW: 1.333; SL: 1.211; EL: 0.303; ML: 1.98; MW: 1.04**.** In the only two examined major workers uniformly black (Figs 36.3, 4) or sides of pro-

notum with indistinct brown spot of diffused borders, color of legs in one specimens almost completely yellow with brown coxa and femora infuscate at base, in the second specimen whole legs dark brown. Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight (Fig. 36.6). Anterior margin of clypeus slightly serrulate, in the middle sometimes with semicircular emargination. Scapus shorter, 0.9 times as long as width of head. Eyes relatively smaller, 0.22 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, occipital and temporal part of head with few erected setae, 8 setae on pronotum, 10-12 on mesonotum and 16-18 on the whole dorsum of propodeum, petiolar crest with 8 very long setae. Propodeal flat dorsum shorter, approximately 1.2 times as long as wide. Ventral posterior surface of fore femora with 7 long erected setae.

Gyne as in Figs 36.7, 8.

Comparative remarks. *Camponotus candiotes* belongs to the complex of species with predominantly shiny body, well marked or deep mesonotal groove and predominantly black head. This complex comprises also *C. atricolor*, *C. dalmaticus*, *C. heidrunvogtae* and *C. piceus*. The first species differs in very shallow mesonotal groove. *Camponotus dalmaticus* differs in setation of propodeum limited only to its posterior margin, slightly stronger microsculpture and base of scapus with slightly marked horizontal extension, *C. heidrunvogtae* differs in longer antennae with SL/HW in minor workers 1.281-1.441 (mean 1.361) while in *C. candiotes* is 1.121-1.235 (mean 1.203) and base of scapus with slightly marked horizontal extension. *Camponotus piceus* is the most similar to *C. candiotes* but differs in body predominantly black and scapus at base with slightly marked horizontal extension.

Biological notes. Thermophilous species, most records are from fig trees inside olive plantations, stream valleys with deciduous forests, especially plane trees, seashore with frygana and pines trees, occasionally on frygana with bushes. Foraging workers regularly observed on trunks of pine trees or leaves of fig trees especially fig trees infected with Homopteran insects producing honeydew. Nests under stones. Most records are from an altitude below 800 m, the highest location was from Psiloritis Mts., Crete from an altitude of 1650 m.

37. *Camponotus dalmaticus* (Nylander, 1849)

(Figs 37.1-12)

Formica dalmatica Nylander, 1849: 37.

Distribution in Greece: Aegean Islands (Salata & Borowiec 2019 b: 120); **Epirus** (Salata & Borowiec 2017c: 298-299, Borowiec & Salata 2018 a: 4, Salata & Borowiec 2019 b: 100); **Ionian Islands** (Forel 1886: clxvii - as *Camponotus lateralis* v. *dalmaticus*, Emery 1898: 125 - as *Camponotus lateralis* var. *dalmatica*, Emery 1914: 159 - as *Camponotus lateralis* var. *dalmatica*, Collingwood 1993: 195, Legakis 2011: 30, Borowiec & Salata 2014 a: 515, Salata & Borowiec 2017c: 298-299, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 100-104, 113, 114, Seifert 2019: 22, Borowiec & Salata 2021 a: 5; **new data:** Cephalonia, Ainos Mts, 1595 m, 15 VI 2021, 38.14007 / 20.6606; Cephalonia, Avithos Lake, 288 m, 10 VI 2019, 38.17203 / 20.71107; Cephalonia, 1.6 km SW of Digaleto, 564 m, 11 VI 2019, 38.16558 / 20.67099; Cephalonia, 1.8 km SW of Digaleto, 580 m, 11 VI 2019, 38.16593 / 20.66788; Cephalonia, 3.8 km SW of Digaleto, 760 m, 11 VI 2019, 38.16577 / 20.64259; Cephalonia, Kapandriti vic. loc. 1, 320 m, 9 VI 2019, 38.12913 / 20.72447;

Cephalonia, Kapandriti vic. loc. 2, 160 m, 9 VI 2019, 38.11361 / 20.73201; Cephalonia, Katapodata, 100 m, 10 VI 2019, 38.23337 / 20.64594; Cephalonia, 800 m S of Kateleios, 20 m, 9 VI 2019, 38.07066 / 20.75329; Cephalonia, 1.5 km NE of Koulourata, 273 m, 10 VI 2019, 38.20667 / 20.67715; Cephalonia, Kremmidi, 285 m, 9 VI 2019, 38.09048 / 20.74471; Cephalonia, 1 km NW of Pastra, 300 m, 9 VI 2019, 38.10058 / 20.7421; Cephalonia, 1.7 km NW of Pastra, 335 m, 9 VI 2019, 38.1084 / 20.74085; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005; Cephalonia, 2.4 km NE of Sami, 32 m, 14 VI 2021, 38.26884 / 20.66621; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala vic. loc. 1, 40 m, 6 VI 2019, 38.08178 / 20.79275; Cephalonia, Skala vic. loc. 2, 34 m, 7 VI 2019, 38.08221 / 20.79504; Cephalonia, Skala vic. loc. 3, 50 m, 7 VI 2019, 38.08505 / 20.7926; Cephalonia, Skala-Poros rd., 12 VI 2019, 38.12872 / 20.79576; Cephalonia 2.8 km NE of Valsamata, 560 m, 11 VI 2019, 38.19844 / 20.59694; Lefkada, Kavalikefta beach, 57 m, 12 VI 2021, 38.75366 / 20.59056; Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595); **Macedonia** (Borowiec & Salata 2012: 474, Seifert 2019: 22, Salata & Borowiec 2019 b: 104-105, 2022: 5; **new data:** Pieria, Mt. Olympus, Litohoro vic., 470 m, 14 V 2019, 40.09677 / 22.49301; Pieria, 2 km W of Panteleimonas, 305 m, 15 V 2019, 39.98563 / 22.59513; Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971; Pieria, Platamonas Castle hill loc. 1, 12 m, 11 V 2019, 40.00868 / 22.59654; Pieria, Platamonas Castle hill loc. 2, 60 m, 14 V 2019, 40.0073 / 22.59696; Pieria, road to P. Poroi loc. 1, 110 m, 17 V 2019, 39.97963 / 22.61563; Pieria, road to P. Poroi loc. 2, 185 m, 17 V 2019, 39.97627 / 22.61146); **Peloponnese** (Forel 1886: clxvii - as *Camponotus lateralis* v. *dalmaticus*, Legakis 2011: 30, Borowiec & Salata 2017 a: 203, Salata & Borowiec 2019 b: 114, 115, 120, Borowiec & Salata 2021 b: 4); **Sterea Ellas** (Forel 1886: clxvii - as *Camponotus lateralis* v. *dalmaticus*, Legakis 2011: 30, Borowiec & Salata 2017 b: 2, Salata & Borowiec 2017c: 298-299, Borowiec & Salata 2018 e: 5, Salata & Borowiec 2019 b: 106, Borowiec & Salata 2021 b: 4); **Thessaly** (Borowiec & Salata 2012: 474, Borowiec & Salata 2018 b: 222, Salata & Borowiec 2019 b: 107); **Thrace** (Bračko et al. 2016: 13, Seifert 2019: 22).

Distribution in Europe and Mediterranean Basin: Bosnia and Herzegovina; Bulgaria; Croatia; Greece; Israel; Italy: mainland; Lebanon; Montenegro; North Macedonia; Romania; Serbia; Slovenia; Switzerland; Syria; Turkey.

Description. Moderately large, polymorphic; minor worker: HL: 0.920-1.013 (mean 0.946); HW: 0.749-0.854 (mean 0.786); SL: 0.905-1.016 (mean 0.958); EL: 0.230-0.256 (mean 0.241); ML: 1.29-1.48; MW: 0.68-0.74. **Color.** Very variable in coloration. Head in the dominant darkest form almost completely black with narrowly yellowish to reddish anterior margin of clypeus and gena, often whole clypeus and gena up to insertions of antennae yellowish, reddish to reddish brown, rest of head black, occasionally anterior half of head brown posterior half black, in the palest form whole head yellowish brown to brown but such colored specimens was observed only in 3% of examined materials (Fig. 37.5). Mesosoma usually bicoloured with pronotum yellowish to red and rest of mesosoma dark brown to black (Figs 37.1, 2, 7), often dorsum of mesonotum and propodeum yellowish to red and sides black, in the palest form whole mesosoma yellowish to red, in very dark forms mesosoma predominantly black with brown to dark brown pronotum, in extreme case whole mesosoma black but such colored specimens represent only 2% of examined materials (Fig. 37.6); petiolar scale from uniformly yellow or reddish to completely black, gaster from dark brown to black except yellowish white posterior transparent margins, sometimes first gastral

tergite slightly paler than subsequent tergites; antennal scapus yellow to yellowish brown, usually basal 1-3 segments yellowish then subsequent segments gradually darker; legs in the palest forms completely yellow, often coxa brown to black, trochanters partly brown partly yellowish, femora mostly brown except yellowish apices, tibiae and tarsi yellowish to yellowish brown, in the darkest form legs completely brown. **Head.** Stout, approximately 1.2 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 37.7). Clypeus trapezoidal, with anterior margin straight to slightly convex, not crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated but appears shiny, covered with short and sparse appressed to decumbent hairs, anterior margin with a row of 4-6 long setae centrally but without short setae on sides, clypeal plate with few long erected setae grouping on sides and base of clypeus. Head distinctly microsculptured, frontal area microreticulate or on sides with striation, occipital and temporal area mostly with transverse or circular striation, surface with short and sparse appressed pubescence, appears shiny, gena, fros and anterior part of occipitum with few short to long erected setae, only occipital and temporal areas without setae, ventral side of head without or up to 6 moderately long to long erected setae. Scape moderately elongate, approximately 1.2 times as long as width of head, at apex only slightly wider than in base, basal part with slightly marked horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.2 times as long as wide and 1.6-1.7 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 37.7). Eyes moderately big, almost round, 0.25 length of head. Mandibles stout, diffusely microreticulate, surface shiny. **Mesosoma.** Moderately elongate, 1.9-2.0 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation often diffused, whole surface shiny but mesosomal dorsum sometimes appears slightly matt. In lateral view dorsum with distinct mesonotal groove, propodeum with slightly convex dorsum which is 1.4-1.5 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle, posterior face not excavate (Figs 36.1, 2). Surface of mesosoma with short and scarce hairs, pronotal plate with up to two long erected setae, mesonotum with 2-4 moderately long to long erected setae, propodeum only on posterior margin with 2-4 long erected setae, central part without setae; the number of erected setae increases with body length, the longest setae with length to 0.215. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI = 2.0- 2.2, with convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-8 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, surface shiny, covered with moderately long but scarce appressed hairs; each tergite with row of very long erected setae across middle and close to posterior margin, occasionally with few additional erected setae between main rows. Legs. Elongate, hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed hairs, inner margin of hind tibiae with row of 1-3 thorns. Ventral surface of fore femora with 1-2 long erected setae.

Major worker: Large, HL: 1.539-1.760 (mean 1.654); HW: 1.521-1.840 (mean 1.712); SL: 1.151-1.254 (mean 1.204); EL: 0.346-0.381 (mean 0.363); ML: 1.92-2.13; MW: 1.05-1.17. Body color and sculpture as in minor workers but darker forms predominate, also antennae and legs usually darker , brown, tarsi often as dark colored as tibiae (Figs 37.3, 4, 6, 8). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight (Fig. 37.8). Anterior margin of clypeus slightly serrulate, in the middle with semicircular or triangular emargination. Sculpture of head stronger. Scapus shorter, 0.7-0.8 times as long as width of head. Eyes relatively smaller, 0.22 times as long of head. Setation on head, pronotum and mesonotum more numerous than in minor workers but occipital and temporal part of head also lacking erected setae, propodeum with long erected setae only on posterior margin, petiolar crest with 8-10 very long setae. Propodeal flat dorsum approximately 1.6 times as long as wide. Ventral posterior surface of fore femora with 3-6 long erected setae.

Gyne as in Figs 37.9-11, male as in Fig. 37.12.

Comparative remarks. *Camponotus dalmaticus* belongs to the complex of species with predominantly shiny body, well marked or deep mesonotal groove and predominantly black head. This complex comprises also *C. atricolor*, *C. candiotes*, *C. heidrunvogtae* and *C. piceus*. *Camponotus dalmaticus* differs from all relatives in propodeum with erected setae limited only to posterior margin of the plate and stronger microsculpture of head and mesosomal dorsum, thus its body surface often appears slightly matte. While four other species have the whole surface of propodeal plate setose and finer microsculpture of head and mesosomal, thus body surface is always more or less shiny. *Camponotus atricolor* and *C. piceus* differ from *C. dalmaticus* also in predominantly black mesosoma while in *C. dalmaticus* predominate forms with yellow to reddish colouration of at least pronotum. Predominantly black forms of *C. dalmaticus* differs from *C. heidrunvogtae* in distinctly shorter antennae with SL/HW of minor workers 1.163-1.267 (mean 1.219) while in *C. heidrunvogtae* SL/HW is 1.281-1.441 (mean 1.361). *Camponotus atricolor* differs from completely black form of *C. dalmaticus* in very shallow mesonotal groove and antennal scapus without basal horizontal extension, *C. piceus* differs in less marked microsculpture and perfectly shiny body surface, *C. candiotes* differs in antennal scapus without basal horizontal extension.

Biological notes. Thermophilous species. Common in deciduous forests, especially oak forests. Dominant ant species on bushes at roadsides inside deciduous forests or on Mediterranean bushes. Less common in pine or fir forests. Noted also from frygana on sea coast, old olive tree plantations, stream valleys with plane trees. Workers often foraging on leafs of *Hedera helix* entwining olive or fruit trees. Quite common in towns and tourists resorts on herbs, shrubs and walls in garden. Nests under stones or rock walls made of rubble and clay. Most records are from an altitude below 800 m, only in Peloponnese several samples come from an altitude above 1000 m with the highest location in Parnonas Mts. from an altitude of 1370 m.

38. *Camponotus fallax* (Nylander, 1856)

(Figs 38.1-9)

Formica fallax Nylander, 1856: 57;
Camponotus marginatus var. *ruzskyi* Emery, 1898: 150;
Camponotus marginatus var. *kamensis* Ruzsky, 1903 b: 302;
Camponotus (*Myrmetoma*) *fallax pageti* Hamann & Klemm, 1976: 674.

Distribution in Greece: Greece generally (Roger 1859: 230 as *Formica fallax*); **Aegean Islands** (**new data:** Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E, Samos, Nightigale Valley, 50-100 m, 9 VI 2013, 37.7 N / 26.63333 E); **Epirus** (Borowiec & Salata 2018 a: 4, Salata & Borowiec 2019 b: 100); **Ionian Islands** (Borowiec & Salata 2013: 351, Borowiec & Salata 2021 a: 5; **new data:** Cephalonia, 3.8 km SW of Digaleto, 760 m, 11 VI 2019, 38.16577 / 20.64259); **Macedonia** (Legakis 2011: 30, Borowiec & Salata 2012: 475); **Peloponnese** (Collingwood 1963: 115, Legakis 2011: 30, Borowiec & Salata 2017: 205); **Sterea Ellas** (Borowiec & Salata 2018 e: 5); **Thessaly** (Borowiec & Salata 2018 b: 223, Salata & Borowiec 2019 b: 107); **Thrace** (Bračko et al. 2016: 13).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Azerbaijan; Belarus; Belgium; Bulgaria; Croatia; Czech Rep.; Finland; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Iran; Israel; Italy: mainland, Sardinia, Sicily; Liechtenstein; Lithuania; Luxembourg; Malta; Moldova; Montenegro; Morocco; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, moderately polymorphic; minor worker: HL: 1.159-2.571 (mean 1.347); HW: 0.943-1.302 (mean 1.137); SL: 1.194-1.413 (mean 1.289); EL: 0.349-0.433 (mean 0.386); ML: 1.74-2.14; MW: 0.810-1.083; major worker: HL: 2.070-2.267 (mean 2.159); HW: 2.050-2.367 (mean 2.171); SL: 1.620-1.706 (mean 1.677); EL: 0.492-0.526 (mean 0.507); ML: 2.71-2.87; MW: 1.37-1.46. **Color.** In most specimens body black only anterior and posterior transparent margins of pronotum yellowish, sometimes pronotum mostly yellowish to yellowish brown, often with obscure spots dorsally, mesonotum and propodeum on sides brown, clypeus partly yellowish to reddish brown and gena with yellow to reddish brown spots, gaster usually completely black, occasionally brown with anterior slope of first gastral tergite yellowish to yellowish brown, posterior margins of tergites transparent yellow; antennae in the palest specimens yellowish but usually yellowish brown to brown, legs from uniformly yellow with only fore coxa infuscate basally, or femora yellow, tibiae and tarsi yellowish brown to brown (Figs 38.1-4). **Head.** In minor workers elongate, approximately 1.2 times longer than wide, in front of eyes softly rounded, behind eyes regularly rounded, posterior margin straight (Fig. 38.5), in major workers head stout, approximately as long as wide, sides in basal half almost parallel, then softly rounded anteriorly, posterior margin distinctly concave (Fig. 38.6). Clypeus almost rectangular, with anterior margin straight but with shallow to deep median emargination, especially in major workers excavation is almost semicircular, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated and sparse punctation but indistinctly shiny, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 4-6 very long setae, also sides and basal part of clypeus with a pair long erected setae. Head distinctly microreticulate and with moderately coarse and sparse punctation, distance between punctures larger than the diameter of puncture , interspaces appear indistinctly shiny, frons with well-marked median sulcus or impunctate line, whole surface with short and very sparse appressed hairs. Sides of head and gena lacking erected setae, only frons with or two pairs of long erected setae and central postocular area with one or two pairs of long erected setae, occipital area lacking erected setae, ventral side of head with 8-16 short to long erected setae. Scape moderately long, in minor workers 1.1-1.3 times, in major workers 0.7-0.8 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate,

shiny, with very short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.6-2.6 times as long as wide and approximately 1.6 times as long as second segment, third segment slightly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 38.5). Eyes moderately big, almost round, in minor workers 0.29 in major workers 0.23 length of head. Mandibles stout, microreticulate and coarsely punctate, surface shiny. **Mesosoma.** Elongate, in minor workers approximately 1.9-2.1, in major workers 1.9-2.0 times as long as wide, dorsally and laterally distinctly sculptured , dorsum and lateral sides with transverse to partly longitudinal striae, dorsum with additional sparse punctation, surface shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum form a continuous angle. Surface of mesosomal dorsum with short and scarce depressed hairs directed forward, pronotum in minor workers lacking erected setae, in major workers with 4-8 setae, mesonotum in minor workers usually with only 2 in major workers 2-4 erected setae, propodeum in minor workers with 4-6 in major workers 4-8 very long erected setae, the longest with length to 0.370. **Waist and gaster.** Petiolar scale moderately thin to moderately thick with convex anterior and flat posterior face, apex rounded; anterior surface transversely striate, posterior surface smooth, without pubescence, apical crest with 4-10 very long erected setae (Figs 38.2, 4). Gaster shorter than mesosoma, tergites with transverse microstriation and sparse micropunctation, surface distinctly shiny, covered with very short and scarce appressed hairs; each tergite with numerous, long erected setae arranged in transverse one to two rows in the middle and a row close to posterior margin. **Legs.** Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with sparse subdecumbent to decumbent hairs, inner margin of hind tibiae lacking row of thorns except three apical spurs. Ventral surface of fore femora without or with a single long erected seta.

Gyne as in Figs 38.7-9.

Comparative remarks. *Camponotus fallax* belongs to the complex of species with indistinctly shiny body with regularly arched mesosoma in profile. Only three members of the subgenus *Myrmentoma* have this set of characters: *C. fallax*, *C. gestroi gestroi* and *C. tergestinus*. *Camponotus gestroi gestroi* differs in not as regularly arched mesosoma in profile with well-marked mesonotal suture and black body, at least partly black legs and antennae, and longer antennal scapus with SL/HW in minor workers = 1.26 and major workers 0.92. While *C. fallax* and *C. tergestinus* have mesosoma regularly arched in profile, with only softly marked mesonotal suture, their overall body colouration is brown to dark brown with legs and antennae completely to mostly yellow to yellowish brown (sometimes head and mesosoma are black), and their antennal scapus is shorter with SL/HW in minor workers usually below 1.15 and major workers below 0.90. *Camponotus tergestinus* differs in setose gena (in *C. fallax* without setae), anteromedian clypeal margin without or with very shallow median emargination (in *C. fallax* usually with distinct median emargination, especially in major workers) and propodeum in lateral view forming blunt angle (in *C. fallax* forming more continuous convexity).

Biological notes. Arboricolous species usually associated with deciduous forests, especially oak forests. In Greece, collected also in mixed fir-oak forests, old olive plantations, stream valleys with plane trees and on trees in tourist resorts. Nests mainly in dead wood of old trees or in dead, dry and hollow branches. All Greek localities were placed at the altitude below 1000 m.

39-40. *Camponotus gestroi* Emery, 1878

(Figs 39.1-6, 40.1-7)

Camponotus gestroi Emery, 1878: 44;
Camponotus gestroi st. *creticus* Forel, 1886 b: clix;
Camponotus (*Myrmentoma*) *gestroi* var. *ponariensis* Santschi, 1921 c: 435.

Distribution in Greece (nominotypical form): **Aegean Islands** (Salata & Borowiec 2017: 295-296; **new data:** Lesbos, Anaxos Skoutarou, 28 m, 7 VI 2015, 39.31701 / 26.14061; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 / 26.21009); **northern Ionian Islands** (Borowiec & Salata 2014 a: 515, Salata & Borowiec 2017 a: 295-296, Salata & Borowiec 2019 b: 100-104, 113, 114, Borowiec & Salata 2021 a: 6; **new data:** Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595; Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747); **Macedonia** (Petrov & Legakis 1996: 31, Legakis 2011: 30, Borowiec & Salata 2012: 475); **Peloponnese** (Forel 1886: clxvii, Legakis 2011: 30, Borowiec & Salata 2017 b: 205, Salata & Borowiec 2019 b: 114, 115, Borowiec & Salata 2021 b: 5); **Sterea Ellas:** Salata & Borowiec 2019 b: 106; **Thessaly** (Borowiec & Salata 2018 b: 223, Borowiec & Salata 2018 e: 5); **Thrace** (Bračko et al. 2016: 13).

Distribution in Greece (ssp. *creticus*): **Crete** (Forel 1886: clix - as *Camponotus gestroi* st. *creticus*, Emery 1894: 10 - as *Camponotus gestroi* var. *creticus*, Legakis 2011: 30, Borowiec & Salata 2012: 475, Borowiec & Salata 2015: 25, Salata & Borowiec 2017: 297-298 - partly as *Camponotus gestroi creticus*, Salata et al. 2020 a: 34); **Cyclades** (Finzi 1939: 160 - as *Camponotus gestroi* ssp. *creticus*, Legakis 2011: 30); **Dodecanese** (Forel 1889: 256 - as *Camponotus gestroi* r. *creticus*, Emery 1915: 2 - as *Camponotus gestroi* var. *creticus*, Menozzi 1936: 303, Collingwood 1993: 195, Legakis 2011: 30, Salata & Borowiec 2015 a: 68-69, Salata & Borowiec, 2016: 199, Borowiec et al. 2021: 14); **southern Ionian Islands** (Emery 1914: 159 - as *Camponotus maculatus gestroi creticus*, Borowiec & Salata 2018 d: 5, Legakis 2011: 30; **new data:** Cephalonia, Ag. Panentes ruins, 230 m, 10 VI 2019, 38.24856 / 20.65411; Cephalonia, Ainos Mts, 1512 m, 15 VI 2021, 38.12594 / 20.68345; Cephalonia, Assos, 64 m, 16 VI 2021, 38.37935/ 20.53555; Cephalonia, Avithos Lake, 288 m, 10 VI 2019, 38.17203 / 20.71107; Cephalonia, Kapandriti vic. loc. 1, 320 m, 9 VI 2019, 38.12913 / 20.72447; Cephalonia, Kremmidi, 285 m, 9 VI 2019, 38.09048 / 20.74471; Cephalonia, 1.7 km NW of Pastra, 335 m, 9 VI 2019, 38.1084 / 20.74085; Cephalonia, 2 km SW of Poros, 50 m, 18 VI 2021, 38.13659 / 20.75968; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005; Cephalonia, Skala-Poros rd., 12 VI 2019, 38.12872 / 20.79576); **Sterea Ellas** (Finzi 1928: 791 - as *Camponotus gestroi* ssp. *creticus*, Legakis 1984: 87 – as *Camponotus gestroi creticus*, 2011: 30, **new data:** Attika, Pireus beach, 5 m,10 VII 2016, 37.92083 N / 23.69777 E).

Distribution in Europe and Mediterranean Basin: nominotypical form: Algeria; France: Corsica; Greece; Gibraltar; Italy: mainland, Sardinia, Sicily; Portugal; Serbia, Spain: mainland; ssp. *creticus*: Greece; Turkey.

Note. Populations of *Camponotus gestroi* from Greece were classified into two subspecies: *Camponotus gestroi gestroi* Emery, 1878 and *Camponotus gestroi creticus* Forel, 1886. Typical specimens for each subspecies appears to be distinct morphologically. However, Pe-

loponnesian populations of this species have characters intermediate between these described subspecies. Thus, most likely this variability should be trated as a morphocline. However, until confirmation of these assumptions, we provide separate characteristics for each of the subspecies.

Description. *Camponotus gestroi gestroi*: Large, moderately polymorphic; minor worker: HL: 1.103-1.302 (mean 1.212); HW: 0.854-1.008 (mean 0.934); SL: 1.100-1.183 (mean 1.178); EL: 0.302-0.333 (mean 0.318); ML: 1.71-1.89; MW: 0.68-1.93; major worker: HL: 1.508-1.960 (mean 1.752); HW: 1.270-1.796 (mean 1.534); SL: 1.317-1.490 (mean 1.396); EL: 0.357-0.436 (mean 0.389); ML: 2.18-2.57; MW: 1.05-1.29. **Color.** Body black; antennae, coxa and femora usually black, sometimes antennae brown, occasionally scapus in basal 2/3 length yellowish and in apical 1/3 yellowish brown, tibiae usually dark brown to black, sometimes brown with yellow apex, tarsi yellowish to brown, occasionally black (Figs 39.1-6). **Head.** In minor workers elongate, approximately 1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin straight (Fig. 39.5), in major workers head stout, 1.1-1.2 times as long as wide, widest in basal 1/3 length, sides softly convex and softly converging anterad, posterior margin straight (Fig. 39.6). Clypeus hexagonal, with anterior margin straight, in minor workers without in major workers with small crenulation, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface slightly opalescent, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 4-6 very long setae, each side of clypeus with 4-8 short to long erected setae. Head distinctly microreticulate, frons and gena with few punctures, especially in major workers, frons with well-marked median sulcus or impunctate line, whole surface with short and very sparse appressed hairs, appears unhaired, central part of head appears slightly opalescent, sides indistinctly shiny. In minor workers gena, in major workers gena and whole sides of head with erected setae, frons with 10-14 long erected setae grouping mostly on sides of frons, central postocular area with 4-16 long erected setae, occipital area lacking erected setae or only in major workers with 1-2 long setae, ventral side of head in minor workers with 4-8, in major workers 8-16 short to long erected setae. Scape moderately long, in minor workers 1.3 times, in major workers 0.8-1.0 times as long as width of head, at apex twice wider than in base, its surface distinctly microreticulate but shiny, with very short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.7 times as long as wide and approximately 1.6 times as long as second segment, third segment as long as or slightly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 39.5). Eyes moderately big, short oval, in minor workers 0.26 in major workers 0.22 length of head. Mandibles stout, microreticulate and coarsely punctate, surface shiny. Mesosoma. Elongate, in minor workers 2.0-2.5, in major workers 1.9-2.1 times as long as wide, dorsally and laterally distinctly sculptured , on sides tending to form transverse or oblique striation, without punctures except slightly marked setose punctation, surface distinctly shiny. In lateral view dorsum form regular arch, without mesonotal groove but with well-marked deep mesonotal suture, propodeum forms obtuse angle (Figs 39.2, 4). Surface of mesosomal dorsum with short and scarce depressed hairs, appears unhaired, pronotum and mesonotum in minor workers with 2-6, in major workers 6-12 erected setae, propodeum in both minor and major workers with 10-24 in major workers 4-8 very long erected setae, the longest with length to 0.310. **Waist and gaster.** Petiolar scale

moderately thin to moderately thick with convex anterior and flat posterior face, apex rounded; anterior surface transversely striate, posterior surface smooth, without pubescence, apical crest with 8-10 very long erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation and sparse micropunctation, surface distinctly shiny, covered with very short and scarce appressed hairs; each tergite with numerous, long erected setae arranged in transverse one to two rows in the middle and a row close to posterior margin. Legs. Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with sparse, moderately long appressed hairs, inner margin of hind tibiae with row of 4-7 thorns. Ventral surface of fore femora with 5-6 erected setae, in largest major workers also external surface of femurs with 1-3 erected setae.

Gyne as in Figs 39.7, 8.

Camponotus gestroi creticus: minor worker: HL: 0.960-1.175 (mean 1.111); HW: 0.730-0.873 (mean 0.828); SL: 0.905-1.159 (mean 1.079); EL: 0.286-0.302 (mean 0.292); ML: 1.43-1.80; MW: 0.70-0.82; major worker: HL: 1.920-2.007 (mean 1.978); HW: 1.764-1.960 (mean 1.884); SL: 1.429-1.532 (mean 1.495); EL: 0.429-0.444 (mean 0.434); ML: 2.53-2.67; MW: 1.31-1.38. In color and structure similar to nominotypical subspecies (Figs 40.1-4) but head in minor workers more elongate, 1.3-1.4 times longer than wide (Fig. 40.5), in major workers head stout, approximately as long as wide, sides in upper half almost parallel, then softly rounded anteriorly, posterior margin distinctly concave (Fig. 40.6). Structure and setation of head similar to that of nominotypical subspecies but microsculpture slightly stronger thus head appears more opalescent. Scape moderately long, in minor workers 1.2-1.3 times, in major workers 0.8 times as long as width of head, at apex twice wider than in base, its surface distinctly microreticulate but shiny, with very short and sparse appressed pubescence, in the largest workers with 1-6 erected setae. Mesosoma elongate, in minor workers 2.0-2.3, in major workers 1.9-2.0 times as long as wide, dorsally and laterally distinctly sculptured , slightly stronger than in nominotypical subspecies thus surface slightly less shiny. In lateral view dorsum form irregular arch, with distinctly marked mesonotal groove (Figs 40.2, 4). Rest of characters like in nominotypical subspecies. Ventral surface of fore femora with more numerous erected setae, especially in major workers such setae occupy also whole external surface of femur and the largest number of erected setae may be up to 20.

Male as in Fig. 40.7.

Comparative remarks. *Camponotus gestroi gestroi* belongs to the complex of species with indistinctly shiny body with regularly arched mesosoma in profile. Only three members of the subgenus *Myrmentoma* have this set of characters: *C. fallax*, *C. gestroi gestroi* and *C. tergestinus*. *Camponotus gestroi gestroi* differs from both relatives in mesosoma with well-marked mesonotal suture and not as regularly arched as in both relatives, black body colouration, at least partly black legs and antennae, and longer antennal scapus with SL/HW in minor workers = 1.26 and major workers 0.92. *Camponotus fallax* and *C. tergestinus* have mesosoma regularly arched in profile, mesonotal suture is only softly marked, body coloration is brighter from brown to dark brown (sometimes only head and mesosoma appear blackish), legs and antennae are completely to mostly yellow to yellowish brown, and antennal scapus is shorter with SL/HW in minor workers usually below 1.15 and major workers below 0.90.

Camponotus gestroi creticus appears similar to the nominotypical subspecies but differs in mesosoma in profile with shallow to moderately deep metanotal groove (Cretan population

has the groove slightly shallower than populations from the Aegean). Mesosomal sculpture in *C. gestroi creticus* is more distinct and slightly opaque (in *C. gestroi gestroi* mesosomal surface is distinctly shiny); major workers are slightly larger than in nominotypical subspecies with mean ML up to 2.61 and HL 1.98 (in *C. gestroi gestroi* 2.35 and 1.75 respectively). The largest major workers of *C. gestroi creticus* have antennal scapus with 1-6 erected setae while in *C. gestroi gestroi* such setae have never been observed within Greek population. Other species of the subgenus *Myrmentoma* with mostly shiny body differ from *C. gestroi creticus* in presence of deep mesonotal groove and saddle-form propodeum.

Biological notes. Thermophilous species associated with various mediterranean habitats. Collected in luminous oak forests, shrubs in cypress forests, shrubs around pastures, limestones hills after burned forests, old abandoned gardens on leafs of fig trees, on herbs in mountain zones, fryganas, deciduous trees and meadows, mountain plateaus, alpine zone with limestones rocks and pastures, single records come from pine grove, limestones quarry, ruderal grassland in urban area. Nests under stones. Most records are from an altitude below 700 m, the highest location was from Nida Plateau, Crete from an altitude of 1166 m.

41. *Camponotus heidrunvogtae* Seifert, 2019

(Figs 41.1-8)

Camponotus piceus sp. 2: Seifert 2007: 155;
Camponotus sp. LONG: Seifert 2018: 120;
Camponotus heidrunvogtae Seifert, 2019: 29.

Distribution in Greece: Epirus (Borowiec & Salata 2018 a: 5 - as *Camponotus* cf. *piceus*); **Ionian Islands** (Salata & Borowiec 2017: 298 - as *Camponotus* cf. *piceus*, Salata & Borowiec 2019 b: 100-104, Seifert 2019: 30, Borowiec & Salata 2021 a: 6); **Macedonia** (Seifert 2019: 30); **Sterea Ellas** (Finzi 1928: 791 - as *Camponotus lateralis piceus* var. *candiotes*).

Distribution in Europe and Mediterranean Basin: Bosnia and Herzegovina; Croatia; Greece; Montenegro.

Description. Moderately large, polymorphic; minor worker: HL: 0.825-1.1058 (mean 0.9580); HW: 0.663-0.857 (mean 0.758); SL: 0.849-1.151 (mean 1.032); EL: 0.230-0.262 (mean 0.245); ML: 1.23-1.57; MW: 0.58-0.80. **Color.** Body completely black (in 1/3 of examined specimens) or pronotum laterally with reddish spot of various size (in 2/3 of examined specimens); usually gena close to anterior margin with small yellowish to reddish spot, occasionally almost whole pronotum yellowish red; antennal scapus yellow, occasionally slightly infuscate in the widest apical part, first segment of funiculus usually infuscate in basal half and yellowish apically, segments, segments 6-11 gradually infuscate; coxa brown to black, trochanters partly brown partly yellowish, femora mostly brown to black except yellowish apices, tibiae yellow to yellowish brown, tarsi yellow, in the darkest forms tibiae mostly to almost completely brown (Figs 41.1-4). **Head.** Stout, 1.2-1.3 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 41.5). Clypeus trapezoidal, with anterior margin straight to slightly convex, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface with diffused microreticulation, appears shiny, covered with short and sparse appressed to decumbent hairs, anterior margin with a

row of 6-8 long setae centrally and 2-3 short setae on sides, whole Clypeus with several moderately long and long erected setae grouping on sides and base of clypeus. Head diffusely to distinctly microsculptured, frontal area microreticulate, occipital and temporal area mostly with transverse striation, surface with short and sparse appressed pubescence, appears shiny, gena, frons and anterior part of occipitum with short to long erected setae, only occipital area without setae, ventral side of head with 6-10 moderately long to long erected setae. Scape elongate, 1.3-1.4 times as long as width of head, at apex only slightly wider than in base, basal part with slightly marked horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.4 times as long as wide and 1.4 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broa (Fig. 41.5). Eyes moderately big, almost round, 0.26 length of head. Mandibles stout, microreticulate, surface shiny. **Mesosoma.** Moderately elongate, 2.0-2.1 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal and oblique striation, on sides of pronotum microstriation often diffused or surface partly completely shiny. In lateral view dorsum with distinct mesonotal groove, propodeum with flat dorsum which is 2.0-2.1 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle posterior face not excavate (Fig. 41.2). Surface of mesosoma with short and scarce depressed to decumbent hairs, pronotum posterolaterally with 2-3 long erected setae, mesonotum with 10-16 moderately long to long erected setae, propodeum anteriorly and centrally with 2-10 short to moderately long and close to posterior margin 2-6 long erected setae, the longest setae with length to 0.254. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI > 2.0, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, surface shiny, covered with moderately long but scarce appressed t hairs; each tergite with row of, very long erected setae across middle and close to posterior margin. **Legs.** Elongate, hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed hairs, inner margin of hind tibiae with row of 2-5 thorns. Ventral surface of fore femora with 3-6 long erected setae.

Major worker: Large, HL: 1.820-2.030 (mean 1.898); HW: 1.820-2.010 (mean 1.869); SL: 1.460-1.524 (mean 1.499); EL: 0.333-0.413 (mean 0.383); ML: 2.27-2.33; MW: 1.16-1.25. Body color and sculpture as in minor workers but antennae and legs usually darker , brown to dark brown and apex of tibiae brown, tarsi as dark colored as tibiae (Figs 41.3, 4). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight. Anterior margin of clypeus slightly serrulate, in the middle sometimes with indistinctly marked emargination (Fig. 41.6). Scapus shorter, 0.8 times as long as width of head. Eyes relatively smaller, 0.2 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, occipital part of head with erected setae, petiolar crest with 8-10 very long setae. Propodeal flat dorsum shorter than in minor worker, 1.5-1.6 times as long as wide Ventral posterior surface of fore femora with 6-10 long standing setaerected setae.

Gyne as in Figs 41.7, 8.

Comparative remarks. *Camponotus heidrunvogtae* belongs to the complex of species with predominantly shiny body, well marked or deep mesonotal groove and predominantly black head. This complex comprises also *C. atricolor*, *C. candiotes*, *C. dalmaticus* and *C. piceus*. *C. dalmaticus* differs in propodeum with erected setae limited only to its posterior margine and stronger microsculpture of head and mesosomal dorsum. While the three remaining species have whole surface of propodeal dorsum setose, and their head and mesosomal microsculpture is finer and more or less shiny. *Camponotus heidrunvogtae* differs from relative species in distinctly longer antennae with SL/HW in the smallest workers 1.281-1.441 (mean 1.361) while in *C. piceus* SL/HW is 1.189-1.260 (mean 1.236), in *C. atricolor* 1.257-1.329 (mean (1.293) and *C. candiotes* 1.121-1.235 (mean 1.203). However, for the largest major workers the difference is less distinct: *C. heidrunvogtae* SL/HW 0.753-0.837 (mean 0.804), *C. piceus* 0.750-0.817 (mean 0.784), *C. atricolor* 0.701-.0753 (0.727), only in *C. candiotes* this index equals 0.908 (only one major worker measured). *Camponotus atricolor* differs from *C. heidrunvogtae* in predominantly black body (in *C. heidrunvogtae* predominate specimens with reddish spots on pronotum), very shallow mesonotal groove (deep in *C. heidrunvogtae*) and antennal scapus lacking basal horizontal extension (in *C. heidrungvogtae* such extension is indistinctly marked); *C. piceus* also differs in predominantly black body; *C. candiotes* due to predominant bicolored mesosoma looks the most similar to *C. heidrunvogtae* but differs in antennal scapus without basal horizontal extension. Also, both species are separated geographically: *C. heidrunvogtae* has small distribution range limited to Ionian Island, Epirus, southern Macedonia and Sterea Ellas while *C. candiotes* was noted only from Crete and southern Aegean Islands.

Biological notes. Thermophilous species collected mainly in olive plantations and oak forests on shrubs, or on rocks surrounded by Mediterranean shrubs. Nests under stones or in rock crevices. Collecting sites were placed on an altitude between 170 and 900 m.

42. *Camponotus kiesenwetteri* (Roger, 1859)

(Figs 42.1-10)

Formica (*Hypoclinea*) *kiesenwetteri* Roger, 1859: 241;
Camponotus (*Orthonotomyrmex*) *kiesenwetteri* var. *cypria* Emery, 1920: 26.

Distribution in Greece: Aegean Islands (Forel 1889: 255, Finzi 1939: 160, Collingwood 1993: 194, Legakis 2011: 31, Salata & Borowiec 2017: 295-299, 304, Borowiec & Salata 2018 c: 4; **new data:** Lesbos, Anaxos Skoutarou, 28 m, 7 VI 2015, 39.31701 / 26.14061; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 / 26.24461; Lesbos, Mantamados vic., 150 m, 30 VII 2009, 39.3 / 26.35; Lesbos, 3.4 km NE of Skalochori, 292 m, 9 VI 2015, 39.27923 / 26.10926; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015; Samos, Kallithea, 286 m, 5 X 2019, 37.73631 / 26.58214; Samos, Klima, 10 m, 4 VI 2013, 37.76666 / 26.88333; Samos, Megali Panagia, 255 m, 6 X 2019, 37.69509 / 26.84318); **Crete** (Emery 1894: 10, Legakis 2011: 31, Borowiec & Salata 2012: 477, Borowiec & Salata 2015: 21, 25, Salata & Borowiec 2017 a: 295-299, 304, Salata et al. 2020 a: 35); **Cyclades** (Legakis 2011: 31, Salata & Borowiec 2017 a: 297; **new data:** Naxos, above Akrotiri, 46 m, 30 VI 2016, 37.1298 / 25.4481; Naxos, 780 m SE of Keramoti, 660 m, IV-XI 2006, 37.10361 / 25.52194; Naxos, Kouros, 68 m, 30 VI 2016, 37.1788 / 25.4932; Naxos, Lionas, 20 m, 4 VII 2016, 37.137 / 25.5855; Tinos, Falatados-Panagia Kaki Skala rd., 330 m, 11 IV 2015, 37.62

/ 25.18); **Dodecanese** (Forel 1889: 255, Emery 1915: 2, Menozzi 1936: 304, Collingwood 1993: 194, Legakis 2011: 31, Borowiec & Salata 2012: 477, Salata & Borowiec 2015 a: 68-69, Salata & Borowiec, 2016: 198-199, Salata & Borowiec 2017 a: 295-299, 304, Borowiec et al. 2021: 15); **Ionian Islands** (Roger 1859: 241 - as *Formica* (*Hypoclinea*) *kiesenwetteri*, Forel 1886: clx, Emery, 1901: 57, Collingwood 1993: 194, Legakis 2011: 31, Borowiec & Salata 2014 a: 515, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 100-104, 113, 114; **new data:** Cephalonia, Ancient Same, 220 m, 10 VI 2019, 38.2522 / 20.66423; Cephalonia, Assos, 64 m, 16 VI 2021, 38.37935/ 20.53555; Cephalonia, Kapandriti vic. loc. 1, 320 m, 9 VI 2019, 38.12913 / 20.72447; Cephalonia, 1.5 km NE of Koulourata, 273 m, 10 VI 2019, 38.20667 / 20.67715; Cephalonia, Kremmidi, 285 m, 9 VI 2019, 38.09048 / 20.74471; Cephalonia, Moni Aprilion, 220 m, 10 VI 2019, 38.26221 / 20.66651; Cephalonia, 1 km NW of Pastra, 300 m, 9 VI 2019, 38.10058 / 20.7421; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005; Cephalonia, Poros forest loc. 1, 14 VI 2021, 129 m, 38.18344 / 20.74936; Cephalonia, 2.4 km NE of Sami, 32 m, 14 VI 2021, 38.26884 / 20.66621; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala vic. loc. 1, 40 m, 6 VI 2019, 38.08178 / 20.79275; Cephalonia, Skala vic. loc. 2, 34 m, 7 VI 2019, 38.08221 / 20.79504; Cephalonia, Skala vic. loc. 3, 50 m, 7 VI 2019, 38.08505 / 20.7926; Cephalonia, Skala-Poros rd., 12 VI 2019, 38.12872 / 20.79576); **Macedonia** (Borowiec & Salata 2012: 477); **Peloponnese** (Legakis 2011: 31, Salata & Borowiec 2017 a: 295-299, 304, Borowiec & Salata 2017 b: 205, Salata & Borowiec 2019 b: 114, 115, Borowiec & Salata 2021 b: 5); **Sterea Ellas** (Legakis 1984: 87, 2011: 31, Borowiec & Salata 2018 e: 5, Salata & Borowiec 2019 b: 106, **new data:** Attica, Athens, 110 m,10 VII 2016, 37.97222 N / 23.72527 E); **Thrace** (Bračko et al. 2016: 14).

Distribution in Europe and Mediterranean Basin: Cyprus; Greece; Turkey.

Description. Moderately large, polymorphic; minor worker: HL: 1.167-1.269 (mean 1.220); HW: 0.949-1.079 (mean 1.012); SL: 1.135-1.190 (mean 1.163); EL: 0.286-0.309 (mean 0.315); ML: 1.73-1.92; MW: 0.89-0.986. **Color.** Body black, only anterior margin of pronotum and apical half of mandibles yellowish to reddish brown and posterior margins of gastral tergites whitish yellow; antennae from yellow to dark brown, base and apex of scapus usually paler than rest of surface, yellowish to reddish brown, in extreme case scapus almost completely black and funiculus dark brown; coxa, femora and tibiae brown to almost black, trochanters and extreme apex of femora and tibiae often partly yellowish, tarsi from yellow to dark brown, basitarsus often darker than subsequent tarsomeres (Figs 42.1, 2). **Head**. Stout, 1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin slightly convex (Fig. 42.5). Clypeus trapezoidal, with anterior margin slightly convex and slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface opalescent dull, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 4-6 very long setae and between long setae often with few very short setae, whole Clypeus with several moderately long and long erected setae. Head distinctly microreticulate, surface opalescent dull, frons sometimes with impunctate line, whole surface , including gena and sides of head with sparse and short, hardly visible appressed hairs and long erected setae including occipital area, ventral side of head with 6-10 moderately long to long standing setae. Scape moderately long, 1.1-1.2 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with

short and sparse appressed pubescence, without decumbent hairs or erected setae; base of scapus with indistinctly marked horizontal extension. Funicular segments elongate, thin, first segment 2.8 times as long as wide and 2.6 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 42.5). Eyes moderately big, almost round, 0.243 length of head. Mandibles stout, microreticulate and elongate punctate, surface shiny. **Mesosoma.** Moderately elongate, 1.8-2.0 times as long as wide, dorsally and laterally with strong microsculpture. In lateral view dorsum with distinct mesonotal groove, propodeum saddle-shaped with flat dorsum and deeply emarginate posterior margin, posterior face distinctly excavate with well-marked, distinctly protruding posterad dorsal angles thus in dorsal view posterior angles appear as blunt teeth (Figs 42.1, 2). Surface of mesosoma with short and scarce depressed to decumbent hairs, whole dorsum with numerous moderately long to long erected setae, the longest with length to 0.270. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI < 1.60, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface microreticulate, sculpture tends to form transverse striation, without pubescence, apical crest with 8-12 very long standing setae. Gaster shorter than mesosoma, tergites with strong microreticulation, surface opalescent dull, covered with moderately long but scarce appressed to decumbent hairs; each tergite with numerous, very long erected setae (Fig. 42.2). Legs. Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 2-5 thorns. Ventral surface of fore femora with 5-10 long erected setae.

Major worker: Large, HL: 1.840-2.093 (mean 1.988); HW: 1.686-1.980 (mean 1.866); SL: 1.413-1.537 (mean 1.466); EL: 0.394-0.405 (mean 0.399); ML: 2.38-2.60; MW: 1.28-1.43. Body color and sculpture as in minor workers but antennae and legs usually darker , dark brown to black and apex of tibiae brown, and tarsi as dark colored as tibiae (Figs 42.3, 4). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin often straight. Clypeus in the middle often with indistinctly marked emargination (Fig. 42.6). Scapus shorter, 0.8 times as long as width of head. Eyes relatively smaller, 0.2 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, petiolar crest with 12-16 very long setae. Ventral posterior surface of fore femora with 10-18 long erected setae.

Gyne as in Figs 42.7-9, male as in Fig. 42.10.

Comparative remarks. *Camponotus kiesenwetteri* belongs to the complex of species with strong microsculpture of head and at least mesosomal dorsum and with distinct mesonotal groove. This group comprises also *C. boghossiani*, *C. nitidescens* and *C. schulzi*. The last two species differ in weaker microsculpture of head and mesosoma with shiny lateral sides while in *C. kiesenwetteri* the microsculpture is stronger and the whole mesosoma surface is dull. *Camponotus boghossiani* differs in base of scapus lacking horizontal extension and truncate posterior margin of propodeum. Small workers of *C. kiesenwetteri* with very shallow emargination of propodeum appears very similar to *C. boghossiani* but differ in always present distinct horizontal extension on base of scapus.

Biological notes. Thermophilous species mainly associated with pine trees but regularly collected in several other mediterranean habitats: shady and sunny valleys in mixed forests, suburban areas with maquis or frygana, pastures with shrubs, fir forests, in mountain plateau on trunks of coniferous trees, fryganas, rocky coastline, seashore with frygana

and pine trees, limestones gorges with deciduous trees and shrubs, on shrubs in deciduous gallery forests, limestones quarry, shrubs growing along olive plantation and hotel gardens in tourist resorts. Foraging workers intensively penetrate trunks of pine trees, shrubs and inflorescences of large herbs. Nests were found under stones or in rock crevices on limestones wall exposed to sun. In northern and central Greece, most localities were placed at an altitude below 700 m, in southern Greece, especially on Crete, several localities come from altitude above 800 m, the highest location was from Lefka Ori Mts., Crete from an altitude of 1800 m.

43. *Camponotus lateralis* (Olivier, 1792)

(Figs 43.1-17)

Formica lateralis Olivier, 1792: 497;
Formica bicolor Latreille, 1798: 43 not *Formica bicolor* Fabricius, 1793: 351;
Formica melanogastes Latreille, 1802 a: 171;
Formica axillaris Spinola, 1808: 243;
Formica pallidinervis Brullé, 1833: 326;
Formica hemispila Förster, 1850 b: 492;
Camponotus (*Myrmentoma*) *lateralis* subsp. *armouri* Wheeler, 1926: 5;
Camponotus (*Myrmentoma*) *lateralis* var. *balearis* Santschi, 1929 a: 164 (= *Camponotus* (*Myrmetoma*) *lateralis* st. *spissinodis* var. *balearis* Santschi, 1925: 360 unavailable name);
Camponotus (*Myrmentoma*) *lateralis* var. *purius* Santschi, 1929 a: 163;
Camponotus (*Myrmentoma*) *lateralis* var. *rhodia* Santschi, 1934: 280 (= *Camponotus lateralis dalmaticus* var. *rhodia* Emery, 1925 c: 69 unavailable name);
Camponotus (*Orthonotomyrmex*) *kosswigi* Donisthorpe, 1950: 68.

Distribution in Greece: Aegean Islands (Forel 1889: 256, Legakis 2011: 31, Borowiec & Salata 2013: 351 - as *Camponotus honaziensis*, Salata & Borowiec 2017 a: 295-299, 304, Borowiec & Salata 2018 c: 5, Salata & Borowiec 2019 b: 120, Seifert 2019: 19; **new data:** Samos, Kokkari, 5 m, 7 X 2019, 37.77851 / 26.89155; Samos Platanos, 502 m, 7 X 2019, 37.73842 / 26.74563; Samos, Pythagorio Castle, 11 m, 6 X 2019, 37.68904 / 26.93875); **Crete** (Forel 1889: 256, Legakis 2011: 31, Borowiec & Salata 2012: 477-479 as - *Camponotus lateralis*, *C.* cf. *lateralis* sp. 1 and *C.* cf. *lateralis* sp. 2, Salata & Borowiec 2017 a: 295-299, 304, Seifert 2019: 18, Salata et al. 2020 a: 36); **Cyclades** (Forel 1889: 256, Salata & Borowiec 2017 a: 297, Seifert 2019: 18; **new data:** Naxos, above Akrotiri, 46 m, 30 VI 2016, 37.1298 / 25.4481; Naxos, Aliki, 15 m, 4 VII 2016, 36.9799 / 25.388; Naxos, Amiki Bay, 6 m, 30 VI 2016, 37.1328 / 25.4338; Naxos, Apollonas-Koranida rd., 123 m, 30 VI 2019, 37.165 / 25.5453; Naxos, Demeter Temple vic., 110 m, 2 VII 2016, 37.027 / 25.4288; Naxos, above Eggares, 60 m, 3 VII 2016, 37.116 / 25.4447; Naxos, Kinidaros, 410 m, 3 VII 2016, 37.1006 / 25.4833; Naxos, Kouros, 68 m, 30 VI 2016, 37.1788 / 25.4932; Naxos, Kouros of Milonas, 200 m, 3 VII 2016, 37.0847 / 25.4501; Naxos, Lionas, 20 m, 4 VII 2016, 37.137 / 25.5855; Naxos, Mesi Potamia, 150 m, 1 VII 2016, 37.0675 / 25.4444; Naxos, Moni, 390 m, 4 VII 2016, 37.0814 / 25.4932); **Dodecanese** (Forel 1889: 256, Emery 1925: 69 - as *Camponotus lateralis dalmaticus* var. *rhodia*, Legakis 2011: 31, Borowiec & Salata 2012: 477-479 as - *Camponotus lateralis*, *C.* cf. *lateralis* sp. 1 and *C.* cf. *lateralis* sp. 2, Salata

& Borowiec 2015 a: 68 - as *Camponotus lateralis* and *C. honaziensis*, Salata & Borowiec, 2016: 188-199, Salata & Borowiec 2017 a: 295-299, 304, Seifert 2019: 19, Borowiec et al. 2021: 15); **Epirus** (Legakis 2011: 31, Borowiec & Salata 2018 a: 4, Salata & Borowiec 2019 b: 100); **Ionian Islands** (Emery 1898: 125, Emery, 1901: 57, Emery 1914: 159, Legakis 2011: 31, Borowiec & Salata 2013: 351 - as *Camponotus honaziensis*, Borowiec & Salata 2014 a: 515 – as *Camponotus lateralis* and *C. honaziensis*, Salata & Borowiec 2017 a: 295-299, 304, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 100-104, 113, 114, Seifert 2019: 18, Borowiec & Salata 2021 a: 6; **new data:** Cephalonia, 1.6 km SW of Digaleto, 564 m, 11 VI 2019, 38.16558 / 20.67099; Cephalonia, Kapandriti vic. loc. 2, 160 m, 9 VI 2019, 38.11361 / 20.73201; Cephalonia, 800 m S of Kateleios, 20 m, 9 VI 2019, 38.07066 / 20.75329; Cephalonia, Poros forest loc. 2, 118 m, 18 VI 2021, 38.18413 / 20.74856; Lefkada, 1.2 km W of Kalavros, 330 m, 2 IX 2016, 38.80662 / 20.66471; Lefkada, Kavalikefta beach, 57 m, 12 VI 2021, 38.75366 / 20.59056; Lefkada, Nikiana, 24 m, 11 VI 2021, 38.766171, 20.71766; Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595; Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747); **Macedonia** (Legakis 2011: 31, Borowiec & Salata 2012: 477-479 as - *Camponotus lateralis*, *C.* cf. *lateralis* sp. 1 and *C.* cf. *lateralis* sp. 2, Seifert 2019: 19, Salata & Borowiec 2019 b: 104-105, 2022: 6; **new data:** Kavalas, Kotza Orman forest, 16 m, 3 VIII 1999, 40.8882 / 24.7786); **Peloponnese** (Forel 1886: clxvii, Legakis 2011: 31, Borowiec & Salata 2013: 351 - as *Camponotus honaziensis*, Salata & Borowiec 2017 a: 295-299, 304, Borowiec & Salata 2017 b: 205, Salata & Borowiec 2019 b: 105, 114, 115, Borowiec & Salata 2021 b: 5); **Sterea Ellas** (Forel 1886: clxvii, Forel 1889: 256, Legakis 1984: 87, 2011: 31, Salata & Borowiec 2017 a: 295-299, 304, Borowiec & Salata 2018 e: 5, Salata & Borowiec 2019 b: 106, 121, Borowiec & Salata 2021 b: 5; **new data:** Attica, Athens National Gardern, 90 m, 10 VII 2016, 37.97138 / 23.7175; Attica, Pireus beach, 5 m, 10 VII 2016, 37.92083 / 23.69777); **Thessaly** (Legakis 2011: 31, Borowiec & Salata 2012: 477-479 as - *Camponotus lateralis*, *C.* cf. *lateralis* sp. 1 and *C.* cf. *lateralis* sp. 2, Borowiec & Salata 2018 b: 223, Salata & Borowiec 2019 b: 107, Seifert 2019: 19); **Thrace** (Finzi 1939: 160 - as *Camponotus lateralis* var. *rhodia*, Bračko et al. 2016: 14).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Azerbaijan; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; France: Corsica; Georgia; Greece:; French: Corsica, mainland; Germany; Gibraltar; Hungary; Israel; Italy: mainland, Sardinia, Sicily; Malta; Monaco; Montenegro; Morocco; North Macedonia; Portugal; Romania; Russia; Serbia; Slovakia; Spain: Baleares, mainland; Switzerland; Syria; Turkey; Ukraine.

Note. *Camponotus lateralis* forms two dostinct morphotypes: typical morphotype with sparse body setation, dorsal propodeum with erect setae only close to its posterior margin and antennal scapus without erect setae. The second morphotype has setose body, dorsal propodeum with erect setae on the whole surface and antennal scapus with several erect setae. Both morphotypes were usually collected in the same localities, with nests often in close proximity to each other, although we have never seen both forms in one nest (although Seifert (2019) noted such a single situation). All other characters, both morphological and biological, are the same in both forms, so we prepared a single description for this species.

Description. Moderately large, polymorphic; minor worker: HL: 0.921-1.013 (mean 0.966); HW: 0.778-0.857 (mean 0.825); SL: 0.905-0.968 (mean 0.934); EL: 0.273-0.289 (mean 0.278); ML: 1.29-1.42; MW: 0.67-0.75. **Color.** Body variable in color, head, meso-

soma and petiolar scale from uniformly yellowish red to uniformly dark brown but never completely black, at most head and dorsum s of mesonotum and propodeum partly to predominantly black, gaster always dark colored brown to black often with paler anterior face of first gastral tergite; often body bicolored with head reddish brown and mesosoma dark brown, often head reddish with obscure spot in frontal area; antennae also variable in color, in the palest forms uniformly yellow or with slightly obscure last 1-2, funicle segments, often scapus yellowish and funicle with yellowish basal 2-4 and obscure apical segments, in dark forms scapus reddish brown to brown and funicle completely obscure; legs in the palest form completely yellowish red but usually coxa and femora reddish brown to black and tibiae brown with yellowish apices or whole legs reddish brown to brown with paler apices of femora, apices of tibiae and tarsi, in the darkest specimens whole legs brown with slightly paler tarsi (Figs 43.1-12). **Head.** Stout, 1.1-1.2 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Figs 43.5, 6, 11, 12). Clypeus trapezoidal, with anterior margin straight to shallowly emarginate, posterior margin in the middle emarginate by frontal triangle, whole surface with diffused microreticulation, appears shiny, in typical form covered with short and sparse appressed hairs, anterior margin with a row of 5-7 long setae centrally and 2-3 short setae on sides, whole Clypeus with few moderately long erected setae grouping on sides and base of clypeus, in setose form clypeus with short appressed to decumbent hairs and numerous erected setae on the whole surface. Head diffusely to distinctly microsculptured, frontal area usually microreticulate, sides, occipital and temporal area mostly with transverse or circular striation, surface in typical form with short and sparse appressed pubescence, appears shiny, gena, frons and anterior part of occipitum with few short to long erected setae, occipital and temporal areas without setae, in setose form gena, frons, temporal area with numerous erected setae, occipital corners with few subdecumbent hairs and few short erected setae, ventral side of head in typical form without or with 1-4 erected setae, in setose form with numerous erected setae. Scape moderately elongate, 1.1 times as long as width of head, at apex only slightly wider than in base, basal part with slightly marked horizontal extension, surface diffusely to distinctly microreticulate, shiny, in typical form with short and sparse appressed pubescence, without decumbent hairs or erected setae, in setose form with partly subdecumbent hairs and 3-12 short erected setae. Funicular segments elongate, thin, first segment 2.2-2.3 times as long as wide and 1.8-1.9 times as long as second segment, third segment slightly to distinctly longer than second, the rest of funicular segments distinctly longer than broad (Figs 43.5, 11). Eyes moderately big, almost round, 0.29 length of head. Mandibles stout, diffusely microreticulate, surface shiny. **Mesosoma.** Moderately elongate, 1.9 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation often diffused, whole surface appears shiny. In lateral view dorsum with deep mesonotal groove, propodeum high, with flat to slightly convex dorsum which is 1.4-1.5 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle posterior face not excavate (Figs 43.1, 2, 7, 8). Surface of mesosoma in typical form with short and scarce depressed hairs, pronotum posterolaterally with 1-2 long erected setae, mesonotum with 2-4 moderately long to long erected setae, propodeum on posterior margin with 2-4 short to moderately long erected setae, in setose form ground pubescence slightly longer and denser than in typical form, appressed to decumbent, pronotum with 2-4 long erected setae, mesonotum with 4-8

moderately long to long erected setae, propodeum on posterior margin with 4-6 moderately long erected setae and on dorsal surface with subdecumbent to semierect pubescence; the number of erected setae increases with body length, the longest setae with length to 0.195. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI = 1.9- 2.4, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, microripples fine and sparse with RipD 9.1–13.7 μm, surface shiny, in typical form covered with moderately long but scarce, in setose form long and moderately dense appressed hairs but never covering the surface of tergites; each tergite with row of, very long erected setae across middle and close to posterior margin, sometimes with few additional erected setae between main rows. **Legs.** Elongate, hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed to decumbent hairs, inner margin of hind tibiae with row of 1-3 thorns. Ventral surface of fore femora in typical form with 2-3, in setose form 3-6 long erected setae.

Major worker: Large, HL: 1.680-1.880 (mean 1.783); HW: 1.660-1.860 (mean 1.791); SL: 1.269-1.365 (mean 1.295); EL: 0.384-0.405 (mean 0.398); ML: 2.03-2.20; MW: 1.09-1.25. Body color, sculpture and setation as in minor workers (Figs 43.3, 4, 6, 9, 10, 12). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight. Anterior margin always in the middle with deep triangular or semicircular emargination (Figs 43.6, 12). Scapus shorter, 0.7 times as long as width of head. Eyes relatively smaller, 0.22 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, occipital and temporal part of head often with few erected setae, petiolar crest with 8-10 very long setae. Ventral posterior surface of fore femora with 6-12 long erected setae.

Gyne as in Figs 43.13-16, body from completely black to bicolour. Male as in Fig. 43.17.

Comparative remarks. *Camponotus lateralis* with *C. anatolicus* and *C. rebeccae* forms a complex of species with deep mesonotal groove, saddle-shaped propodeum, shiny body surface, predominantly yellowish to rusty red head, and usually yellow to rusty red mesosoma that only occasionally has brownish to blackish spots. *Camponotus anatolicus* differs in first gastral tergite never darker than mesosoma, short and high propodeal saddle, and more setose head and mesosoma. *Camponotus rebeccae* appears very similar to *C. lateralis* but differs in longer and less convex propodeal saddle and antennal scapi lacking erect setae. However, the gaster microsculpture is the most solid character that can be used to separate these taxa. In *C. rebeccae* transverse microstriation of tergites is deep and dense, on first tergite with RipD 7.1–9.5 μm while in all forms of *C. lateralis* microripples are finer and sparser with RipD 9.1–13.7 μm. *Camponotus lateralis* is very common in the whole continental and insular Greece, while *C. rebeccae* occurs only on Crete and Dodecanese.

Biological notes. The most common and ubiquistic Greek species of *Camponotus*. Collected in various types of habitats but prefers deciduous trees and shrubs. Although it was noted also from luminous coniferous forests, stream valleys with deciduous forests, mixed forests close to streams or rivers, olive and fig plantations, pastures with shrubs, seashore with frygana, deciduous gallery forests, oak forests, stream valleys with plane trees, small gorges with oak shrubs, regularly observed in gardens and parks in towns and tourist resorts. Foraging workers penetrate shrubs and trees (especially fig trees) or herbs infected with Ho-

mopteran insects producing honeydew. Nests under stones or in rock crevices on rocky walls exposed to sun, sometimes also under moss on large stones and inside dry stems of large herbs or bushes. Most of collecting sites were placed from an altitude below 500 m and the highest location was placed at 1100 m.

44. *Camponotus libanicus* André, 1881

(Figs 44.1-6)

Camponotus libanicus André, 1881: 54;
Camponotus (*Orthonotomyrmex*) *libanicus* r. *sahlbergi* Forel, 1913 a: 435.

Distribution in Greece: ?Aegean Islands (Legakis 2011: 31 (based on unpublished manuscript by Taylor & Clee prepared in 2008 with ant identifications by C. Collingwood); **?Dodecanese** (A. Radchenko in Fauna Europaea. Occurrence in Greece needs confirmation based on recent material. Certain localities of this species are quite far from the borders of Greece and recent expeditions to the Dodecanese and Aegean Islands did not confirm its occurrence in these areas.

Distribution in Europe and Mediterranean Basin: Cyprus; ?Greece; Iran; Israel; Lebanon; Turkey.

Description. Moderately large, polymorphic; minor worker: HL: 1.095-1.167 (mean 1.137); HW: 0.959-1.037 (mean 0.985); SL: 1.095-1.183 (mean 1.143); EL: 0.286-0.308 (mean 0.297); ML: 1.71-1.80; MW: 0.95-0.97. **Color.** Body black, only anterior margin of pronotum and apical half of mandibles yellowish to yellowish brown and posterior margins of gastral tergites whitish yellow; antennae yellow, sometimes apical 2-4 segments of funiculus slightly infuscate; coxa brown to black, femora and tibiae brown, dark brown to almost black, apex of tibiae often yellowish to yellowish brown, tarsi from yellow to brown, basitarsus often darker than subsequent tarsomeres (Figs 44.1, 2, 5). **Head.** Stout, 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin slightly convex (Fig. 44.5). Clypeus trapezoidal, with anterior margin slightly convex and sometimes slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface opalescent dull, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 6-8 very long setae and between long setae with very short setae, whole Clypeus with several moderately long and long erected setae. Head distinctly microreticulate, surface opalescent dull, frons with well-marked impunctate line, whole surface, including gena and sides of head with sparse and short, hardly visible appressed hairs and long erected setae but occipital area without or with 2-4 erected setae, ventral side of head with several moderately long to long erected setae. Scape moderately long, 1.1-1.2 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with very short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.8 times as long as wide and approximately 1.8 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 44.5). Eyes moderately big, almost round, 0.26 length of head. Mandibles stout, elongate punctate, surface shiny. **Mesosoma.** Moderately elongate, 1.8-1.9 times as long as wide, dorsally and laterally with strong microsculpture, surface from indistinctly shiny to slightly dull. In lateral

view dorsum form regular arch, without mesonotal groove, propodeum forms distinct, almost straight angle, posterior face of propodeum deeply excavate (Fig. 44.2). Surface of mesosoma with short and scarce depressed hairs, pronotum with 6-16 erected setae, mesonotum with 4-12, propodeum with 14-22 moderately long to long erected setae, the longest with length to 0.286. **Waist and gaster.** Petiolar scale thin and broad in anterior view, PI < 1.42, anterior face strongly convex, posterior face flat, apex rounded; anterior and posterior surface microreticulate, sculpture tends to form transverse striation, without pubescence, apical crest with 6-10 moderately long and very long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation, surface opalescent dull, covered with moderately long but scarce appressed hairs; each tergite with numerous, very long erected setae. **Legs.** Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 2-4 thorns. Ventral surface of fore femora with 3-6 long erected setae.

Major worker: Large, HL: 1.571-1.820 (mean 1.704); HW: 1.437-1.650 (mean 1.549); SL: 1.381-1.492 (mean 1.434); EL: 0.346-0.378 (mean 0.366); ML: 2.10-2.34; MW: 1.19-1.34. Body color and sculpture as in minor workers but apex of antennal scapus and apical half of funiculus often indistinctly infuscated (Figs 44.3, 4, 6). Head stouter, 1.1 times as long as wide, sides of head softly convex, posterior margin often straight (Fig. 44.6). Scapus shorter, approximately 0.9 times as long as width of head. Eyes relatively smaller, 0.21 times as long of head. Setation more numerous than in minor workers, present also in occipital corners. Setae on all mesosomal segments numerous, more than 20, petiolar crest with 14-16 very long setae and few additional short setae. Ventral surface of fore femora with 8-12 long erected setae.

Gyne not studied.

Comparative remarks. *Camponotus libanicus* belongs to the complex of species within the subgenus *Myrmentoma* with distinctly dull body with strongly sculptured mesosoma and head with regurarly arched mesosoma in lateral with visible metanotal suture. In the eastern part of the Mediterranean basin only three species have this combination of characters: *C. aegaeus*, *C. aktaci* and *C. libanicus*, only the first species has confirmed records from Greece. *Camponotus aktaci* differs in distinctly bicolored body with mostly yellowish to reddish-brown legs, yellowish-brown gaster, and short and sparse setation of head, mesosoma, and gaster. Both remaining relatives have mostly brown to black legs and gaster and long and dense setation of head, mesosoma and gaster. *Camponotus libanicus* is the most similar to *C. aegaeus* but they can be separated based on the petiolar index. In *C. libanicus* petiole is thick with PI < 1.42 while in *C. aegaeus* petiole is thin with PI > 1.50. Aditionally, *C. libanicus* has slightly more convex mesosoma in profile and its excavation of posterior face of propodeum is slightly deeper than in *C. aegaeus*. Also, *Camponotus libanicus* is more eastern species, known from Cyprus, south-eastern Turkey, Lebanon, Israel and Iran and its records from Aegean Turkey and Greece most likely are based on misidentification. While *C. aegaeus* is more western species and was recorded from Bulgaria, Greece, North Macedonia and western Turkey east to Kirikkale province of Central Anatolia.

Biological notes. No data from Greece. On Cyprus the species was collected in pine forests, its foraging workers were observed on pine trunks and in inflorescences of *Cytisus* (Fabaceae) bushes. Nests probably under stones like other species of *Camponotus kiesenwetteri* complex.

45. *Camponotus nitidescens* Forel, 1889

(Figs 45.1-6)

Camponotus kiesenwetteri r. *nitidescens* Forel, 1889: 260; Radchenko 1997: 707 (as synonym of *Camponotus piceus*);
Camponotus kiesenwetteri nitidescens For.: Emery 1914: 159; Finzi 1930 b: 310;
Camponotus (*Myrmentoma*) *kiesenwetteri* subsp. *nitidescens* Forel: Emery 1925 d: 121;
*Camponotus nitidescen*s: Borowiec & Salata 2014 a: 502.

Distribution in Greece: Ionian Islands (Forel, 1889: 260 – as *Camponotus kiesenwetteri* r. *nitidescens*, Emery 1914: 159 - as *Camponotus kiesenwetteri nitidescens*, Legakis 2011: 31, Borowiec & Salata 2014 a: 502); **Peloponnese** (Borowiec & Salata 2017 b: 206, Salata & Borowiec 2019 b: 120); **Sterea Ellas** (Borowiec & Salata 2017 a: 2, Salata & Borowiec 2017: 299).

Distribution in Europe and Mediterranean Basin: Greece.

Description. Moderately large, polymorphic; minor worker: HL: 1.095-1.270 (mean 0.963); HW: 0.873-1.048 (mean 0.969); SL: 1.159-1.302 (mean 1.250); EL: 0.254-0.302 (mean 0.284); ML: 1.72-1.92; MW: 0.80-0.94. **Color.** Body completely black except yellowish transparent anterior explanate margin of pronotum, brownish apical half of mandibles and whitish to whitish yellow posterior margins of gastral tergites; antennal scapus dark brown to black often with yellowish brown to reddish brown apex, funiculus dark brown to black; coxa black, femora and tibiae brown to dark brown, trochanters and extreme apex of femora and tibiae often partly yellowish, tarsi from yellow to brown (Figs 45.1, 2). **Head.** Stout, 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes regularly rounded, posterior margin slightly convex (Fig. 45.5). Clypeus pentagonal, with anterior margin slightly convex, simple or slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface opalescent dull, covered with short and sparse appressed hairs, anterior margin with a row of 3-5 very long setae and between long setae often with few very short setae, whole Clypeus with several moderately long and long erected setae. Head distinctly microreticulate, surface opalescent dull, frons with well-marked impunctate median line, whole surface, including gena, sides of head and occipital area with short and sparse appressed hairs and long erected setae, ventral side of head with more than 10 moderately long to long erected setae. Scape moderately long, 1.2-1.4 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae; base of scapus without horizontal extension. Funicular segments elongate, thin, first segment 2.3 times as long as wide and 1.6 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 45.5). Eyes moderately big, almost round, 0.24 length of head. Mandibles stout, microreticulate but without coarse punctures, surface shiny with long decumbent and erect setae. **Mesosoma.** Moderately elongate, 2.0-2.1 times as long as wide, dorsally with strong microreticulate sculpture, laterally with less strong microreticulation tending to form longitudinal and oblique striation, dorsum appears slightly opalescent dull, sides appears indistinctly shiny. In lateral view dorsum with shallow but distinct mesonotal groove, saddle-shaped propodeum low and elongate, 1,7 times as long

as wide, with flat dorsum and truncate posterior margin, posterior face not excavate with well-marked but not protruding posterad dorsal angles (Fig. 45.2). Surface of promesonotum with short and scarce depressed to decumbent hairs, of propodeum also with subdecumbent to decumbent hairs, whole dorsum with numerous moderately long to long erected setae, the longest with length to 0.270. **Waist and gaster.** Petiolar scale thin, broad in anterior view, PI: 1.54–1.74, with convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence, apical crest with 6-10 very long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation partly tending to form transversely striate microsculpture, surface indistinctly shiny to slightly dull, covered with moderately long but scarce appressed hairs; each tergite with numerous, very long erected setae. **Legs.** Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 1-3 thorns. Ventral surface of fore femora with 4-6 long erected setae.

Major worker: Large, HL: 1.890-2.030 (mean 1.974); HW: 1.800-1.960 (mean 1.875); SL: 1.600-1.720 (mean 1.678); EL: 0.397-0.429 (mean 0.413); ML: 2.40-2.60; MW: 1.28-1.36. Body color and sculpture as in minor workers (Figs 45.3, 4. 6). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin often straight to shallowly concave (Fig. 45.6). Clypeus in the middle with triangular emargination. Scapus shorter, 0.9 times as long as width of head. Eyes relatively smaller, 0.21 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, petiole less thick, crest with 12-16 very long setae. Propodeal dorsum shorter, 1,4 times as long as wide. Ventral surface of fore femora with 10-16 long erected setae.

Gyne unknown.

Comparative remarks. *Camponotus nitidescens* together with *C. schulzi* form a complex of species appearing intermediate between strongly sculptured and matt members of the *C. kiesenwetteri* complex and finely sculptured and shiny members of the *C. piceus* complex. Only two species of *C. kiesenwetteri* complex have deep mesonotal groove and saddle-shaped propodeum with flat dorsum – *C. boghossiani* and *C. kiesenwetteri.* But both differ in dull body with strong microsculpture of head and mesosoma. Only populations of *C. boghossiani* from western Turkey have often lateral sides of mesosoma less distinctly microsculptured but their body never appears as shiny as in *C. nitidescens*. *Camponotus kiesenwetteri* differs also presence of horizontal extension in base of scapus, posterior margin of propodeum with indistinctly marked emargination, and posterior angles of propodeum forming blunt tooth protruding posterad. *Camponotus schulzi* differs from *C. nitidescens* in presence of horizontal extension in base of antennal scape and thick petiolar scale with PI: 1.26–1.33. Also, both species are separated geographically, *C. nitidescens* is known only from Cephalonia Island, western Sterea Ellas and Peloponnese while *C. schulzi* was recorded only from Bozdag Mountains of western Turkey.

Biological notes. Rare species known from only few samples. Reported from coniferous forests, stream valley with mixed forest and mountain pastures with oak shrubs. The only known nest was located on a cracked rock wall under a loose piece of rock. The rock was situated on the edge of a natural deciduous forest composed of low oaks and underbrush heavily overgrown with Mediterranean frygana. The wall with the nest was on north-western exposure. All collecting sites were in mountains at an altitude between 1000 and 1700 m.

46. *Camponotus piceus* (Leach, 1825)

(Figs 46.1-10)

Formica picea Leach, 1825: 292;
Formica merula Losana, 1834: 313;
Formica foveolata Mayr, 1853 b: 277;
Camponotus ebeninus Emery, 1869: 2;
Camponotus (*Myrmentoma*) *lateralis* var. *ebneri* Finzi, 1930 a: 24.

Distribution in Greece: Aegean Islands (Legakis 2011: 32, **new data:** Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E); **Crete** (Forel 1886: clxvii - as *Camponotus lateralis* v. *foveolatus*, Legakis 2011: 32, Borowiec & Salata 2012: 480, Salata et al. 2020 a: 36); **Dodecanese** (Legakis 2011: 32, probably misidentification); **Epirus** (Legakis 1983: 5, 2011: 32, Borowiec & Salata 2018 a: 5, Salata & Borowiec 2019 b: 100, Seifert 2019: 29; **new data:** Preveza, Parga, 30 m, 14 VI 2014, 39.287 / 20.4); **Ionian Islands** (Emery 1898: 125 - as *Camponotus lateralis* var. *merula*, Legakis 2011: 32, Salata & Borowiec 2017: 298, Salata & Borowiec 2019 b: 100-104, Seifert 2019: 29, Borowiec & Salata 2021 a: 6); **Macedonia** (Legakis 2011: 32, Borowiec & Salata 2012: 480, Seifert 2019: 29, Salata & Borowiec 2019 b: 104, 2022: 6; **new data:** Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 / 24.6356; Drama, Partheno Dasos, 995 m, 7 X 1999, 41.5056 / 24.4288; Pieria, Mt. Olympus, Prionia-Mt. Olympus trail loc. 1, 1200 m, 12 V 2019, 40.08122 / 22.400123; Pieria, 2 km W of Panteleimonas, 305 m, 39.98563 / 22.59513; Pieria, P. Poroi, 510 m, 17 V 2019, 39.96797 / 22.58846); **Peloponnese** (Legakis 2011: 32, Borowiec & Salata 2017: 206, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b: 6); **Sterea Ellas** (Forel 1886: clxvii (as *Camponotus lateralis* v. *foveolatus*, Finzi 1928: 791 - as *Camponotus lateralis* var. *picea*, Legakis 1984: 87, 2011: 32, Borowiec & Salata 2018 e: 6, Salata & Borowiec 2019 b: 106, Borowiec & Salata 2021 b: 6); **Thessaly** (Legakis 2011: 32, Borowiec & Salata 2012: 480, Borowiec & Salata 2018 b: 223, Salata & Borowiec 2019 b: 107, 121, Seifert 2019: 28, 29; **new data:** Larissa, Ossa Mts., Kokkino Nero-Karitsa rd., 251 m, 29 VII 2009, 39.836 / 22.775); **Thrace** (Bračko et al. 2016: 15, **new data:** Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 N / 24.6356 E; Drama, Partheno Dasos, 995 m, 7 X 1999, 41.5056 N / 24.4288 E).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech rep.; France: Corsica; Georgia; Greece; Hungary; Iran; Italy: mainland, Sardinia, Sicily; Lebanon; Malta; Montenegro; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Switzerland; Turkey; Ukraine.

Description. Moderately large, polymorphic; minor worker: HL: 0.917-1.012 (mean 0.956); HW: 0.762-0.841 (mean 0.794); SL: 0.960-1.000 (mean 0.980); EL: 0.235-0.243 (mean 0.240); ML: 1.35-1.49; MW: 0.70-0.76. **Color.** Body completely black except yellowish explanate anterior margin of pronotum, occasionally pronotum laterally with reddish brown spot of diffused borders (in Greek populations only 2% of examined specimens have spotted pronotum); usually gena apically with small yellowish to reddish spot, gaster sometimes brown; antennal scapus yellow, occasionally slightly infuscate in the widest apical part, funicle from uniformly yellow to mostly infuscate, usually basal 1-3 segments yellowish then

subsequent segments gradually darker, sometimes whole scapus brown to dark brown; coxa brown to black, trochanters partly brown partly yellowish, femora mostly brown to almost black except yellowish apices, in the palest specimens apical 1/3 of femora yellowish, in the darkest specimens almost whole femora brown to almost black, tibiae from yellow to yellowish brown, tarsi yellow, in the darkest forms tibiae mostly to almost completely brown (Figs 46.1, 2, 5). **Head.** Stout, 1.1-1.3 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 46.5). Clypeus trapezoidal, with anterior margin straight to slightly convex, simple or slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface with diffused microreticulation, appears shiny, covered with short and sparse appressed to decumbent hairs, anterior margin with a row of 6-8 long setae centrally and 4-8 short setae on sides, whole Clypeus with several moderately long erected setae grouping on sides and base of clypeus. Head diffusely to distinctly microsculptured, frontal area microreticulate, occipital and temporal area mostly with transverse or circular striation, surface with short and sparse appressed pubescence, appears shiny, gena, frontal and interantennal area and anterior part of occipitum with short to long erected setae, only occipital and temporal areas without setae, ventral side of head with 6-12 moderately long to long erected setae. Scape moderately elongate, 1.1-1.3 times as long as width of head, at apex only slightly wider than in base, basal part with slightly marked horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.24 times as long as wide and 1.8-1.9 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 46.5). Eyes moderately big, almost round, 0.25 length of head. Mandibles stout, diffusely microreticulate, surface shiny. **Mesosoma.** Moderately elongate, 1.9-2.0 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation often diffused, whole surface shiny. In lateral view dorsum with distinct mesonotal groove, propodeum with flat dorsum which is 1.4-1.5 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle posterior face not excavate (Figs 46.1, 2). Surface of mesosoma with short and scarce depressed to decumbent hairs, pronotum posterolaterally with 2-4 long erected setae, mesonotum with 10-16 moderately long to long erected setae, propodeum on the whole surface with 12-22 short to moderately long erected setae; the number of erected setae increases with body length, the longest setae with length to 0.225. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI = 1.9- 2.0, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-8 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, surface shiny, covered with moderately long but scarce appressed hairs; each tergite with row of, very long erected setae across middle and close to posterior margin, sometimes with few additional erected setae between main rows. **Legs.** Elongate hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed hairs, inner margin of hind tibiae with row of 2-4 thorns. Ventral surface of fore femora with 3-6 long erected setae.

Major worker: Large, HL: 1.720-1.760 (mean 1.741); HW: 1.690-1.756 (mean 1.712); SL: 1.309-1.389 (mean 1.341); EL: 0.338-0.383 (mean 0.360); ML: 2.13-2.27; MW: 1.18-1.20. Body color and sculpture as in minor workers but antennae and legs usually darker , brown to dark brown and apex of tibiae brown, tarsi often as dark colored as tibiae (Figs 46.3, 4, 6). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight (Fig. 46.6). Anterior margin of clypeus slightly serrulate, in the middle with deep triangular emargination. Scapus shorter, 0.8 times as long as width of head. Eyes relatively smaller, 0.21 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, occipital and temporal part of head often with few erected setae, petiolar crest with 8-10 very long setae. Propodeal flat dorsum shorter, approximately 1.2 times as long as wide. Ventral posterior surface of fore femora with 6-10 long erected setae.

Gyne as in Figs 46.7-9, male as in Fig. 46.10.

Comparative remarks. *Camponotus piceus* belongs to the complex of species with predominantly shiny body, well marked or deep mesonotal groove and predominantly black head. This complex comprises also *C. atricolor*, *C. candiotes*, *C. dalmaticus* and *C. heidrunvogtae*. *Camponotus dalmaticus* differs from *C. piceus* in propodeum with erected setae limited only to posterior margin of the plate, predominantly bicoloured mesosoma and stronger microsculpture of head and mesosomal and slightly matte body; *C. heidrunvogtae* differs in distinctly longer antennae with SL/HW in the smallest workers 1.281-1.441 (mean 1.361) while in *C. piceus* SL/HW = 1.189-1.260 (mean 1.236), and in pronotum often with reddish spot laterally; *C. atricolor* differs in very shallow mesonotal groove (deep in *C. piceus*) and antennal scapus lacking basal horizontal extension (such extension present in *C. piceus*); *C. candiotes* looks the most similar to *C. piceus* but often has bicolored mesosoma. Rare black forms of *C. candiotes* differs from *C. piceus* in antennal scapus lacking basal horizontal extension. Both species are sympatric only on Crete, where *C. candiotes* can be found in warm habitats in lowlands and *C. piceus* occypies shady habitats in mountains. *Camponotus piceus* is common in continental Greece where *C. candiotes* was not observed and *C. candiotes* is common in Dodecanese Islands from which *C. piceus* has not been recorded so far.

Biological notes. Common species associated with habitats covered with deciduous shrubs and trees less often found in coniferous forests. Noted from stream valleys with overgrown with deciduous trees, mountain deciduous forests, xerothermophile oak forests, olive plantations, the edges of the streams overgrown by *Hedera helix*, fryganas on sea coasts, small gorges with shrubs, roadsides with mediterranean shrubs, rest area in village with stone walls, shrubs around the old monastery, alpine pastures with shrubs, pine forest on rocks and coniferous forest with shrubs. Occasionally observed in tourist resorts on trees and shrubs. Nests under stones or on cracked rocky walls. Listed from the lowlands and lower mountain sites up to 1450 m.

47. *Camponotus rebeccae* Forel, 1913

(Figs 47.1-6)

Camponotus (*Orthonotomyrmex*) *lateralis* var. *rebeccae* Forel, 1913 c: 436;
Camponotus (*Myrmentoma*) *lateralis* var. *cypridis* Santschi, 1939 b: 6.

Distribution in Greece: Crete (Seifert 2019: 22, Salata & Borowiec, 2020: 37); **Dodecanese** (Salata & Borowiec, 2016: 199, Seifert 2019: 22, Salata et al. 2020 a: 36, Borowiec et al. 2021: 15).

Distribution in Europe and Mediterranean Basin: Cyprus; Greece; Israel; Lebanon; Syria, Turkey.

Description. Moderately large, polymorphic; minor worker: HL: 0.917-1.032 (mean 0.963); HW: 0.762-0.873 (mean 0.811); SL: 0.952-1.032 (mean 1.005); EL: 0.235-0.271 (mean 0.254); ML: 1.39-1.51; MW: 0.65-0.79. **Color.** Head, mesosoma and petiolar scale rusty yellow to reddish yellow, often central part of head with obscure spot; in dark specimens dorsum of mesosomal dorsum with obscure, brown spots of diffused borders but head and mesosoma never partly black; gaster brown to almost black, often frontal face of first tergite paler than rest of gaster; antennal scapus yellow to yellowish red, funicle mostly yellow to reddish yellow, usually only apical 1-3 segments partly infuscate, occasionally 4-5 apical segments infuscate; legs yellowish to rusty yellow, in dark specimens coxa and femora yellowish brown, tibiae mostly brown, in extreme case legs mostly brown (Figs 47.1-6). **Head.** Stout, 1.2 times longer than wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 47.5). Clypeus trapezoidal, with anterior margin straight to slightly convex, simple, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface with diffused microreticulation, appears shiny, covered with short and sparse appressed to decumbent hairs, anterior margin with a row of 6-8 long setae centrally and 2-4 short setae on sides, whole Clypeus with several moderately long erected setae grouping on sides and base of clypeus. Head diffusely to distinctly microsculptured, frontal area microreticulate, occipital and temporal area mostly with transverse or circular striation, surface with short and sparse appressed pubescence, appears shiny, gena, frons and anterior part of occipitum with short to long erected setae, only occipital and temporal areas without setae, ventral side of head without or with 2-4 moderately long to long erected setae. Scape moderately elongate, 1.2-1.3 times as long as width of head, at apex only slightly wider than in base, basal part with slightly marked horizontal extension, surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae. Funicular segments elongate, thin, first segment 2.2 times as long as wide and 1.7 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 47.5). Eyes moderately big, almost round, 0.26 length of head. Mandibles stout, diffusely microreticulate, surface shiny with numerous erected setae. **Mesosoma.** Moderately elongate, 1.9-2.2 times as long as wide, dorsally and laterally distinctly sculptured tending to form transverse, longitudinal, oblique and concentric striation, on sides of pronotum microstriation often diffused, whole surface shiny. In lateral view dorsum with distinct mesonotal groove, propodeum with flat dorsum which is 1.6-1.7 times as long as wide, posterior margin truncate, in lateral view posterior face and dorsum form distinct angle posterior face not excavate (Fig. 47.2). Surface of mesosoma with very short and scarce depressed hairs, pronotum posterolaterally with 0-4 long erected setae, mesonotum with 2 long and sometimes also 2 short erected setae, propodeum close to posterior margin with 2-4(6) short to moderately long erected setae; the number of erected setae increases with body length, the longest setae with length to 0.238. **Waist and gaster.** Petiolar scale thick, broad in anterior view, PI = 2.2- 2.3, with very convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence or with few very short and very scarce appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with deep and dense transverse

microstriation, surface shiny, covered with short and very scarce appressed hairs; each tergite with row of, very long erected setae across middle and close to posterior margin, sometimes with few additional erected setae between main rows. Legs. Elongate hind femora shorter than mesosoma, surface of legs covered with short to moderately long and sparse appressed hairs, inner margin of hind tibiae with row of 1-3 thorns. Ventral surface of fore femora with 1-3 long erected setae.

Major worker: Large, HL: 1.460-1.772 (mean 1.569); HW: 1.381-1.524 (mean 1.515); SL: 1.175-1.286 (mean 1.230); EL: 0.351-0.410 (mean 0.372); ML: 1.92-2.03; MW: 0.99-1.08. Body color and sculpture as in minor workers but predominate specimens with obscure spot on frons of head with legs usually darker , brown to dark brown, sometimes also antennal scapi partly infuscate, in extreme dark form anterior half of head, mesonotal and propodeum and gaster black (Figs 47.3, 4, 6). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight (Fig. 47.6). Anterior margin of clypeus slightly serrulate, in the middle sometimes with deep triangular or semicircular emargination. Scapus shorter, 0.7-0.8 times as long as width of head. Eyes relatively smaller, 0.24 times as long of head. Frons and genae with large setose punctures, setation on head and whole dorsum more numerous than in minor workers, but occipital and temporal part lacking erected setae, ventral sides of head with 6-8 short to long erected setae, petiolar crest with 6-8 very long setae. Propodeal flat dorsum shorter, approximately 1.4-1.5 times as long as wide. Ventral posterior surface of fore femora with 4-5 long erected setae.

Gyne unknown.

Comparative remarks. *Camponotus rebeccae* with *C. anatolicus* and *C. lateralis* forms a complex of species with deep mesonotal groove, saddle-shaped propodeum, shiny body surface, usually from yellow to rusty red and never predominantly blakc head, and usually yellow to rusty red mesosoma that only occasionally has brownish to blackish spots. *Camponotus anatolicus* differs in first gastral tergite not darker than mesosoma, short and high propodeal saddle and more setose head and mesosoma. *Camponotus lateralis* differs in shorter and more convex propodeal saddle. Setose form of *C. lateralis* differs in antennal scapi with few short erect setae and propodeal dorsum with additional short decumbent to semierect setae. The gaster microsculpture provides some additional characters useful in species separatio, in *C. rebeccae* transverse microstriation of tergites is deep and dense, on first tergite with RipD 7.1–9.5 μm while in all forms of *C. lateralis* microripples are finer and sparser with RipD 9.1–13.7 μm. *Camponotus rebeccae* occurs only on Crete and Dodecanese while *C. lateralis* is very common in whole continental and island Greece.

Biological notes. Rare, thermophilous species. Collected on leafs of fig trees inside olive plantations, on leafs of deciduous trees in stream valleys, on leafs of single deciduous tree inside pine forests, on leafs of deciduous tree in rocky gorge with deciduous trees, on leafs of fig tree in roadsides, and on herbs around an artificial lake. Nest unknown, probably under stones like in other species of the *Camponotus lateralis* complex.

48. *Camponotus schulzi* Salata, Loss, Kiran, Karaman & Borowiec, 2019

(Figs 48.1-6)

Camponotus schulzi Salata, Loss, Kiran, Karaman & Borowiec, 2019: 95.

Distribution in Greece: No records from Greece but its occurrence in Bozdağ Mts., İzmir Province of Aegean Turkey suggests that it may occur in Greek Aegean Islands.

Distribution in Europe and Mediterranean Basin: Bulgaria; Hungary; Italy: mainland; Montenegro; Romania; Serbia; Slovenia; Turkey.

Description. Moderately large, polymorphic, minor worker: HL: 1.111-1.436 (mean 1.335); HW: 0.921-1.357 (mean 1.145); SL: 1.169-1.396 (mean 1.305); EL: 0.281-0.317 (mean 0.305); ML: 1.67-2.06; MW: 0.84-1.05. **Color.** Head, mesosoma and petiolus black, gaster from brownish-black to black, antennal scapus brown, base and apex of scapus in some specimens paler than the central part of scapus, reddish-brown, funicle reddish brown to brown, legs brown to black, trochanters as dark as femora (Figs 48.1, 2). **Head.** Stout, 1.2-1.3 times as long as wide, sides in front of eyes almost straight and slightly converging anterad, behind eyes regularly rounded, posterior margin convex (Fig. 48.5). Clypeus pentagonal, with anterior margin slightly convex, simple or slightly crenulate, without median emargination, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated, surface slightly shiny to slightly dull, covered with short and sparse appressed hairs, anterior margin with a row of 3-5 very long setae and between long setae often with few very short setae, whole Clypeus with several moderately long and long erected setae. Head distinctly microreticulate, slightly opalescent dull, frons with well-marked impunctate median line, whole surface, including gena, sides of head and occipital area with short and sparse appressed hairs and long erected setae, ventral side of head with more than 10 moderately long to long erected setae. Scape moderately long, 1.1-1.3 times as long as width of head, at apex twice wider than in base, its surface diffusely to distinctly microreticulate, shiny, with short and sparse appressed pubescence, without decumbent hairs or erected setae; base of scapus with horizontal extension. Funicular segments elongate, thin, first segment 2.3 times as long as wide and 1.6 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments distinctly longer than broad (Fig. 48.5). Eyes moderately big, almost round, 0.23 length of head. Mandibles stout, microreticulate but without coarse punctures, surface shiny with long decumbent and erect setae. **Mesosoma.** Moderately elongate, twice as long as wide, dorsally with strong microreticulate sculpture, laterally with less strong microreticulation partly tending to form longitudinal and oblique striation, dorsum appears indistinctly dull, sides appears indistinctly shiny. In lateral view dorsum with shallow but distinct mesonotal groove, saddle-shaped propodeum low and elongate, 1,7 times as long as wide, with flat dorsum and truncate posterior margin, posterior face shallowly excavate with well-marked but not protruding posterad dorsal angles (Figs 48.1, 2). Surface of promesonotum with short and scarce depressed to decumbent hairs, of propodeum also with subdecumbent to decumbent hairs, whole dorsum with numerous long to long erected setae, the longest with length to 0.285. **Waist and gaster.** Petiolar scale low and thick, broad in anterior view, PI: 1.26–1.33, with convex anterior and flat posterior face, apex rounded; anterior and posterior surface transversely striate, without pubescence, apical crest with 4-8 very long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation partly tending to form transversely striate microsculpture, surface indistinctly shiny, covered with long but scarce appressed hairs; each tergite with numerous, very long erected setae. Legs. Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with short and sparse appressed hairs, inner margin of hind tibiae with row of 2-5 thorns. Ventral surface of fore femora with 3-6 long erected setae.

Major worker: Large, HL: 1.770-1.800 (mean 1.790); HW: 1.690-1.742 (mean 1.716); SL: 1.460-1.548 (mean 1.503); EL: 0.346-0.365 (mean 0.3593); ML: 2.28-2.40 mean 2.340;

MW: 1.16-1.22 mean (1.19). Body color and sculpture as in minor workers (Figs 48.3, 4). Head stouter, approximately as long as wide, sides of head softly convex, posterior margin straight to shallowly concave (Fig. 48.6). Clypeus in the middle with deep triangular emargination. Scapus shorter, 0.9 times as long as width of head. Eyes relatively smaller, 0.20 times as long of head. Setation on head and whole dorsum more numerous than in minor workers, petiole less thick, crest with 8-12 very long setae. Propodeal dorsum shorter, 1.4 times as long as wide. Ventral surface of fore femora with 7-9 long erected setae.

Gyne unknown.

Comparative remarks. *Camponotus schulzi* together with *C. nitidescens* form a complex of species appearing intermediate between strongly sculptured and matt members of the *C. kiesenwetteri* complex and finely sculptured and shiny members of the *C. piceus* complex. Only two species of *C. kiesenwetteri* complex have deep mesonotal groove and saddle-shaped propodeum with flat dorsum – *C. boghossiani* and *C. kiesenwetteri* but both differ from *C. schulzi* in dull body with strong microsculpture of head and mesosoma. Populations of *C. boghossiani* from western Turkey have weaker sculpture on lateral sides of mesosoma but they never appear as shiny as *C. schulzi*. Aditionally, *C. boghossiani* has basal scape lacking horizontal extension. *Camponotus kiesenwetteri* differs also in posterior margin of propodeum with indistinctly marked emargination and posterior angles of propodeum forming blunt tooth protruding posterad. *Camponotus schulzi* appears similar to *C. nitidescens* but it differs in base of antennal scape lacking horizontal extension and thin petiolar scale with PI: 1.54–1.74. While *C schulzi* has distinct horizontal extension at base of scapus and thick petiole with PI: 1.26–1.33. Also, both species are separated geographically, *C. nitidescens* is known only from Cephalonia Island, western Sterea Ellas and Peloponnese while *C. schulzi* was recorded only from Bozdag Mountains of western Turkey.

Biological notes. Unknown, ants were collected in mountain, from mostly deforested area between 1150-1500 m.

49. *Camponotus tergestinus* Müller, 1921

(Figs 49.1-6)

Camponotus tergestinus Müller, 1921: 46.

Distribution in Greece: No records from Greece but its occurrence in the European part of Turkey and Bulgaria suggests that it may occur in northern Greece, especially in Thrace.

Distribution in Europe and Mediterranean Basin: Bulgaria; Hungary; Italy: mainland; Montenegro; Romania; Serbia; Slovenia; Turkey.

Description. Large, moderately polymorphic; HL: 1.980-2.500 (mean 2.278); HW: 1.550-2.433 (mean 2.075); SL: 1.780-2.2020 (mean 1.916); EL: 0.452-0.548 (mean 0.506); ML: 2.76-3.48; MW: 1.19-1.72. **Color.** Head, mesosoma and petiole dark brown to black, often clypeus partly yellowish to brown and gena with yellow to brown spots, gaster predominantly blakc only anterior slope of first gastral tergite yellowish to yellowish brown and posterior margins of tergites transparent yellow, antennal scapus yellowish to brown, funicle yellowish, yellowish brown or brown, legs uniformly yellow or femora yellow, tibiae and tarsi yellowish brown to brown (Figs 49.1-6). **Head.** In minor workers elongate, 1.3 times

longer than wide, in front of eyes softly rounded, behind eyes regularly rounded, posterior margin straight (Fig. 49.5), in major workers head stout, as long as wide, more rounded on sides than in minor workers, posterior margin shallowly concave (Fig. 49.6). Clypeus almost rectangular, with anterior margin straight but broadly, shallowly emarginate, posterior margin in the middle emarginate by frontal triangle, whole surface distinctly microreticulated but indistinctly shiny, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 4-6 very long setae, also sides and basal part of clypeus with short to long erected setae. Head distinctly microreticulate with coarse but sparse punctation , distance between punctures larger than the diameter of puncture, interspaces appear indistinctly shiny, frons with well-marked median sulcus or impunctate line, whole surface with very short and very sparse appressed hairs. Lateral sides of head and gena with sparse, short erect setae, frons on sides with numerous short to long erected setae, central post ocular area o with 7-10 long erected setae, occipital area with few short erected setae, ventral side of head with numerous short to long erected setae. Scape moderately long, in minor workers 1.3 times longer than width of head, in major workers approximately as long as width of head, at apex twice wider than in base, its surface diffusely microreticulate shiny, with short and sparse subdecumbent to decumbent pubescence, and on anterior face with numerous short erected setae. Funicular segments elongate, thin, first segment 2.7-2.8 times as long as wide and approximately 1.6 times as long as second segment, third segment slightly longer than second, the rest of funicular segments distinctly longer than broad (Figs 49.5, 5). Eyes moderately big, almost round, 0.22 length of head. Mandibles stout, microreticulate and coarsely punctate, surface shiny. **Mesosoma.** Elongate in minor workers approximately 2.3, in major workers 2.0-2.2 times as long as wide, dorsally and laterally distinctly sculptured, dorsum and lateral sides with transverse and oblique to partly longitudinal striae, pronotum laterally with a patch of coarse punctures, dorsum without or with a few punctures, surface shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum form a blunt angle (Figs 49.2, 4). Surface of pronotal dorsum and mesonotum with short and scarce depressed hairs directed forward, pronotum with 4-18, mesonotum with 10-14, propodeum with 16-24 very long and erected setae, the longest with length to 0.415. **Waist and gaster.** Petiolar scale moderately thick with convex anterior and flat posterior face, apex rounded; anterior surface transversely striate, posterior surface smooth, without pubescence, apical crest with 7-14 very long erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation and sparse micropunctation, surface distinctly shiny, covered with very short and scarce appressed hairs; each tergite with numerous, long erected setae. Legs. Moderately elongate, hind femora shorter than mesosoma, surface of legs covered with sparse subdecumbent to decumbent hairs, inner margin of hind tibiae in apical fourth with row of thorns. Ventral surface of fore femora with 9-12 long erected setae.

Gyne unknown.

Comparative remarks. *Camponotus tergestinus* belongs to the complex of species with body appearing more or less shiny with regularly arched mesosoma in profile. Only three members of the subgenus *Myrmentoma* have this set of characters: *C. fallax*, *C. gestroi gestroi* and *C. tergestinus*. *Camponotus gestroi gestroi* is the most distinct due to the mesosoma in profile not as regularly arched as in both relatives with well-marked mesonotal suture, black body, at least partly black legs and antennae, and longer antennal scapus with SL/HW in minor workers = 1.26 and major workers 0.92. While in *C. fallax* and *C. tergestinus*

mesosoma is regularly arched in profile, mesonotal suture softly marked, body colouration from yellowish brown to dark brown (if body is black then first gastral tergite has yellowish to brown anterior slope), legs and antennae completely to mostly yellow to yellowish brown, and antennal scapus shorter with SL/HW in minor workers usually below 1.15 and major workers below 0.90. *Camponotus fallax* differs in gena lacking erected setae (in *C. tergestinus* gena are setose), anteromedian clypeal margin usually with distinct emargination, especially in major workers (in *C. tergestinus* anteromedian clypeal margin is without or with very shallow median emargination) and propodeum in lateral view forming more continuous convexity (in *C. tergestinus* forming a blunt angle).

Biological notes. Arboricolous, associated with deciduous trees, especially oaks. In Slovenia nesting on a Turkey oak (*Quercus cerris*). The tree was approximately 15 m high, standing in the meadow/pasture with other scattered oaks. The nest was located in a tree knot on the trunk at the height of 2.2 m and had two entrances 3 cm apart with diameters of 6 mm and 3 mm, respectively. In other cases discovered colony was located in a burl on one of oak's four main branches at the height of 3.2 m. The nest had two entrances 15 cm apart with diameter of approximately 5 mm each (Bračko 2017).

Subgenus *Tanaemyrmex* Ashmead, 1905

A key to species of the subgenus *Tanaemyrmex*

1. Dorsal surface of antennal scape and hind tibia with subdecumbent to suberect pubescence ..... 2.

–. Dorsal surface of antennal scape and hind tibia with completely appressed pubescence .... 4.

2. Gena with erected setae (Figs 55.5, 6, 57.5, 6) ..... 3.

–. Gena lacking erected setae (Figs 53.5, 6) ..... ***C. ionius*** Emery, p. 120

3. Base of gaster distinctly paler than the rest of gastral tergites, mesosoma partly yellowish-red to red, occasionally uniformly brown (Fig.57.3) ..... ***C. samius*** Forel, p. 130

–. Gaster uniformly black, sometimes minor workers with the base of gaster indistinctly brighter, mesosoma in both minor and major workers uniformly brown to black (Fig. 55.3) .....***C. laconicus*** Emery, p. 125

4. Gena with erected setae (Figs 50.8, 9, 54.7, 8, 56.7, 8, 59.5, 6) ..... 5.

–. Gena lacking erected setae (Figs 51.3, 7, 52.5, 6, 58.5, 6) ..... 8.

5. Ventral margin of hind tibia with a row of thorns (Figs 50.4, 56.4, 59.2) ..... 6.

–. Ventral margin of hind tibia except apical spine without a row of thorns (Figs 54.5, 6) .... ***C. jaliensis*** Dalla Torre, p. 123

6. Microsculpture of body stronger, whole head and sides of mesosoma appears distinctly sculptured ..... 7.

–. Microsculpture of body more superficial, especially postocular area and occipitum of head with diffused microsculpture and sides of mesosoma appears strongly shiny .... ***C. sannini* Tohmé & Tohmé**, p. 136

7. The transverse row of short setae on posterior margin of gaster tergites short, not reaching posterior margin of the tergite, usually reaching to ½-2/3 of length of the margin (Fig. 56.10) ..... ***C. oertzeni* Forel**, p. 127

–. The transverse row of short setae on posterior margin of gaster tergite long, usually reaching to or beyiond posterior margin of the tergite (Fig. 50.3) .... ***C. aethiops* (Latreille)**, p. 112

8. Ventral side of head with erected setae ..... 9.

–. Ventral side of head lacking erected setae ..... ***C. sanctus* Forel** – typical form, p. 133

9. Gaster in minor workers yellow basally, brown to black posteriorly, in major workers almost completely brown to black only anterior face from yellow to yellowish-brown (Figs 51.1-4, 58.1-4, 7, 8 ..... 10.

–. Gaster in both minor and major workers brown to black, in the smallest minor workers anterior face of first tergite only slightly paler than the rest of the surface, but the color gradually changes from lighter to darker (Figs 52.1-4). No reliable records from Greece, common on Cyprus ..... ***C. cecconii* Emery**, p. 118

10. Head in minor workers yellow, the same color as mesosoma (Figs 51.1, 2). Outer surface of hind tibiae in major workers not or only slightly depressed. Microsculpture of head and mesosoma in major workers more superficial thus surface not perfectly matt. Number of erected setae on ventral side of head usually more than four. Head of gyne partly yellow to rusty (Fig. 51.11). Males at least partly yellow (Fig. 51.8) .... ***C. baldaccii* Emery**, p. 115

–. Head in minor workers yellow to rusty yellow but always slightly darker than the mesosoma (Figs 58.1, 2). Outer surface of hind tibiae in major workers distinctly depressed. Microsculpture of head and mesosoma in major workers distinct thus surface perfectly matt. Number of erected setae on ventral side of head usually less than five. Head of gyne black (Fig. 58.11). Males dark brown (Fig. 58.12) .... ***C. sanctus* Emery** – setose form, p. 133

Review of species

50. *Camponotus aethiops* (Latreille, 1798)

(Figs 50.1-9)

Formica aethiops Latreille, 1798: 35;
Formica marginata Latreille, 1798: 35;
Formica angustata Latreille, 1798: 34;
Formica nigrata Nylander, 1849: 35;
Camponotus sylvaticus var. *sylvaticoaethiops* Forel, 1874: 39;

Camponotus marginatus var. *hyalinipennis* Costa, 1884: 56;

Camponotus aethiops var. *concava* Dalla Torre, 1893: 221 (= *Camponotus rubripes* r. *aethiops* v. *concavus* Forel, 1889: 263 unavailable name);

Camponotus aethiops var. *sylvaticoides* Dalla Torre, 1893: 221 (= *Camponotus maculatus* r. *aethiops* var. *sylvaticoides* Forel, 1892 b: 306 unavailable name);

Camponotus (*Tanaemyrmex*) *aethiops* var. *caschmirensis* Emery, 1925 d: 97 (= *Camponotus maculatus* r. *aethiops* var. *caschmirensis* Forel, 1904 a: 29 unavailable name);

Camponotus (*Tanaemyrmex*) *aethiops* var. *escherichi* Emery, 1925 d: 97 (= *Camponotus maculatus* subsp. *oertzeni* var. *escherichi* Emery, 1897: 239 unavailable name);

Camponotus (*Tanaemyrmex*) *aethiops* var. *glaber* Emery, 1925 d: 97 (= *Camponotus maculatus aethiops* var. *glaber* Ruzsky, 1905: 213 unavailable name).

Distribution in Greece: Aegean Islands (Forel 1889: 255 - as *Camponotus rubripes* r. *aethiops* var. *concavus*, Finzi 1928: 791 - as *Camponotus aethiops* var. *concava* and *Camponotus aethiops* var. *marginata*, Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Salata & Borowiec 2017 a: 295-299, Borowiec & Salata 2018 c: 4; **new data:** Samos, Kallithea, 286 m, 5 X 2019, 37.73631 / 26.58214); **Crete** (Forel 1886: clxvii - as *Camponotus sylvaticus st. aethiops*, Emery 1894: 9 - as *Camponotus maculatus* ssp. *aethiops* var. *concavus*, Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2015: 21, Salata & Borowiec 2017 a: 295-299, Salata et al. 2020 a: 32); **Cyclades** (Forel 1889: 255 - as *Camponotus rubripes* r. *aethiops* var. *concavus*, Finzi 1928: 791 - as *Camponotus aethiops* var. *concava* and *Camponotus aethiops* var. *marginata*, Finzi 1939: 158 - as *Camponotus aethiops* var. *concava*, Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2012: 471; **new data:** Andros, 1.5 km SE of Kolimpos, 235 m, IV-XI 2006, 37.80056 / 24.84667; Christiani, 55 m, 4 VIII 2006, 36.2515 / 25.2032; Naxos, 780 m SE of Keramoti, 660 m, IV-XI 2006, 37.10361 / 25.52194); **Dodecanese** (Emery 1915: 2 - as *Camponotus maculatus aethiops* var. *concava*, Menozzi 1936: 300 - as *Camponotus aethiops* var. *concava*, Collingwood 1993: 195, Salata & Borowiec 2017 a: 295-299, Borowiec et al. 2021: 13); **Epirus** (Legakis 1983: 5, 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2018 a: 4); **Ionian Islands** (Forel 1886: clxvii - as *Camponotus sylvaticus st. aethiops*, Emery 1898: 125, Emery, 1901: 57 - as *Camponotus maculatus aethiops* var. *concava*, Emery 1914: 159 - as *Camponotus maculatus aethiops*, Collingwood 1993: 195, Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2014 a: 515, Salata & Borowiec 2017 a: 295-299, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 100-104, 113, 114, Borowiec & Salata 2021 a: 5; **new data:** Cephalonia, Ainos Mts, 1430 m, 15 VI 2021, 38.12251 / 20.68765; Cephalonia, 1.6 km SW of Digaleto, 564 m, 11 VI 2019, 38.16558 / 20.67099; Cephalonia, 1.8 km SW of Digaleto, 580 m, 11 VI 2019, 38.16593 / 20.66788; Cephalonia, 3.8 km SW of Digaleto, 760 m, 11 VI 2019, 38.16577 / 20.64259; Cephalonia, Kapandriti vic. loc. 2, 160 m, 9 VI 2019, 38.11361 / 20.73201; Cephalonia, Kremmidi, 285 m, 9 VI 2019, 38.09048 / 20.74471; Cephalonia, Skala vic. loc. 1, 40 m, 6 VI 2019, 38.08178 / 20.79275; Cephalonia, Skala-Poros rd., 12 VI 2019, 38.12872 / 20.79576; Cephalonia 2.8 km NE of Valsamata, 560 m, 11 VI 2019, 38.19844 / 20.59694; Lefkada, Asprogerakata, 430 m, 2 IX 2016, 38.46828 / 20.39191; Lefkada, 2.5 km S of Egklouvi,

1010 m, 2 IX 2016, 38.70876 / 20.63711; Lefkada, 1.2 km W of Kalavros, 330 m, 2 IX 2016, 38.80662 / 20.66471; Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747); **Macedonia** (Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2012: 471, Salata & Borowiec 2019 b: 104, 2022: 5; **new data:** Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 / 24.6356; Drama, 12 km S of Livadero, 500 m, 9 X 1999, 41.2351 / 24.1936; Drama, Partheno Dasos, 995 m, 7 X 1999, 41.5056 / 24.4288; Drama, 1 km S of Skaloti, 954 m, 8 VII 1996, 41.4073 / 24.2766; Pieria, Nei Pori, 30 m, 15 VI 2013, 39.964 / 22.648; Pieria, road to P. Poroi loc. 1 , 110 m, 17 V 2019, 39.97963 / 22.61563; Pieria, road to P. Poroi loc. 2 , 185 m, 17 V 2019, 39.97627 / 22.61146); **Peloponnese** (Forel 1886: clxvii - as *Camponotus sylvaticus st. aethiops*, Legakis 1984: 86, 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2017 b: 203, Salata & Borowiec 2019 b: 114, Borowiec & Salata 2021 b: 4; **new data:** Arkadia, Langadia, Valtessiniko, 1200 m, 7 VI 2007, 37.7011 / 22.11196); **Sterea Ellas** (Finzi 1928: 791 - as *Camponotus aethiops* var. *concava* and *Camponotus aethiops* var. *marginata*, Finzi 1939: 158 - as *Camponotus aethiops* var. *concava,* Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2012: 471, Borowiec & Salata 2018 e: 5, Salata & Borowiec 2019 b: 106, 120, Borowiec & Salata 2021 b: 4; **new data:** Boeotia, Parnassos Mts., Arachova, 880 m, 5 V 1994, 38.479 / 22.586; Fokida, Mt Parnassos, ad ski center, 1758 m, 8 VI 2021, 38.55506 / 22.57166); **Thessaly** (Legakis 2011: 28 – as *Camponotus aethiops*, 29 as *Camponotus concavus*, Borowiec & Salata 2012: 471, Borowiec & Salata 2018 b: 222, Salata & Borowiec 2019 b: 107, 121); **Thrace** (Bračko et al. 2016: 13).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czech Rep.; France: Corsica, mainland; Georgia; Germany; Gibraltar; Greece: Aegean Is., Crete, Cyclades, Dodecanese, Ionian Is., mainland; Hungary; Iran; Israel; Italy: mainland; Sardinia, Sicily; Malta; Moldova; Montenegro; North Macedonia; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares; Switzerland; Turkey.

Description. Moderately large to large, polymorphic; minor workers HL: 1.317-1.437 (mean 1.376); HW: 0.876-0.965 (mean 0.934); SL: 1.508-1.634 (mean 1.568); EL: 0.373-0.381 (mean 0.377); ML: 2.07-2.27; MW: 0.83-0.94. **Color.** Body predominantly brown to black (Figs 50.1, 2, 4, 5, 7), in Greek populations pure black specimens are rare, most samples represent specimens with body brown of various shades, head sometimes paler than mesosoma, reddish brown with brown frontal spot of diffused borders, pronotum often paler than mesonotum and propodeum, yellowish brown, in rare very pale specimens head reddish with reddish brown spot on frons and gena, mesosoma reddish brown with yellowish brown pronotum, petiolar scale brown with yellowish base, gaster always dark colored from dark brown to pure black (Fig. 50.6); antennae from uniformly yellow to dark brown with blackish scapus, legs usually dark colored, brown to black, in pale forms coxa yellowish drown, whole tibiae and tarsi yellow or whole legs reddish brown but samples with dark legs predominate. **Head.** Elongate, 1.4-1.5 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 50.8). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple or slightly crenulate, on sides anterior clypeal margin deeply emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with

distinct obtuse keel, whole surface distinctly microreticulated, surface slightly dull, covered with sparse and short appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae, central plate with several long erected setae. Head distinctly microreticulate, sculpture in posterior half and sides of head often tends to form transverse or circular striation, background slightly dull, covered with sparse and short appressed pubescence, appears partly unhaired, whole surface including gena, sides of head and occipitum with numerous moderately long to long erected setae, ventral side of head with several moderately long to long erected setae. Scape very elongate, thin, 1.6-1.7 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, with short and sparse appressed pubescence only apex of scapi with slightly decumbent hairs. Funicular segments elongate, thin, first segment approximately three times as long as wide and 1.2-1.3 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 50.8). Eyes large, elongate oval, 0.27 length of head. Mandibles stout, microreticulate and punctate, surface slightly shiny. **Mesosoma.** Elongate 2.3-2.5 times as long as wide, dorsally and laterally distinctly sculptured , tending to form longitudinal and oblique striation and partly also microreticulation, surface indistinctly shiny. In lateral view dorsum form relatively regular arch, without mesonotal groove (Figs 50.5, 6), but propodeum in some populations with shallow concavity (Fig. 50.7), posterior face forms with dorsum obtuse angle. Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 6-14, mesonotum 6-9, propodeum 5-8 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiolar in form of broad, thin scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 6-8 very long erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears indistinctly shiny, covered with short and scarce appressed hairs; all tergites with several very long erected setae, row of setae on posterior margin composed with elongate hairs mostly reaching to or behind the hind margin of tergites. **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae in apical 2/3 length with row of thorns. Ventral surface of fore femora with 4-9 long erected setae.

Major workers: HL: 2.533-2.767 (mean 2.658); HW: 2.483-2.770 (mean 2.643); SL: 2.060-2.233 (mean 2.133); EL: 0.523-0.595 (mean 0.559); ML: 3.18-3.47; MW: 1.49-1.75. In body color and sculpture similar to minor workers but surface duller than in minor workers, especially on head and sides of mesosoma (Figs 50.4, 5, 9). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin concave; anterior margin of clypeus distinctly crenulate, central plate of clypeus head with more numerous erected setae, gular area with more than 10 short to long erected setae (Fig. 50.9). Scape proportionally shorter, 0.8 times as long as width of head. Eyes proportionally smaller, 0.21 length of head; mesosoma stouter, 1.9-2.1 times as long as wide, in profile forming more convex arch, propodeum usually without shallow dorsal concavity and more angulate posterior angle. Setation of all mesosomal parts more numerous. Ventral surface of fore femora with up to 14 long erected setae.

Gyne as in Figs 50.10, 11.

Comparative remarks. *Camponotus aethiops* belongs to the complex of large species with setose gena, presence of pubescence of antennal scapi, and posterior tibiae lacking suberect hairs. This complex comprises also *C. jaliensis*, *C. oertzeni* and *C. sannini*. *Camponotus jaliensis* differs in inner margin of hind tibiae lacking row of spines or thorns while *C. aethiops* have at least 2-3 (often more) thorns at least in apical part of inner margin of tibia. *Camponotus sannini* differs in more superficial body microsculpture with head, in both major and minor workers, with diffused microreticulation and strongly shiny background on lateral sides and in occipital area. *Camponotus oertzeni* is the most similar to *C. aethiops* but differs in the setation pattern in posterior margin of gastral tergites. In *C. aethiops* the transverse row of short setae on posterior margin of gaster tergite is long and usually reaching to or beyond posterior margin of the tergite (Fig. 50.3) while in *C. oertzeni* this row is short, usually reaching only to ½-2/3 of length of the margin (Fig. 56.10). *Camponotus aethiops* is generally darker with predominant dark brown to almost black body, and usually with brown to black legs (only rarely with reddish to reddish brown mesosoma and yellowish legs) while in *C. oertzeni* populations with partly pale, yellowish red to reddish head, mesosoma and legs are common, especially on Greek islands.

Biological notes. One of the most common Greek species of *Camponotus*. Ubiquistic but less thermophilous than other species of the subgenus *Tanaemyrmex*. Noted from wide range of habitats both forest and open. Collected in all types of deciduous, mixed and coniferous forests, olive plantations, mountain pastures with clumps of low oaks, gorges with a limestone rocks, shaded valleys of a small creek, small gorges with mediterranean shrubs, frygana on sea coast, alpine zone with limestone rocks and pastures, roadsides along olive plantation, limestone quarry, shrubs growing along roadsides, pastures with fig trees, on stone walls in garden in tourist resorts and in urban parks. Nests under large stones, deep in soil, sometimes with a flat dome of solidified material under which hidden entrance holes open up in lateral direction. Sometimes the nests are only in the soil, on slopes covered with grassy turf. Listed from the lowland's, uplands and mountains with the highest locality on Trocharis peak, Crete at an altitude of 2130 m.

51. *Camponotus baldaccii* Emery, 1908

(Figs 51.1-8)

Camponotus maculatus subsp. *baldaccii* Emery, 1908: 198 (= *Camponotus maculatus* ssp. *dichrous* var. *baldaccii* Emery, 1894 a: 9 unavailable name).

Distribution in Greece: Aegean Islands (Legakis 2011: 29, Borowiec & Salata 2018 c: 4, **new data:** Chios, Kerameia, 8 m, 15 V 2013, 38.2987 N / 26.1373 E; Ikaria, Chalaris Canyon, 12 VI 2013, 37,61666 N / 26,05 E; Samos; Samos, Pythagorio, 20 m, 5 VI 2013, 36.68333 N / 26.93333 E); **Crete** (Forel 1886: clixi - as *Camponotus sylvaticus* var. *dichrous*, Forel 1889: 255 - as *Camponotus rubripes* var. *maculato-dichrous*, Emery 1894: 9 - as *Camponotus maculatus* ssp. *dichrous* var. *baldaccii*, Emery 1908: 198 - as *Camponotus maculatus baldaccii*, Legakis 2011: 29, Borowiec & Salata 2012: 472, Salata & Borowiec 2017: 296-298, 304, Salata et al. 2020 a: 33); **Dodecanese** (Forel 1889: 255 - as *Camponotus rubripes* var. *maculato-dichrous*, Emery 1915: 2 - as *Camponotus maculatus baldaccii*, Menozzi 1936: 300 - as *Camponotus sylvaticus* ssp. *baldaccii*, Legakis 2011: 29, Borowiec & Salata 2012: 472, Borowiec & Salata 2015: 53, Salata & Borowiec, 2016: 199, Salata &

Borowiec 2017: 296-298, 304, Borowiec et al. 2021: 13); **?Sterea Ellas** (Legakis 2011: 29). Record from Sterea Ellas needs confirmation.

Distribution in Europe and Mediterranean Basin: Cyprus; Greece; Iran; Israel; Saudi Arabia; Turkey.

Description. Large to very large, polymorphic; minor workers HL: 1.556-1.810 (mean 1.649); HW: 0.952-1.127 (mean 1.008); SL: 1.950-2.060 (mean 2.021); EL: 0.381-0.444 (mean 0.409); ML: 2.47-2.74; MW: 0.93-1.06. **Color.** Head, mesosoma, petiolar scale, antennae and legs yellow, gaster bicolor, tergites yellow anteriorly and brown to black posteriorly, yellow can be only first tergite, or first two tergites, or in pale specimens also part of third tergite, sternites yellow (Figs 51.1-3); in intermediate workers as the body size increases, the head becomes darker, partly rusty yellow to rusty brown and mesosoma rusty yellow but gaster always yellow to rusty anteriorly Fig. 51.4). **Head.** Very elongate, 1.6-1.7 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 51.3). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple, on sides anterior clypeal margin shallowly emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with obtuse keel, whole surface with diffused microreticulation, surface strongly shiny, covered with sparse and short appressed hairs, anterior margin in the middle with 5-7 very long setae, on sides with few short additional setae, central plate with 3-4 pairs of erected setae, grouping on sides and base of clypeus. Head microreticulate, sculpture in posterior half and sides of head often tends to form transverse or circular striation, behind eyes microsculpture sometimes diffused, background strongly shiny, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with row of 3-4 long erected setae, vertex and central part of occipitum with a pair of long erected setae, gena and sides of head lacking erected setae, ventral side of head with 2-6 moderately long to long erected setae. Scape very elongate, thin, 1.8-2.1 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment approximately 3.6 times as long as wide and 1.3-1.4 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 51.3). Eyes large, elongate oval, 0.25 length of head. Mandibles stout, diffusely microreticulate and punctate, surface shiny. **Mesosoma.** Elongate 2.5-2.7 times as long as wide, distinctly sculptured tending to form longitudinal, transverse and oblique striation, surface strongly shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posteriorly very broadly rounded (Figs 51.2, 4). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, laterally surface partly unhaired, pronotum with 2, mesonotum and propodeum with up to two erected setae, number of erected setae only slightly increases with the size of the specimen. **Waist and gaster.** Petiole in form of broad, very thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with two long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears strongly shiny, covered with short and scarce appressed hairs; first tergite with a pair of very long erected setae centrally and a row of 4 long setae

close to posterior margin, two subsequent tergites with 2-4 long setae in front of the middle and similar row of 4-6 setae close to posterior margin, moderately elongate, appressed hairs on posterior margin of tergites very short, reaching to 1/3-1/2 length of the transparent margin. **Legs.** Elongate and thin, hind femora only slightly shorter than mesosoma, surface of legs covered with very sparse appressed hairs, inner margin of tibiae in apical 1/3 length with 2-6 thorns. Ventral surface of fore femora with 2-3 long erected setae.

Major workers: HL: 2.907-3.453 (mean 3.253); HW: 2.667-3.267 (mean 3.060); SL: 2.500-2.667 (mean 2.590); EL: 0.611-0.631 (mean 0.620); ML: 3.71-4.40; MW: 1.85-2.06. Head always dark colored, rusty brown to black, including mandibles, scapus mostly brown to black except pale base and apex, funicle from yellow to rusty yellow, mesosoma dorsally rusty brown, brown to black laterally gradually yellowish brown to yellow, petiole, coxa and femora yellow, tibiae and tarsi from rusty yellow to yellowish brown, first gastral tergite mostly to completely yellow, sternites yellow (Figs 51.5-7). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin deeply concave (Fig. 51.7); rectangular anterior plate of clypeus shallowly emarginate on sides thus anterior corners slightly angulated, central plate of clypeus head with 5-6 pairs of erected setae, gular area with 2-8 short to long erected setae. Scape proportionally shorter, 0.8-0.9 times as long as width of head. Eyes proportionally smaller, 0.19 length of head; mesosoma stouter, 2.0-2.2 times as long as wide, in profile forming more convex arch, propodeum with less obtusely posterior angle. Pronotum with 4-8, mesonotum 2-6, propodeum 3-5, petiolar crest 4-6 very long erected setae. Ventral surface of fore femora with 3-6 long erected setae.

Gyne as in Figs 51.9-11, body partly yellowish brown, head partly or completely yellowish. Male as in Fig. 51.8, head and mesosoma mostly yellow, gaster yellowish-brown.

Comparative remarks. *Camponotus baldaccii* with *C. cecconii* and *C. sanctus* forms a group of large species with gena lacking erected setae and head and mesosoma in minor workers predominantly yellow to rusty yellow. Typical form of *C. sanctus* differs in ventral side of head lacking erected setae while in *C. baldaccii* and *C. cecconii* ventral side of head is always setose. *Camponotus cecconii* differs in gaster of both minor and major workers completely brown to black (smallest minor workers have sometimes anterior face of first tergite slightly paler than the rest of the surface, but the color gradually changes from lighter to darker) while in *C. baldaccii* and *C. sanctus* gaster is yellow basally and brown to black posteriorly in minor workers, and major workers have gaster almost completely brown to black (anterior face of gaster is from yellow to yellowish-brown and border between the pale spot and dark rest of gastral surface is well-marked). *Camponotus cecconii* has no reliable records from Greece while *C. baldaccii* and C. *sanctus* are common in southern and eastern Greek islands. Setose form of *C. sanctus* that has few erected setae on ventral side of head is very similar to *C. baldaccii* and both species have similar range of variation of body coloration and morphological characters. However, minor workers of *C. baldaccii* have always head uniformly yellow and in the same color as mesosoma while minors of *C. sanctus* have head yellow to rusty yellow but always slightly darker than the mesosoma. In *C. baldaccii* outer surface of hind tibiae in major workers is not or only slightly depressed and lacking longitudinal channel while in *C. sanctus* outer surface of hind tibiae in major workers is distinctly depressed with well-marked longitudinal channel. *Camponotus baldaccii* is slightly smaller with HL in major workers up to 3.453 mm while in *C. sanctus* up to 4.175 mm. Both species

differ in color of males, at least partly yellow in *C. baldaccii* and dark brown in *C. sanctus*. Both species are partly separated geographically, *C. baldaccii* occurs on Crete, Dodecanese and Aegean Islands while *C. sanctus* is known only from Dodecanese and Aegean Islands.

Biological notes. Very thermophilous species. Prefers open and sunny habitats, especially pastures with shrubs, stony hills with scarce vegetation and few trees, fryganas, periodic riverbeds, roadsides, limestone gorges but was noted also from pine groves, olive plantations, stream valleys with luminous deciduous or pine forest. Foraging workers were often observed in tourist resorts and villages on fig trees searching for producing honeydew aphids and cocccids. Nests in soil under large stones. Most records are from low and mid altitude below 500 m, the highest locality was from Lefka Ori Mts., Crete at an altitude 1800 m.

52. *Camponotus cecconii* Emery, 1908

(Figs 52.1-6)

Camponotus maculatus subsp. *cecconii* Emery, 1908: 198.

Distribution in Greece: ?Aegean Islands (Collingwood 1993: 195, Legakis 2011: 29, probably misidentifications); **?Dodecanese** (Collingwood 1993: 195, Legakis 2011: 29, probably misidentifications). Records from Greece are probably based on misidentifications. Recent studies in the Aegean and Dodecanese Islands have not confirmed the occurrence of this species in these regions.

Distribution in Europe and Mediterranean Basin: Cyprus; ?Greece; ?Iran. Records from Greece and Iran are unbelievable and probably this species is endemic to Cyprus.

Description. Large to very large, polymorphic; minor workers HL: 1.508-1.780 (mean 1.620); HW: 1.031-1.198 (mean 1.103); SL: 1.870-1.998 (mean 1.916); EL: 0.397-0.444 (mean 0.420); ML: 2.38-2.57; MW: 0.93-1.06. **Color.** Head yellow anteriorly and rusty yellow posteriorly or completely orange yellow to rusty yellow, mesosoma and petiolar scale yellow, gaster with brown to black tergites and yellow sternites, antennae and legs uniformly yellow; in intermediate workers as the body size increases, the head becomes darker, rusty brown to brown and mesosoma rusty yellow (Figs 52.1, 2, 5). **Head.** Very elongate, 1.5 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 52.5). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple, on sides anterior clypeal margin very shallowly emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with obtuse keel, whole surface with diffused microreticulation, surface strongly shiny, covered with very sparse and short appressed hairs, anterior margin in the middle with 5 very long setae, on sides with few short additional setae, central plate with 3-4 pairs of erected setae. Head microreticulate, sculpture in posterior half and sides of head often tends to form transverse or circular striation, background shiny, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with row of 3 long erected setae, vertex and central part of occipitum with a pair of long erected setae, gena and sides of head lacking erected setae, ventral side of head with 4-6 moderately long to long erected setae. Scape very elongate, thin, 1.7-1.8 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, with short and sparse appressed pubescence. Funicular segments elongate, thin,

first segment approximately 3.5 times as long as wide and 1.3-1.4 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 52.5). Eyes large, elongate oval, 0.26 length of head. Mandibles stout, diffusely microreticulate and punctate, surface shiny. **Mesosoma.** Elongate 2.4-2.6 times as long as wide, dorsally with microreticulation, distinctly sculptured tending to form longitudinal and oblique striation, surface strongly shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posteriorly very broadly rounded (Fig. 52.2). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 2-4, mesonotum 2, propodeum 2-4 very long erected setae, number of erected setae does not increase with the size of the ant. **Waist and gaster.** Petiole in form of broad, very thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with two long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears strongly shiny, covered with short and scarce appressed hairs; first tergite with a pair of very long erected setae centrally and a row of long setae on posterior margin, two subsequent tergites with a row of long setae close to base and similar row close to posterior margin elongate, appressed hairs on posterior margin of tergites very short, reaching 1/3 length of the transparent margin. **Legs.** Elongate and thin, hind femora only slightly shorter than mesosoma, surface of legs covered with very sparse appressed hairs, inner margin of tibiae in apical 1/3length with 2-4 thorns. Ventral surface of fore femora with 2-3 long erected setae.

Major workers: HL: 2.667-3.177 (mean 3.010); HW: 2.433-3.117 (mean 2.904); SL: 2.133-2.667 (mean 2.342); EL: 0.556-0.619 (mean 0.580); ML: 3.31-3.83; MW: 1.54-1.88. Head always dark colored, rusty brown to black, mandibles mostly brown to black except reddish brown base of teeth, scapus mostly brown to black except pale base and apex, mesosoma dorsally brown to black laterally gradually yellowish brown to yellow, petiole, coxa and femora yellow, tibiae and tarsi from rusty yellow to yellowish brown, gastral tergites black, only anterior slope of first tergite with yellowish brown to brown spot, sternites yellow (Figs 52.3, 4, 6). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin deeply concave with occipital corners strongly protruding posterad (Fig. 52.6); rectangular anterior plate of clypeus deeply emarginate on sides thus anterior corners acute or hook-like, central plate of clypeus head with 5 pairs of erected setae, gular area with 6-8 short to long erected setae. Scape proportionally shorter, 0.7-0.9 times as long as width of head. Eyes proportionally smaller, 0.19 length of head; mesosoma stouter, 1.8-2.2 times as long as wide, in profile forming more convex arch, propodeum with less obtusely posterior angle. Pronotum with 4, mesonotum 4-6, propodeum 4, petiolar crest 4 very long erected setae. Ventral surface of fore femora with 3-6 long erected setae.

Gyne not studied.

Comparative remarks. *Camponotus cecconii* with *C. sanctus* and *C. baldaccii* forms a group of large species with gena lacking erected setae and predominantly yellow to rusty yellow head and mesosoma in minor workers. Typical form of *C. sanctus* differs in ventral side of head lacking erected setae while in *C. baldaccii* and C. *cecconii* erected setae are present. *Camponotus cecconii* differs from both relatives in completely brown to black gaster of

both minor and major workers (sometimes smallest minor workers have anterior face of first tergite slightly paler than the rest of the surface, but the color gradually changes from lighter to darker) while in *C. baldaccii* and *C. sanctus* gaster in minor workers is yellow basally, brown to black posteriorly (in major workers gaster is almost completely brown to black but with anterior face from yellow to yellowish-brown and well-marked border between the pale spot and dark rest of gastral surface). *Camponotus cecconii* has no reliable records from Greece while *C. baldaccii* and *C. sanctus* are common in Dodecanese and Aegean Islands and *C. baldaccii* also is common on Crete.

Biological notes. No data from Greece. On Cyprus specimens of this species were observed in pine forest at an altitude 375 m and in garden of tourist resort at an altitude 60 m. Nest under large stone.

53. *Camponotus ionius* Emery, 1920

(Figs 53.1-8)

Camponotus (*Myrmoturba*) *samius* var. *ionia* Emery, 1920: 6 (= *Camponotus maculatus samius* var. *ionia* Emery, 1901: 59 unavailable name).

Distribution in Greece: Aegean Islands (Collingwood 1993: 195, Legakis 2011: 30); Cyclades (Finzi 1928: 791 - as *Camponotus samius* var. *jonia*, Finzi 1939: 159 - as *Camponotus samius* var. *ionia*, Collingwood 1993: 195, Legakis 2011: 30, Salata & Borowiec 2017 a: 297, 299, Borowiec & Salata 2018 c: 4; **new data:** Lesbos, Piges Pesa, 113 m, 10 VI 2015, 39.12736 N / 26.26342 E; Samos, Vigla, 15 m, 6 VI 2013, 37.7 N / 26.63333 E); **Cyclades** (**new data:** Andros, 1.5 km SE of Kolimpos, 235 m, IV-XI 2006, 37.80056 / 24.84667; Kea, Korisia, 7 m, 3 IV 2017, 37.65 / 24.31; Milos, Tripiti, 150 m, 6 IV 2016, 36.73 / 24.42; Naxos, above Akrotiri, 46 m, 30 VI 2016, 37.1298 / 25.4481; Naxos, Aliki, 15 m, 4 VII 2016, 36.9799 / 25.388; Naxos, Zeus Cave vic., 650 m, 1 VII 2016, 37.0341 / 25.4991; Thira, Akrotiri, 97 m, 14 VII 2006, 36.3554 / 25.3942); **Dodecanese** (Forel 1889: 255 - as *Camponotus rubripes* var. *cognato-pilicornis*, Emery 1908: 193 - as *Camponotus maculatus samius* var. *ionia*, Collingwood 1993: 195, Legakis 2011: 30, Salata & Borowiec 2015 a: 68-69, Borowiec et al. 2021: 14); **Epirus**: Borowiec & Salata 2018 a: 4); **Ionian Islands** (Emery, 1901: 59 - as *Camponotus maculatus samius var. ionia*, Emery 1914: 159 - as *Camponotus maculatus samius* var. *ionia*, Collingwood 1993: 195, Legakis 2011: 30, Borowiec & Salata 2014 a: 515, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 6; **new data:** Cephalonia, Assos, 64 m, 16 VI 2021, 38.37935/ 20.53555; Cephalonia, Lourdata, 4 m, 14 VI 2021, 38.11421 / 20.62931; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala, 64 m, 7 VI 2019, 38.07939 / 20.79305; Cephalonia, Skala, 19 m, 17 VI 2021, 38.07683 / 20.79644; Lefkada, Kavalikefta beach, 57 m, 12 VI 2021, 38.75366 / 20.59056; Lefkada, Nikiana, 24 m, 11 VI 2021, 38.766171, 20.71766; Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747; Lefkada, Vasiliki beach, 2 m, 12 VI 2021, 38.63156 / 20.59903); **Macedonia** (Petrov & Legakis 1996: 31, Legakis 2011: 30, Borowiec & Salata 2012: 476, 2022: 6; **new data:** Halkidiki, Kassandra, Agia Paraskevi, 213 m, 26 VIII 2009, 39.95 N / 23.6 E; Pieria, road to P. Poroi loc. 1 , 110 m, 17 V 2019, 39.97963 / 22.61563); **Peloponnese** (Finzi 1939: 159 - as *Camponotus samius* var. *ionia*, Legakis 1984: 86 – as *Camponotus samius ionia*, 2011: 30, Salata & Borowiec 2017 a: 297, 299, Borowiec

& Salata 2017 b: 205, Salata & Borowiec 2019 b: 114, 115); **Sterea Ellas** (Forel 1889: 255 - as *Camponotus rubripes* var. *cognato-pilicornis*, Emery 1908: 193 - as *Camponotus maculatus samius* var. *ionia*, Finzi 1928: 791 - as *Camponotus samius* var. *jonia*, Finzi 1939: 159 - as *Camponotus samius* var. *ionia*, Legakis 1984: 86 – as *Camponotus samius ionia*, 2011: 30, Borowiec & Salata 2018 e: 5, Salata & Borowiec 2019 b: 106; **new data:** Aetolia-Acarnania, Nafpaktos, Nafpaktos Castle, 125 m, 9 VI 2021, 38.39595 / 21.82464); **Thessaly** (Legakis 2011: 30, Borowiec & Salata 2012: 476, Borowiec & Salata 2018 b: 223); **Thrace** (Finzi 1939: 159 - as *Camponotus samius* var. *ionia*, Bračko et al. 2016: 13).

Distribution in Europe and Mediterranean Basin: Bulgaria; Greece; North Macedonia; Serbia; Turkey.

Description. Large to very large, polymorphic; minor workers HL: 1.541-1.784 (mean 1.659); HW: 1.003-1.140 (mean 1.064); SL: 1.924-2.183 (mean 2.041); EL: 0.405-0.425 (mean 0.415); ML: 2.37-2.78; MW: 0.94-1.01. **Color.** Head brown to dark brown, clypeus often paler than rest of head, yellowish brown, basal half of mandibles dark brown, apical half yellowish to yellowish brown, mesosoma brown to dark brown, pronotum often slightly paler than rest of mesosoma with yellowish margins, also posterior margin of propodeum often yellowish, petiolar scale dark brown, gaster dark brown to black, scapus brown with yellowish base, antennal funicle yellow, legs yellowish brown to brown, femora and coxa usually darker than tibiae and tarsi but trochanters paler than coxa and femora; in the palest specimens mesosoma yellowish brown but such colored specimens are very rare, in the darkest specimens whole head, mesosoma, petiolar scale and gaster dark brown to almost black, in intermediate workers predominate specimens with dark brown coloration (Figs 53. 1, 2, 5). **Head.** Very elongate, 1.4-1.6 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 53.5). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple to slightly crenulate, on sides anterior clypeal margin shallowly emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with obtuse to sharp keel, whole surface distinctly microreticulated, surface shiny, covered with sparse and short appressed hairs, anterior margin in the middle with 7-9 very long setae, on sides with few short additional setae, central plate with 10-12 long, erected setae. Head microreticulate, sculpture in posterior half and sides of head often tends to form transverse or circular striation, background shiny to slightly dull, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with row of 3-4 long erected setae and along middle with additional 1-3 short erected setae, vertex and central part of occipitum with 10-14 moderately long to long erected setae, also occipital corners with erected setae but gena and sides of head lacking erected setae, ventral side of head with 8-14 moderately long to long erected setae. Scape very elongate, thin, 1.8-2.0 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, anterior and frontal surface with short and sparse appressed pubescence, dorsal surface at least in apical half with distinctly subdecumbent to suberect hairs. Funicular segments elongate, thin, first segment approximately 3.4 times as long as wide and 1.2-1.3 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 53.5). Eyes large, elongate oval, 0.25 length of head. Mandibles stout, strongly microreticulate and punctate, surface shiny to slightly dull. **Mesosoma.** Elongate, 2.5-2.8

times as long as wide, distinctly sculptured tending to form longitudinal, lateral and oblique striation, surface shiny to slightly dull. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posteriorly very broadly rounded (Figs 53.2, 4). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 6-8, mesonotum 2-6, propodeum 6-12 very long erected setae, number of erected setae does not increase with the size of intermediate workers. **Waist and gaster.** Petiole in form of broad, very thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 5-6 long erected setae. Gaster shorter than mesosoma, tergites with strong transverse microstriation, interspaces with diffused microsculpture thus surface of gaster appears shiny, covered with moderately elongate but scarce appressed hairs and numerous very long erected setae, appressed setae on posterior margin of tergites long, reaching to or behind the transparent margin. **Legs.** Elongate and thin, hind femora only slightly shorter than mesosoma, surface of legs covered with short, sparse appressed hairs and hind tibiae with moderately long subdecumbent to suberect hairs especially on posterior margin, inner margin of tibiae in apical 1/3length with 2-4 thorns. Ventral surface of fore femora with 5-7 long erected setae.

Major workers: HL: 3.550-3.650 (mean 3.605); HW: 3.400-3.575 (mean 3.500); SL: 2.973-3.067 (mean 2.342); EL: 0.587-0.683 (mean 0.629); ML: 4.21-4.47; MW: 1.96-2.07. Body colored as in minor workers but dark brown to almost black specimens predominate, mandibles sometimes mostly brown to black with paler masticatory teeth, scapus dark brown to black except pale base and apex, coxa and femora often yellow to rusty yellow, tibiae and tarsi yellowish brown (Figs 53.3, 4). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin deeply concave with occipital corners distinctly protruding posterad (Fig. 53.6); rectangular anterior plate of clypeus shallowly emarginate on sides thus anterior corners slightly angulated, central plate of clypeus head with more than 14 erected setae, gular area with numerous short to long erected setae. Scape proportionally shorter, 0.9 times as long as width of head. Eyes proportionally smaller, 0.17 length of head; mesosoma stouter, 2.0-2.1 times as long as wide, in profile forming more convex arch, propodeum with less obtusely posterior angle. Pronotum, mesonotum and propodeum with numerous long, erected setae, petiolar crest with 8-10 very long erected setae. Ventral surface of fore femora with 7-12 long erected setae.

Gyne as in Figs 53.7, 8, body predominantly black, coxa and femora partly yellowish-red.

Comparative remarks. *Camponotus ionius* with *C. laconicus* and *C. samius* forms a distinct complex of large species with dorsal surface of scape and posterior margin of hind tibia with subdecumbent to suberect hairs (other large species of the subgenus *Tanaemyrmex* have scapus ant hind tibiae with only appressed to slightly decumbent pubescence). *Camponotus ionius* differs from both relatives in gena and sides of head lacking erected setae while *C. laconicus* and *C. samius* have gena and sides of head distinctly setose. *Camponotus samius* differs also in minor workers with completely yellow to rusty yellow mesosoma, major workers with partly reddish mesosoma and all workers with partly to completely yellowish to reddish first gastral tergite.

Biological notes. Thermophilous species, prefers open and sunny habitats such as pastures with shrubs, luminous pine forests, ruderal areas in town, gardens in tourist resorts,

roadsides, luminous pine plantations but was noted also from shady valley in mixed forests, stream valleys with deciduous forests, area near a small lake in a moist, shaded valley of a small creek, limestones hills after burned forests and gorge with plane forest. Nests directly in soil, or under large stones. Absent in high altitudes, noted from sea level to an altitude of 805 m.

54. *Camponotus jaliensis* Dalla Torre, 1893

(Figs 54.1-10)

Camponotus oertzeni var. *jaliensis* Dalla Torre, 1893: 246 (= *Camponotus rubripes* r. *oertzeni* var. *jaliensis* Forel, 1889: 264 unavailable name).

Distribution in Greece: Aegean Islands (Collingwood 1993: 195, Legakis 2011: 30); **Crete** (Legakis 2011: 30, Borowiec & Salata 2012: 476, Borowiec & Salata 2015: 21, Salata & Borowiec 2017: 297, Salata et al. 2020 a: 35); **Dodecanese** (Forel 1889: 255, 263 - as *Camponotus rubripes* r. *oertzeni var. jaliensis*, Emery 1908: 201 - as *Camponotus maculatus jaliensis*, Collingwood 1993: 195, Legakis 2011: 30, Borowiec & Salata 2012: 476, Salata & Borowiec 2015 a: 68-69, Borowiec et al. 2021: 14); **Ionian Islands** (Collingwood 1993: 195, Legakis 2011: 30); **Macedonia** (Legakis 2011: 30); **Sterea Ellas** (**new data:** Attica, Antikythira, Potamos, 17 m, 5 VIII 2001, 35.8693 N / 23.284 E; Attica, Antikythira, Potamos-Pateriana, 33 m, 11 IX 2001, 35.8796 N / 23.2897 E).

Distribution in Europe and Mediterranean Basin: Cyprus; Greece; Israel; Turkey.

Description. Moderately large to large, polymorphic; minor workers HL: 1.190-1.241 (mean 1.222); HW: 0.822-0.897 (mean 0.868); SL: 1.208-1.352 (mean 1.293); EL: 0.357-0.373 (mean 0.366); ML: 1.84-1.97; MW: 0.77-0.86. **Color.** Body variable in color, in rare palest specimens head, mesosoma, petiolar scale, antennae and legs uniformly yellow, gaster yellowish to yellowish brown (Figs 54.1, 2, 6, 7); usually if head and mesosoma yellow then petiolar scale and gaster brown except white posterior margin of tergites, sometimes also vertex of head with brownish spot of diffused margins; in intermediate specimens head yellowish brown, mesosoma brown in various shade, petiole and gaster dark brown to almost black then antennal scape slightly infuscate and femora partly brown but apex of fore coxa and whole mid and hind coxa and trochanters pale yellow (Fig. 54.5); in dark specimens whole body brown, antennae infuscate, legs mostly brown except yellowish to yellowish brown tarsi and partly contrasting yellow coxa and trochanters; in the darkest specimens whole body dark brown, head and gaster almost black only antennal funicle, tarsi, and mid and hind coxa and trochanters partly yellowish brown (Figs 54.3, 4). Head. Elongate, 1.4 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 54.7). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, slightly crenulate, on sides anterior clypeal margin deeply emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with distinct obtuse keel, whole surface with microreticulation, surface shiny, covered with very sparse and short appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae, central plate with 3-4 pairs of moderately long to long erected setae. Surface with microsculpture mostly tending to form transverse or circular striation, on sides of head and in occipital area microsculpture

indistinctly diffused, background always shiny, covered with sparse and short appressed pubescence, appears partly unhaired, gena and sides of head with few erected setae, frons with 2-4 pairs of erected setae, vertex with less than 10 moderately long to long erected setae, occipital corners without or with 1-2 erected setae, ventral side of head with less than 10 moderately long to long erected setae. Scape very elongate, thin, 1.5 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment approximately 2.7 times as long as wide and 1.4-1.5 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 54.7). Eyes very large, elongate oval, 0.30 length of head. Mandibles stout, diffusely microreticulate and punctate, surface shiny. **Mesosoma.** Elongate 2.2-2.5 times as long as wide, dorsally and laterally distinctly sculptured tending to form longitudinal, transverse and oblique striation, surface strongly shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posterior face forms with dorsum obtuse angle (Figs 54.2, 4, 5, 6). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 2-6, mesonotum 2-4, propodeum 2-3 very long erected setae, number of erected setae in intermediate workers increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears strongly shiny, covered with short and scarce appressed hairs; first tergite with a row of 4 very long erected setae across middle and a row of very long setae in front of posterior margin, tergites 2-3 with transverse row of very long erected setae close to base and similar row in front of posterior margin, row of short setae on posterior margin short, not or partly reaching half length of the transparent margin. **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae lacking row of thorns. Ventral surface of fore femora with 2-3 long erected setae.

Major workers: HL: 2.220-2.333 (mean 2.249); HW: 2.067-2.60 (mean 2.128); SL: 1.830-1.966 (mean 1.902); EL: 0.460-0.523 (mean 0.489); ML: 2.57-2.93; MW: 1.28-1.47. In body color and sculpture similar to minor workers but head appears less shiny than in minor workers (Figs 54.3, 4, 8). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin concave (Fig.54.8); anterior margin of clypeus distinctly crenulate, central plate of clypeus head with more numerous erected setae, gular area with more than 15 short to long erected setae. Scape proportionally shorter, 0.9 times as long as width of head. Eyes proportionally smaller, 0.22 length of head; mesosoma stouter, 1.9-2.0 times as long as wide, in profile forming more convex arch, propodeum with almost straight posterior angle. Setation of all mesosomal parts more numerous, pronotum with 7-12 setae, mesonotum and propodeum with 3-9 setae. Ventral surface of fore femora with 4-9 long erected setae.

Gyne as in Figs 55.9-10, body predominantly yellowish to reddish brown, legs and antennae yellow.

Comparative remarks. *Camponotus jaliensis* belongs to the complex of large species with setose gena, antennal scapi with pubescence and posterior tibiae lacking suberect hairs.

This complex comprises also *C. aethiops*, *C. oertzeni* and *C. sannini*. *Camponotus jaliensis* differs from all three relatives in inner margin of hind tibiae lacking row of spines or thorns while other species have at least at least 2-3 thorns in apical part of inner margin of tibia. *Camponotus jaliensis* is the most diverse species in terms of body coloration and its speciemns can be completely yellow to almost completely dark (such variety in coloration is observed in samples across the whole distribution range of this species). While in *C. aethiops*, *C. oertzeni* and *C. sannini* predominate brown specimens and their yellow forms, if present, are usually restricted geographically.

Biological notes. Rare, thermophilous species observed in oak forests, fryganas, limestone gorges with deciduous trees and shrubs, roadsides and pastures in alpine zone. Nests under stones. Most records are from altitude below 500 m, the highest locality was in Anopoli, Crete at an altitude 1780 m.

55. *Camponotus laconicus* Emery, 1920

(Figs 55.1-8)

Camponotus (*Myrmoturba*) *samius* var. *laconicus* Emery, 1920: 6 (= *Camponotus maculatus samius* var. *laconica* Emery, 1908: 192 unavailable name).

Distribution in Greece: Peloponnese (Emery 1908: 192 - as *Camponotus maculatus samius* var. *laconica*, Legakis 2011: 31, Salata & Borowiec 2017 a: 299, Borowiec & Salata 2017: 205, Salata & Borowiec 2019 b: 105, 114, 115, Borowiec & Salata 2021 b: 5), **Sterea Ellas** (Legakis 2011: 31, Borowiec & Salata 2018 e: 5, Salata & Borowiec 2019 b: 106).

Distribution in Europe and Mediterranean Basin: Endemic to Greece.

Description. Moderately large to large, polymorphic; minor workers HL: 2.050-2.317 (mean 2.156); HW: 1.220-1.480 (mean 1.325); SL: 2.460-2.617 (mean 2.528); EL: 0.492-0.576 (mean 0.519); ML: 3.23-3.55; MW: 1.28-1.46. **Color.** Body predominantly black, mesosoma and petiolar scale sometimes brown, in the palest pale specimens pronotum brown dorsally and yellowish brown laterally and clypeus partly yellowish brown; antenna scapus usually black, occasionally brown, funiculus mostly yellow to rusty yellow, first segment of funicle always partly or mostly infuscate to black, coxa yellowish brown to dark brown, femora and tibiae brown to black, tarsi yellowish brown to dark brown, gaster with whitish yellow posterior margin (Figs 55.1, 2, 5). **Head.** Very elongate, 1.6-1.7 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 55.5). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, slightly crenulate, on sides anterior clypeal margin moderately emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with distinct obtuse keel, whole surface distinctly microreticulated, surface indistinctly shiny, covered with sparse and moderately long subdecumbent hairs, anterior margin in the middle with 6-8 very long setae, on sides with few short additional setae, central plate with numerous moderately long and long erected setae. Head distinctly microreticulate, sculpture in posterior half and sides of head tends to form transverse or circular striation, background from slightly dull to slightly shiny, covered with sparse and short appressed to subdecumbent pubescence, whole surface including gena, sides of head and occipitum with numerous moderately long to long erected setae, ventral side of

head with several moderately long to long erected setae. Scape very elongate, thin, 1.8-2.1 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, with moderately long sparse, in basal third subdecumbent, in apical 2/3 length suberect pubescence. Funicular segments elongate, thin, first segment approximately 3.7 times as long as wide and 1.2-1.3 times as long as second segment, third segment slightly longer than second, the rest of funicular segments very elongate (Fig. 55.5). Eyes large, elongate oval, 0.24 length of head. Mandibles stout, microreticulate and punctate, surface slightly shiny to slightly dull. **Mesosoma.** Elongate 2.4-2.6 times as long as wide, dorsally and laterally distinctly sculptured , tending to form longitudinal, transverse and oblique striation and partly also microreticulation, surface indistinctly shiny. In lateral view dorsum form relatively regular arch, without mesonotal groove, propodeum never with shallow concavity, posterior face broadly rounded (Figs 55.2, 4). Surface of mesosomal dorsum with short and scarce, depressed to decumbent hairs, lateral sides partly unhaired, pronotum and mesonotum with numerous, usually more than 15, propodeum 10-18 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 4-8 very long erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation, interspaces with diffused additional microsculpture thus surface of gaster appears indistinctly shiny, covered with moderately long and scarce appressed hairs; all tergites with several very long erected setae, row of setae on posterior margin composed with elongate hairs, mostly reaching behind transparent margin. **Legs.** Long and thin, hind femora only slightly shorter than mesosoma, surface of legs covered with sparse, moderately elongate decumbent to semierect hairs, inner margin of tibiae in apical half with row of thorns. Ventral surface of fore femora with 10-15 long erected setae.

Major workers: HL: 3.317-3.550 (mean 3.464); HW: 2.967-3.200 (mean 3.088); SL: 3.003-3.167 (mean 3.088); EL: 0.692-0.763 (mean 0.721); ML: 4.33-4.70; MW: 2.07-2.13. In body color and sculpture similar to minor workers but surface duller than in minor workers, especially on head (Figs 55.3, 4, 6). Head stouter, approximately 1.1 times as long as wide, widest in half length, sides softly rounded and converging anterad, posterior margin concave (Fig. 55.6); anterior margin of clypeus distinctly crenulate, central plate of clypeus head with more numerous erected setae, gular area with more than 20 short to long erected setae. Scape proportionally shorter, approximately as long as width of head. Eyes proportionally smaller, 0.21 length of head; mesosoma stouter, 2.0-2.2 times as long as wide, in profile forming more convex arch. Setation of all mesosomal parts more numerous, dense. Ventral surface of fore femora with up to 17 long erected setae.

Gyne as in Figs 55.7, 8, body predominantly brown to brownish black.

Comparative remarks. *Camponotus laconicus* together with *C. ionius* and *C. samius* form a distinct complex of large species with dorsal surface of scape and posterior margin of hind tibia with subdecumbent to suberect hairs (while remaining large species of the subgenus *Tanaemyrmex* have scapus ant hind tibiae with only appressed to slightly decumbent pubescence). *Camponotus ionius* differs in gena and sides of head lacking erected setae while *C. laconicus* has gena and sides of head distinctly setose. *Camponotus samius* differs in minor workers with completely yellow to rusty yellow mesosoma, major workers with partly reddish mesosoma and all workers with partly to completely yellowish to reddish first gastral

tergite while *C. laconicus* has body predominantly brown to black with at most anterior face of first gastral tergite slightly brownish.

Biological notes. Very thermophilous species, inhabits luminous pine forests, pastures with oak shrubs, roadsides with rocks and frygana, dry valleys of periodic rivers, fryganas with oak shrubs and stream valleys with luminous deciduous forest. Nests under large stones. All collecting sites were at low and mid altitude, from 4 to 910 m.

56. *Camponotus oertzeni* Forel, 1889

(Figs 56.1-12)

Camponotus rubripes r. oertzeni Forel, 1889: 263;

Camponotus oertzeni var. *kappariensis* Dalla Torre, 1893: 246 (= *Camponotus rubripes* r. *oertzeni* var. *kappariensis* Forel, 1889: 264 unavailable name);

Camponotus oertzeni var. *andrius* Dalla Torre, 1893: 246 (= *Camponotus rubripes* r. *oertzeni* var. *andrius* Forel, 1889: 265 unavailable name);

Camponotus maculatus subsp. *oertzeni* var. *pericles* Forel, 1911 b: 290 unavailable name;

Camponotus karawajewi Radchenko, 1996 b: 1201 (= *Camponotus* (*Tanaemyrmex*) *maculatus* subsp. *aethiops* var. *clara* Karavaiev, 1926: 190 unavailable name).

Distribution in Greece: Aegean Islands (Forel 1889: 255, 263 - as *Camponotus rubripes* r. *oertzeni*, *Camponotus rubripes* r. *aethiops*, *Camponotus rubripes* r. *oertzeni* var. *kappariensis* and *Camponotus rubripes r. oertzeni* var. *andrius*, Emery 1908: 200 - as *Camponotus maculatus oertzeni* and *Camponotus maculatus oertzeni* var. *andria*), 201 (as *Camponotus maculatus oertzeni* var. *kappariensis*, Finzi 1939: 158 - as *Camponotus aethiops oertzeni* var. *andria*, Collingwood 1993: 195, Legakis 2011: 28 - as *Camponotus andrius*), 30 - as *Camponotus kappariensis*, 31 - as *Camponotus oertzeni*, Salata & Borowiec 2017: 296, Salata & Borowiec 2018 a: 10, Borowiec & Salata 2018 c: 5); **Crete** (Legakis 2011: 28 - as *Camponotus andrius*), 30 - as *Camponotus kappariensis*, 31 – as *Camponotus oertzeni*, Salata et al. 2020 a: 36); **Cyclades** (Emery 1908: 200 - as *Camponotus maculatus oertzeni* and *Camponotus maculatus oertzeni* var. *andria*), 201 - as *Camponotus maculatus oertzeni* var. *kappariensis*, Finzi 1928: 791 - as *Camponotus aethiops oertzeni* var. *andria*, Finzi 1939: 158 - as *Camponotus aethiops oertzeni* var. *andria*, Legakis 2011: 28 - as *Camponotus andrius*), 30 - as *Camponotus kappariensis*, 31 – as *Camponotus oertzeni*; Naxos, 780 m SE of Keramoti, 660 m, IV-XI 2006, 37.10361 / 25.52194); **Dodecanese** (Forel 1889: 255, 263 - as *Camponotus rubripes* r. *oertzeni*, *Camponotus rubripes* r. *aethiops*, *Camponotus rubripes* r. *oertzeni* var. *kappariensis* and *Camponotus rubripes r. oertzeni* var. *andrius*, Emery 1908: 200 - as *Camponotus maculatus oertzeni* and *Camponotus maculatus oertzeni* var. *andria*), 201 - as *Camponotus maculatus oertzeni* var. *kappariensis*, Emery, 1915: 4 - as *Camponotus maculatus oertzeni* var. *andria*, Menozzi 1936: 302 - as *Camponotus aethiops* ssp. *oertzeni* var. *andria*, Legakis 2011: 28 - as *Camponotus andrius*), 30 - as *Camponotus kappariensis*, 31 – as *Camponotus oertzeni*, Salata & Borowiec, 2016: 199, Borowiec et al. 2021: 15); **Epirus** (Legakis 2011: 28 - as *Camponotus andrius*), 30 - as *Camponotus kappariensis*, 31 – as *Camponotus oertzeni*, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2018 a: 5; Zagori, Pindus Mts., 4 V 2017; Zagori, Tymfi Mts., Moni Panagias Stomptikis, 650 m, 18 IX 1991); **Ionian Islands** (Collingwood 1993: 195, Legakis 2011: 28 - as *Camponotus*

andrius, 30 - as *Camponotus kappariensis*, 31 – as *Camponotus oertzeni*, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 100-104, 114; **new data:** Cephalonia, Ainos Mts. loc. 1, 1598 m, 8 VI 2019, 38.1387 / 20.66157; Cephalonia, Ainos Mts. loc. 3, 1330 m, 8 VI 2019, 38.15258 / 20.63944; Cephalonia, 2.4 km W of Poros, 56 m, 18 VI 2021, 38.13924 / 20.75005; Cephalonia, Poros forest loc. 2, 118 m, 18 VI 2021, 38.18413 / 20.74856; Cephalonia, 1.9 km NE of Sami, 138 m, 14 VI 2021, 38.26483 / 20.66705; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala vic. loc. 2, 34 m, 7 VI 2019, 38.08221 / 20.79504; Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595); **Macedonia** (Borowiec & Salata 2012: 479, 2022: 6); **Peloponnese**: Borowiec & Salata 2017 b: 206, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b: 5); **Sterea Ellas** (Finzi 1939: 158 - as *Camponotus aethiops oertzeni* var. *andria*, Borowiec & Salata 2017 a: 1-2, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2018 e: 6); **Thessaly** (Borowiec & Salata 2018 b: 223, Salata & Borowiec 2019 b: 121); **Thrace** (Bračko et al. 2016: 14).

Distribution in Europe and Mediterranean Basin: Croatia; Greece; Iran; Serbia; Slovenia; Turkey.

Description. Moderately large to large, polymorphic; minor workers HL: 1.151-1.246 (mean 1.198); HW: 0.777-0.875 (mean 0.836); SL: 1.238-1.351 (mean 1.294); EL: 0.333-0.349 (mean 0.340); ML: 1.90-2.04; MW: 0.79-0.83. **Color.** Body predominantly pale brown to brown (Figs 56.1, 2, 7), only occasionally black (Fig. 56.6), often head brown and mesosoma yellowish to reddish brown, or mesosoma bicoloured with pronotum yellowish to rusty and mesonotum and propodeum reddish brown (Fig. 56.9), in the palest pale specimens head yellowish with reddish brown spot on occipitum, mesosoma and petiolar scale completely yellow, gaster usually brown to dark brown, occasionally black, in the palest form basal half of gaster yellow (Fig. 56.5); antennae usually uniformly yellow to pale brown, only in the darkest specimens with brown scapus and yellowish brown funiculus, legs usually pale colored, yellow to reddish, only in dark forms with obscure femora and tibiae but never black; brown forms occur mostly in continental Greece, especially in mountains while on Aegean Islands common are forms with mostly pale mesosoma and appendices. **Head.** Elongate, 1.4-1.5 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 56.7). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple or slightly crenulate, on sides anterior clypeal margin deeply emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with distinct obtuse keel, whole surface distinctly microreticulated, surface slightly dull, covered with sparse and short appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae, central plate with several long erected setae. Head distinctly microreticulate, sculpture in posterior half and sides of head often tends to form transverse or circular striation, background slightly dull, covered with sparse and short appressed pubescence, appears partly unhaired, whole surface including gena, sides of head and occipitum with numerous moderately long to long erected setae, ventral side of head with several moderately long to long erected setae. Scape very elongate, thin, 1.5-1.6 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, with short and sparse appressed pubescence only apex of scapi with slightly decumbent hairs. Funicular segments elongate, thin, first segment approximately three times as long as wide and

1.2-1.3 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 56.7). Eyes large, elongate oval, 0.28 length of head. Mandibles stout, microreticulate and punctate, surface slightly shiny. **Mesosoma.** Elongate 2.3-2.5 times as long as wide, dorsally and laterally distinctly sculptured , tending to form longitudinal and oblique striation and partly also microreticulation, surface indistinctly shiny. In lateral view dorsum form relatively regular arch, without mesonotal groove, propodeum never with shallow concavity, posterior face forms with dorsum obtuse angle (Figs 56.2, 4-6, 9). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 4-10, mesonotum 2-6, propodeum 2-5 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiolar in form of broad, thin scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears indistinctly shiny, covered with short and scarce appressed hairs; all tergites with several very long erected setae, row of setae on posterior margin composed with elongate hairs short, mostly reaching only to half length of the transparent margin, never to posterior margin of tergite (Fig. 56.10). **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae in apical 2/3 length with row of thorns. Ventral surface of fore femora with 3-5 long erected setae.

Major workers: HL: 2.533-2.750 (mean 2.654); HW: 2.483-2.666 (mean 2.579); SL: 2.133-2.310 (mean 2.232); EL: 0.492-0.558 (mean 0.539); ML: 3.15-3.56; MW: 1.70-1.80. In body color and sculpture similar to minor workers but surface duller than in minor workers, especially on head and sides of mesosoma (Figs 56.3, 4). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin concave (Fig. 56.8); anterior margin of clypeus distinctly crenulate, central plate of clypeus head with more numerous erected setae, gular area with more than 10 short to long erected setae. Scape proportionally shorter, 0.8-0.9 times as long as width of head. Eyes proportionally smaller, 0.20 length of head; mesosoma stouter, 1.9-2.0 times as long as wide, in profile forming more convex arch, propodeum with more angulate posterior angle. Setation of all mesosomal parts more numerous. Ventral surface of fore femora with up to 14 long erected setae.

Gyne as in Figs 56.11, 12, body predominantly brown to dark brown.

Comparative remarks. *Camponotus oertzeni* belongs to the complex of large species with setose gena, pubescence of antennal scapi and posterior tibiae lacking suberect hairs. This complex comprises also *C. aethiops, C. jaliensis* and *C. sannini*. *Camponotus jaliensis* differs in inner margin of hind tibiae lacking row of spines or thorns while *C. oertzeni* have at least 2-3 thorns in apical part of inner margin of tibia. *Camponotus sannini* differs in more superficial body microsculpture with head in both major and minor workers on sides and in occipital area with diffused microreticulation and strongly shiny background. *Camponotus aethiops* is the most similar and the best character allowing confident separation of these two species is the setation pattern of posterior margin of gastral tergites. In *C. aethiops* the transverse row of short setae on posterior margin of gaster tergite is long, usually reaching to or beyiond posterior margin of the tergite (Fig. 50.3) while in *C. oertzeni* this row is short,

usually reaching only to ½-2/3 of length of the margin (Fig. 56.10). *Camponotus aethiops* is generally darker with predominant dark brown to almost black body, and usually with brown to black legs (only rarely it specimens have reddish to reddish brown mesosoma and yellowish legs) while in *C. oertzeni* populations with partly pale, yellowish red to reddish head, mesosoma and legs are common, especially on Greek islands.

Biological notes. In habitat preferences similar to *Camponotus aethiops* but more thermophilous. Noted from wide range of habitats both forest and open. Most often recorded from coniferous forests but known also from limestone gorges with plane trees, pastures in alpine zone, pastures inside mixed forests, luminous oak forests, mountain deciduous forests, deep canyons with oak forests, roadsides along olive plantations, roadsides on mountain passes, occasionally in beech forest. Nests under large stones. Most collecting sites were from mid and high altitude from 500 to 1600 m, but the species was regularly collected also in low altitudes.

57. *Camponotus samius* Forel, 1889

(Figs 57.1-9)

Camponotus rubripes r. *samius* Forel, 1889: 262;

Camponotus maculatus r. *samius* var. *bosphoricus* Forel, 1906: 187 unavailable name;

Camponotus samius var. *spagnolinii* Emery, 1920: 6 (= *Camponotus maculatus samius* var. *spagnolinii* Emery, 1905: 36 unavailable name).

Distribution in Greece: Aegean Islands (Forel 1889: 255 - as *Camponotus rubripes* r. *samius*, Emery, 1905: 35 - as *Camponotus maculatus samius*, Emery 1908: 192 - as *Camponotus maculatus samius*, Legakis 2011: 32, Salata & Borowiec 2017: 295, Borowiec & Salata 2018: 5; **new data:** Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, Piges Pesa, 113 m, 10 VI 2015, 39.12736 N / 26.26342 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E; Samos, Drakei, 290 m, 8 VI 2013, 37.76666 N / 26.63333 E; Samos, Kokkari, 8 m, 8 VI 2013, 37.76666 N / 26.88333 E; Samos, Nightigale Valley, 50-100 m, 9 VI 2013, 37.7 N / 26.63333 E; Samos, Vourliotes, 350 m, 8 VI 2013, 37.7837 N / 26.84983 E); **Cyclades** (Collingwood 1993: 195, Legakis 2011: 32); **Dodecanese** (Emery 1915: 2 - as *Camponotus maculatus samius*, Menozzi 1936: 300, Salata & Borowiec, 2016: 198-199, Borowiec et al. 2021: 16); **Macedonia** (Legakis 2011: 32, Borowiec & Salata 2012: 481, 2022: 6; **new data:** Halkidiki, Kassandra, Fourka-Kassandrino rd., 69 m, 28 VIII 2009, 40.01666 N / 23.41666 E); **Peloponnese** (Emery, 1905: 35 - as *Camponotus maculatus samius*, Legakis 2011: 32); **Sterea Ellas** (Collingwood 1963: 116, Legakis 2011: 32); **Thrace** (Bračko et al. 2016: 14.

Distribution in Europe and Mediterranean Basin: Bulgaria; Cyprus; Greece; Italy: Sicily; Serbia; Turkey.

Description. Moderately large to large, polymorphic; minor workers HL: 1.890-2.090 (mean 2.030); HW: 1.063-1.290 (mean 1.218); SL: 2.283-2.600 (mean 2.458); EL: 0.452-0.484 (mean 0.470); ML: 2.93-3.48; MW: 1.16-1.31. **Color.** Head partly yellow to rusty yellow, with brownish spot of diffused borders on vertex, never uniformly yellow, mesosoma and petiolar scale uniformly yellow, gaster bicolor, first tergite and basal part of second tergite yellow, rest of tergites brown to black except yellowish posterior margin, first two sternites yellow, subsequent tergites brownish yellow to brown, antennae and legs yellow

(Figs 57.1, 2); in intermediate workers as the size increases, the body becomes darker and darker, head from brown to completely black, mesosoma from yellow to rusty yellow, dorsally sometimes with brown patches, first and second gastral tergites dorsally with brown to black patches, antennal scapus brown to black, funicle rusty yellow, tibiae and tarsi brown. **Head.** Very elongate, 1.6-1.8 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 57.5). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple to slightly crenulate, on sides anterior clypeal margin shallowly emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with obtuse to sharp keel, whole surface with microreticulation, surface strongly shiny l, covered with sparse and short decumbent to subdecumbent hairs, anterior margin in the middle with 5-7 very long setae, on sides with few short additional setae, central plate with several long, erected setae. Head microreticulate, sculpture in posterior half and sides of head tends to form transverse or circular striation, behind eyes microsculpture sometimes diffused, background shiny, covered with sparse and short appressed pubescence, appears partly unhaired, whole surface of head, including, gena, sides and occipital part of headwith numerous erected setae, ventral side of head with more than 10 short to long erected setae. Scape very elongate, thin, 1.9-2.1 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, on frontal and ventral surface mostly with short and sparse appressed pubescence, on dorsal surface, especially in apical half, with subdecumbent to suberect hairs. Funicular segments elongate, thin, first segment approximately 3.8-4.0 times as long as wide and 1.2-1.3 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 57.5). Eyes large, elongate oval, 0.27 length of head. Mandibles stout, diffusely microreticulate and punctate, surface shiny. **Mesosoma.** Elongate, 2.5-2.7 times as long as wide, distinctly sculptured tending to form longitudinal, transverse and oblique striation, on sides of pronotum microsculpture often diffused, surface shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posteriorly very broadly rounded (Figs 57.2, 4). Surface of mesosomal dorsum with short and scarce, hardly visible depressed to decumbent hairs, lateral sides partly unhaired, pronotum with 8-14, mesonotum 5-16, propodeum 8-14 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, very thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 6-8 long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears strongly shiny, covered with short and scarce appressed hairs; all tergites with numerous very long erected setae, appressed hairs on posterior margin of tergites long, reaching to 2/3 or to the end of the transparent margin. **Legs.** Elongate and thin, hind femora only slightly shorter than mesosoma, surface of legs covered with long and sparse appressed hairs, dorsum of hind femora and posterior margin of hind tibiae with subdecumbent to semierect hairs, inner margin of tibiae in almost 3/4 length with several thorns. Ventral surface of fore femora with 6-8 long erected setae.

Major workers: HL: 3.183-3.730 (mean 3.385); HW: 2.733-3.417 (mean 3.021); SL: 2.833-3.330 (mean 3.027); EL: 0.631-0.730 (mean 0.677); ML: 4.25-4.58; MW: 1.84-2.10.

Head always dark colored, dark brown to black, sometimes clypeus and frons slightly paler than rest of surface, mandibles from yellow to black, scapus mostly brown to black except pale base and apex, funicle from yellow to rusty yellow, mesosoma usually bicolor, pronotal dorsum and mesonotum brown to black, sides with rusty yellow to yellowish brown patches (Figs 57.3, 4, 6), sometimes pronotum and mesonotum completely brown with rusty sutures, propodeum usually mostly rusty yellow with brown base, sometimes whole mesosoma rusty yellow, petiole yellow to rusty yellow, gaster predominantly blakc , first and second tergites dorsally with large brown to black patch, coxa rusty yellow, femora completely rusty yellow or slightly darkened apically, tibiae and tarsi brown, external margin of tibiae sometimes almost black, sometimes tibiae and tarsi rusty yellow. Head stouter,1.1-1.2 times as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin concave, rectangular anterior plate of clypeus not to shallowly emarginate on sides, central plate of clypeus head numerous erected setae, gular area with more than 20 short to long erected setae (Fig. 57.6). Scape proportionally shorter, 1.0-1.1 times as long as width of head. Eyes proportionally smaller, 0.20 length of head; mesosoma stouter, 2.1-2.3 times as long as wide, in profile forming more convex arch, propodeum with less obtusely posterior angle. Mesosomal dorsum on each segment with numerous erected setae, petiolar crest 10-14 very long erected setae. Ventral surface of fore femora with more than 10 long erected setae.

Gyne as in Figs 57.7, 8, head yellowish brown, mesosoma predominantly yellow, gaster yellow basally, brown posteriorly. Male as in Fig. 57.9, body and legs black.

Comparative remarks. *Camponotus samius* together with *C. ionius* and *C. laconicus* form a distinct complex of large species with dorsal surface of scape and posterior margin of hind tibia with subdecumbent to suberect hairs while other large species of the subgenus *Tanaemyrmex* have only appressed to slightly decumbent pubescence of scapus and hind tibiae. *Camponotus ionius* differs in gena and sides of head lacking erected setae while *C. laconicus* has gena and sides of head distinctly setose. *Camponotus laconicus* differs in body predominantly brown to black with at most anterior face of first gastral tergite with brownish spot while *C. samius* has minor workers with completely yellow to rusty yellow mesosoma, major workers with partly reddish mesosoma and all workers with partly to completely yellowish to reddish first gastral tergite.

Biological notes. Thermophilous species, prefers open habitats such as dry hills with sparse vegetation, pastures with shrubs, suburban ruderal areas but noted also from luminous coniferous forests, shady pine forest and luminous stream valleys with deciduous forest. Nests under large stones. All collecting sites were at low and mid altitude, from sea level to 670 m.

58. *Camponotus sanctus* Forel, 1904

(Figs 58.1-12)

Camponotus maculatus r. sanctus Forel, 1904 a: 18;

Camponotus maculatus r. *sanctus* var. *cypriacus* Forel, 1904 b: 176 unavailable name;

Camponotus compressus subsp. *sancta* var. *consensi* Finzi, 1928: 791 unavailable name (lapsus = *Camponotus maculatus* r. *sanctus* var. *cosensis* Forel, 1904 a: 20 unavailable name);

Camponotus maculatus subsp. *symiensis* Forel, 1910: 26;

Camponotus (*Myrmoturba*) *compressus* st. *sanctus* var. *confellah* Santschi, 1939: 83 unavailable name;

Camponotus (*Tanaemyrmex*) *compressus* var. *cosensis* Finzi, 1939: 159 (= *Camponotus maculatus* r. *sanctus* var. *cosensis* Forel, 1904 a: 20 unavailable name).

Distribution in Greece: Aegean Islands (Forel 1889: 255 - as *Camponotus rubripes* r. *cognatus*, *Camponotus rubripes* var. *maculato-dichrous, Camponotus rubripes var. cognato-maculato-dichrous* and *Camponotus rubripes* var. *cognato-maculatus*, Finzi 1928: 791 (as *Camponotus compressus sancta* var. *cosensis*, Finzi 1939: 159-160 - as *Camponotus compressus* var. *cosensis*, Collingwood 1993: 195, Legakis 2011: 29 - as *Camponotus cosensis*), 33 - as *Camponotus sanctus* and *Camponotus symiensis*, Salata & Borowiec 2019 b: 120; **new data:** Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, 3 km N of Kalloni, 191 m, 9 VI 2015, 39.26158 N / 26.2073 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, Mt. Olympos, 814 m, 10 VI 2015, 39,06958 N / 26.34976 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E); **?Crete** (Legakis 2011: 29 - as *Camponotus cosensis*, probably misidentifications), 33 - as *Camponotus sanctus* and *Camponotus symiensis*, Salata & Borowiec 2017: 295-296); **?Cyclades** (Finzi 1939: 159-160 - as *Camponotus compressus* var. *cosensis*, probably misidentifications); **Dodecanese** (Forel 1889: 255 - as *Camponotus rubripes* r. *cognatus*, *Camponotus rubripes* var. *maculato-dichrous, Camponotus rubripes var. cognato-maculato-dichrous* and *Camponotus rubripes* var. *cognato-maculatus*, Emery 1915: 2 - as *Camponotus maculatus sanctus* var. *cosensis*, Finzi 1932: 25 - as *Camponotus compressus sanctus* var. *cosensis*, Menozzi 1936: 300 - as *Camponotus compressus* ssp. *sancta* var. *cosensis*, Finzi 1939: 159-160 - as *Camponotus compressus* var. *cosensis*, Menozzi 1943: 3 - as *Camponotus samius* var. *cosensis*, Legakis 2011: 29 - as *Camponotus cosensis*), 33 - as *Camponotus sanctus* and *Camponotus symiensis*, Borowiec & Salata 2012: 482, Salata & Borowiec, 2016: 199, Borowiec et al. 2021: 16); **?Ionian Islands** (Collingwood 1993: 195, probably misidentifications); **?Sterea Ellas** (Finzi 1939: 159-160 - as *Camponotus compressus* var. *cosensis*, probably misidentifications). Recent studies on Crete, Cyclades, Ionian Islands and Sterea Ellas have not confirmed the occurrence of this species in these regions and they probably based on misidentifications with *Camponotus baldaccii*.

Distribution in Europe and Mediterranean Basin: Bulgaria; Cyprus; Greece; Iran; Israel; Lebanon; Syria; Turkey.

Description. Large to very large, polymorphic; minor workers HL: 1.611-2.036 (mean 1.842); HW: 0.984-1.365 (mean 1.172); SL: 2.110-2.267 (mean 2.182); EL: 0.457-0.511 (mean 0.490); ML: 2.73-3.07; MW: 0.97-1.27. **Color.** Head yellow with rusty yellow spots of diffused borders on gena and vertex or completely rusty yellow or yellowish brown, never uniformly yellow, mesosoma and petiolar scale uniformly yellow, gaster bicolor, first two tergites yellow, usually with small brown spot in the middle of first tergite close to posterior margin and large brown spot similarly placed as in the first tergite, rest of tergites brown except yellowish posterior margin, sternites yellow to brownish yellow, often second tergite completely brown, antennae and legs yellow (Figs 58.1, 2, 5); in intermediate workers as the size increases, the body becomes darker and darker, head from brown to dark brown or partly black, mesosoma completely rusty yellow or dark brown dorsally and rusty yellow laterally

or almost completely brown, gaster mostly brown with yellowish brown anterior slope of the first tergite, antennal scapus brown, legs from uniformly yellow to mostly yellowish brown or brown (Figs 58.7, 8). **Head.** Very elongate, 1.5-1.6 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 58.5). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, simple to slightly crenulate, on sides anterior clypeal margin shallowly emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with obtuse keel, whole surface with microreticulation, surface strongly shiny to slightly dull, covered with sparse and short appressed hairs, anterior margin in the middle with 5-7 very long setae, on sides with few short additional setae, central plate with 2-3 pairs of erected setae, grouping on sides and base of clypeus. Head microreticulate, sculpture in posterior half and sides of head tends to form transverse or circular striation, behind eyes microsculpture sometimes diffused, background shiny to slightly dull, covered with sparse and short appressed pubescence, appears partly unhaired, frons along sides with row of 3-4 long erected setae, vertex and central part of occipitum with 2-3 pairs of long erected setae, gena and sides of head lacking erected setae, ventral side of head usually without, or with 1-3 short to moderately long erected setae. Scape very elongate, thin, 1.6-2.2 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment approximately 3.8 times as long as wide and 1.2-1.3 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 58.5). Eyes large, elongate oval, 0.27 length of head. Mandibles stout, diffusely microreticulate and punctate, surface shiny. **Mesosoma.** Elongate 2.4-2.8 times as long as wide, distinctly sculptured tending to form longitudinal, transverse and oblique striation, surface shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posteriorly very broadly rounded (Figs 58.2, 4, 7, 8). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 2, mesonotum up to two propodeum 1-3 very long erected setae, number of erected setae not or only slightly increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, very thick scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 2-6 long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears strongly shiny, covered with short and scarce appressed hairs; first tergite with a pair of very long erected setae centrally and a row of 4 long setae close to posterior margin, two subsequent tergites with 2-4 long setae in front of the middle and similar row of 4-6 setae close to posterior margin, moderately elongate, appressed hairs on posterior margin of tergites moderately long, reaching to 1/2-4/5 length of the transparent margin. **Legs.** Elongate and thin, hind femora only slightly shorter than mesosoma, surface of legs covered with very sparse appressed hairs, inner margin of tibiae in almost 3/4 length with 4-7 thorns. Ventral surface of fore femora with 4-6 long erected setae.

Major workers: HL: 3.700-4.175 (mean 4.046); HW: 3.575-3.950 (mean 3.184); SL: 2.700-3.453 (mean 3.184); EL: 0.635-0.746 (mean 0.692); ML: 4.31-4.96; MW: 2.08-2.37. Head always dark colored, dark brown to black, mandibles black basally reddish apically,

scapus mostly brown to black except pale base and apex, funicle from yellow to rusty yellow, last 1-2 segments sometimes infuscate to brown, mesosoma dorsally brown, laterally gradually yellowish brown to yellow, in the darkest specimens completely brown to almost black except paler sutures of segments, petiole and legs uniformly yellow, or coxa yellowish brown, femora yellowish brown basally and brown apically, tibiae and tarsi brown, external margin of tibiae sometimes almost black, tergites brown to black except yellowish posterior transparent margin, first gastral tergite often partly yellow to rusty yellow, sternites yellow to partly brown (Figs 58.3, 4). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin deeply concave, occipital corners strongly protruding posterad (Fig. 58.6); rectangular anterior plate of clypeus moderately emarginate on sides thus anterior corners slightly angulated, central plate of clypeus head with 4-6 pairs of erected setae, gular area usually without or at most with 1-5 short to long erected setae. Scape proportionally shorter, 0.8-0.9 times as long as width of head. Eyes proportionally smaller, 0.17 length of head; mesosoma stouter, 2.1-2.2 times as long as wide, in profile forming more convex arch, propodeum with less obtusely posterior angle. Pronotum with 2-4, mesonotum 2-4, propodeum 3-8, petiolar crest 4-6 very long erected setae. Lateral surface of hind tibia depressed, with shallow longitudinal channel. Ventral surface of fore femora with 4-5 long erected setae.

Gyne as in Figs 58.9-11, body predominantly brown to black, sides of mesosoma and basal part of gaster partly yellowish to reddish, legs partly yellow to yellowish-red. Male as in Fig. 58.12, body predominantly brownish to black, legs reddish brown to brown.

Comparative remarks. *Camponotus sanctus* together with *C. baldaccii* and C. *ceccoonii* form a group of large species with gena lacking erected setae and head and mesosoma in minor workers predominantly yellow to rusty yellow. Typical form of *C. sanctus* differs from both relatives in ventral side of head lacking erected setae while in *C. baldaccii* and C. *ceccoonii* ventral side of head is always setose. *Camponotus cecconii* differs in gaster of both minor and major workers completely brown to black. Sometimes, the smallest minor workers of *C. cecconii* have anterior face of first tergite slightly paler than the rest of gaster, but the color gradually changes from lighter to darker. While in *C. baldaccii* and *C. sanctus* gaster in minor workers is always yellow basally, brown to black posteriorly and in major workers gaster is almost completely brown to black with anterior face from yellow to yellowish-brown with well-marked border between the pale spot and dark rest of its gastral surface. *Camponotus cecconii* has no reliable records from Greece while C. *sanctus* is common in Dodecanese and Aegean Islands. Setose form of *C. sanctus*, that have few erected setae on ventral side of head, is similar to *C. baldaccii*. However, minor workers of *C. baldaccii* have uniformly yellow head that is in the same color as mesosoma while in *C. sanctus* head in minor workers is yellow to rusty yellow and is always slightly darker than the mesosoma. Aditionally, in major workers of *C. baldaccii* outer surface of hind tibiae is not or only slightly depressed and lacking longitudinal channel while in *C. sanctus* outer surface of hind tibiae in major workers is distinctly depressed with well-marked longitudinal channel. Also, *Camponotus baldaccii* is slightly smaller with HL in major workers up to 3.453 mm while in *C. sanctus* HL reaches up to 4.175 mm. Both species differ in color of males (at least partly yellow in *C. baldaccii* and dark brown in *C. sanctus*), and are partly separated geographically. *Camponotus baldaccii* occurs on Crete, Dodecanese and Aegean Islands while *C. sanctus* is known only from Dodecanese and Aegean Islands.

Biological notes. Very thermophilous species. Prefers open habitats such as dry hills with sparse vegetation, river wadi, sunny roadsides in oak forests, was noted also from urban parks. Nests under large stones. All collecting sites were at low and mid altitude, from sea level to 810 m.

59. *Camponotus sannini* Tohmé & Tohmé, 2000

(Figs 59.1-6)

Camponotus sannini Tohmé & Tohmé, 2000: 477.

Distribution in Greece: Macedonia (Borowiec & Salata 2012: 482).

Distribution in Europe and Mediterranean Basin: Greece; Israel; Lebanon; Syria. *Camponotus sannini* is probably more widespread in the eastern part of Mediterranean Basin but easily can be confused with very similar *C. aethiops* or *C. oertzeni*.

Description. Moderately large to large, polymorphic; minor workers HL: 1.194-1.317 (mean 1.247); HW: 0.838-0.960 (mean 0.888); SL: 1.321-1.444 (mean 1.386); EL: 0.341-0.373 (mean 0.352); ML: 1.92-2.05; MW: 0.78-0.86. **Color.** Body predominantly brown, mandibles anterior margin of clypeus and gena yellow to yellowish brown, in some specimens mesosoma slightly paler brown than head and gaster, sometimes pronotum yellowish brown and rest of mesosoma pale brown, gaster with yellowish posterior margin; antennae completely yellow to pale brown, legs usually completely yellow or coxa and femora at base indistinctly infuscated by brown (Figs 59.1, 2, 5). **Head.** Elongate, 1.3-1.4 times as long as wide, sides in front of eyes straight and parallel, behind eyes regularly softly rounded, posterior margin rounded or in the middle straight (Fig. 59.5). Clypeus pentagonal, in the middle forms rectangular plate protruding anterad, its anterior margin straight, slightly crenulate, on sides anterior clypeal margin deeply emarginate, sides of clypeus strongly converging posterad, straight, posterior margin straight but in the middle shallowly emarginate by frontal triangle, clypeal plate along middle with distinct obtuse keel, whole surface with microreticulation, surface shiny, covered with very sparse and short appressed hairs, anterior margin in the middle with 6 very long setae, on sides with few short additional setae, central plate with several moderately long to long erected setae. Head microreticulate, sculpture in posterior half and sides of head often tends to form transverse or circular striation, on sides of head and in occipital area microsculpture indistinctly diffused, background shiny, covered with sparse and short appressed pubescence, appears partly unhaired, whole surface including gena, sides of head and occipitum with numerous moderately long to long erected setae, ventral side of head with less than 10 moderately long to long erected setae. Scape very elongate, thin, 1.5-1.6 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate, slightly dull, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment approximately 2.7 times as long as wide and 1.4-1.5 times as long as second segment, third segment distinctly longer than second, the rest of funicular segments very elongate (Fig. 59.5). Eyes large, elongate oval, 0.28 length of head. Mandibles stout, diffusely microreticulate and punctate, surface shiny. **Mesosoma.** Elongate, 2.4-2.5 times as long as wide, dorsally and laterally distinctly sculptured tending to form longitudinal and oblique striation, surface strongly shiny. In lateral view dorsum form regular arch, without mesonotal groove, propodeum never with shallow concavity, posterior face forms with dorsum obtuse angle (Figs 59.2, 4). Surface of mesosomal dorsum with short and scarce, hardly visible depressed hairs, lateral sides partly unhaired, pronotum with 3-6,

mesonotum 2-3, propodeum 3-5 very long erected setae, number of erected setae increases with the size of the ant. **Waist and gaster.** Petiole in form of broad, thin scale with convex anterior and flat posterior face, apex regularly rounded; surface with distinct transverse striation covered with short and sparse appressed hairs, apical crest with 4-6 very long erected setae. Gaster shorter than mesosoma, tergites with fine transverse microstriation, interspaces without additional microsculpture thus surface of gaster appears strongly shiny, covered with short and scarce appressed hairs; all tergites with 3-6 very long erected setae centrally and a row of long setae on posterior margin, row of short setae on posterior margin moderately elongate, reaching 2/3-3/4 length of the transparent margin, never to the posterior margin of tergite. **Legs.** Moderately long and thin, hind femora shorter than mesosoma, surface of legs covered with sparse appressed to slightly decumbent hairs, inner margin of tibiae in apical half-length with row of thorns. Ventral surface of fore femora with 3-5 long erected setae.

Major workers: HL: 1.910-2.343 (mean 2.113); HW: 1.612-2.303 (mean 1.967); SL: 1.750-1.958 (mean 1.871); EL: 0.427-0.492 (mean 0.456); ML: 2.64-3.07; MW: 1.25-1.49. In body color and sculpture similar to minor workers but antennal scape often rusty yellow and head appears less shiny than in minor workers (Figs 59.3, 4, 6). Head stouter, approximately as long as wide, widest in basal ¼ length, sides softly rounded and converging anterad, posterior margin concave (Fig. 59.6); anterior margin of clypeus distinctly crenulate, central plate of clypeus head with more numerous erected setae, gular area with more than 15 short to long erected setae. Scape proportionally shorter, 0.9-1.2 times as long as width of head. Eyes proportionally smaller, 0.22 length of head; mesosoma stouter, 2.1-2.3 times as long as wide, in profile forming more convex arch, propodeum with less obtusely posterior angle. Setation of all mesosomal parts more numerous, pronotum often with more than 10 setae. Ventral surface of fore femora with 5-7 long erected setae.

Comparative remarks. *Camponotus sannini* belongs to the complex of large species with setose gena, pubescence of antennal scapi and posterior tibiae lacking suberect hairs. This complex comprises also *C. aethiops, C. jaliensis* and *C. oertzeni*. *Camponotus jaliensis* differs in inner margin of hind tibiae lacking row of spines or thorns while *C. sannini* have at least 2-3 horns in apical part of inner margin of tibia. *Camponotus sannini* differs from two other relatives in more superficial microsculpture of body. Its head, in both major and minor workers, laterally and in occipital area has diffused microreticulation and strongly shiny background. While in *C. aethiops* and *C. oertzeni* especially head is strongly microreticulate with partly dull background.

Biological notes. A single nest was observed under stone in mountain deciduous forest at an altitude of 514 m.

Genus *Cataglyphis* Förster, 1850

Useful identification keys, revisions and taxonomic papers: Radchenko 1998.

Diagnosis. Monomorphic to polymorphic or with marked-size variation, moderately large to very large. Mandibles with 5-7 teeth; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape elongate, distinctly longer than width of head, sometimes with projected setae; antennal sockets close to the posterior clypeal margin; eyes large, circular to elongate, placed slightly behind the midlength of head; ocelli present; mesothorax constricted in the middle; metapleural gland present; propodeum unarmed; propodeal spiracle

elongate; simple tibial spurs on meso- and metatibiae; petiole in form of unarmed scale or node; acidopore with a seta-fringed nozzle.

In Greece five species.

A key to species of the genus *Cataglyphis*

1. Petiole squamiform (Figs 60.2, 61.2, 13, 14, 62.2). Body almost uniformly colored, dark brown to black (Figs 60.1, 2, 61.1, 2, 62.1, 2), sometimes head and partly mesosoma paler coloured than gaster (Figs 61.13, 14) ..... 3.

—. Petiole in form of globular or cubical node (Figs 63.2, 64.2). Body distinctly bicolored, head and mesosoma red to brick-red, gaster brown to black (Figs 63.1, 2, 64.1, 2), occasionally in melanistic forms body mostly brown to black (Figs 63.5, 6) ..... 2.

2. Petiole in form of globular node (Fig. 63.2). Large species, minor workers with HL above 1.3 mm, major workers with HL above 2.5 mm ….....…… ***C. nodus* (Brullé)**, p. 145

—. Petiole in form of cubical node (Fig. 64.2). Small species, minor workers with HL below 1.3 mm, major workers with HL below 1.8 mm ..... ***C. viaticoides* (André)**, p. 148

3. At least third gastral tergite, promesonotum, occipital part of head and often antennal scapus with few short to long erected setae (Figs 61.13, 14). Widespread in Greece and in mountains of Crete ..... 4.

—. First three gastral tergites, occipital part of head and antennal scapus lacking long erected setae, sometimes major workers with a pair of short setae in occipital part of head (Fig. 60.2). Male genitalia as in Figs 60.8-11. Only Crete …..... ***C. cretica* (Forel)**, p. 139

4. Propodeum of major workers with numerous (usually 5-8) erected setae. Petiolar scale in gyne thin with deeply emarginate upper margin. Male unknown. Mountains of Crete only ..... ***C. minos*** sp. nov., p. 142

—. Propodeum of major workers lacking erected setae or at most with 1-6 erected setae (Fig. 61.14). Petiolar scale in gyne thick with truncate upper margin. Male genitalia as in Figs 61.8-12. Continental Greece, Aegean Islands and Cyclades, absent in Crete .... ***C. hellenica* (Forel)**, p. 140

Review of species

60. *Cataglyphis cretica* (Forel, 1910)

(Figs 60.1-11)

Myrmecocystus cursor var. *cretica* Forel, 1910: 23 (= *Myrmecocystus cursor aenescens* var. *cretica* Emery 1906: 48, unavailable name);

Cataglyphis (*Monocombus*) *cursor* st. *hellenica* var. *dorica* Santschi, 1929 c: 35 unavailable name.

Distribution in Greece: Crete (Forel 1886: clxvii - as *Myrmecocystus cursor*, Forel 1889: 256 - as *Myrmecocystus viaticus*, Emery 1894: 11 - as *Myrmecocystus cursor*, Legakis 2011: 34 - as *Cataglyphis aenescens* part, *C. cretica*, *C. dorica* and *C. hellenica* part, Borowiec & Salata 2012: 485 - as *Cataglyphis aenescens*, Salata & Borowiec 2018 a: 14, Salata et al. 2020 a: 25).

Distribution in Europe and Mediterranean Basin: Endemic to Crete.

Description. Moderately large, polymorphic; minor workers HL: 1.202-1.700 (mean 1.442); HW: 0.968-1.460 (mean 1.224); SL: 1.516-2.122 (mean 1.875); EL: 0.325-0.417 (mean 0.377); ML: 1.68-2.73; MW: 0.87-1.20. **Color.** Head, mesosoma and gaster bright brown to black, antennae from yellowish brown to bright brown, legs mostly bright brown only tarsi from yellow to yellowish brown, fore tibiae often paler than fore femora, in the darkest specimens mid and hind femora dark brown (Figs 60.1, 2). **Head.** 1.1-1.2 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded (Fig. 60.3). Clypeus trapezoidal, transverse, its anterior margin convex with crenulate anterior margin, sides strongly convergent posterad, posterior margin short, straight, whole surface distinctly microreticulated, surface dull; sides of clypeal surface with sparse and short, hardly visible appressed hairs, anterior margin with a row of 8-10 very long setae, central part of clypeus with single long and 1-2 moderately long erected setae. Head distinctly microreticulate, appears opalescent dull, only on sides with sparse and short appressed pubescence, appears mostly unhaired, lacking erected setae, only ocellar area with 1-3 short erected setae, gular area with 3-6 short to long erected setae. Scape long, thin, 1.5-1.6 times longer than width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with very short and very sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 3.7 times as long as wide and approximately 1.7 times as long as second segment, third segment slightly shorter than second, the rest of funicular segments distinctly longer than broad (Fig. 60.3). Eyes big, elongate oval, 0.26 length of head. Mandibles very elongate, with longitudinal sculpture, surface shiny. **Mesosoma.** Elongate 1.9-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, surface opalescent dull. In lateral view dorsum with deep mesonotal groove, propodeum regularly convex, rounded (Fig. 60.2). Surface of pronotal dorsum and mesonotum with short and scarce, hardly visible depressed hairs, propodeum with slightly longer and dense pubescence than two anterior segments, whole dorsum lacking erected setae. **Waist and gaster.** Petiole in form of broad, thick scale with convex anterior and flat posterior face, apex regularly rounded; surface distinctly microreticulated covered with short and sparse appressed hairs, margins lacking erected setae. Gaster shorter than mesosoma, tergites with microreticulation partly tending to form transverse microstriation, dorsally opalescent dull, on sides and ventrally gradually less opalescent and less dull than dorsally, covered with very short and scarce appressed hairs; first three tergites lacking erected setae. **Legs.** Very long and thin, hind femora longer than mesosoma, surface of legs covered with sparse hairs, inner margin of tibiae with row of thorns. Ventral surface of fore femora with 8-12 long erected setae.

Major workers: HL: 1.826-1.960 (mean 1.899); HW: 1.680-1.750 (mean 1.712); SL: 2.167-2.267 (mean 2.234); EL: 0.457-0.517 (mean 0.481); ML: 3.00-3.23; MW: 1.32-1.44. In all characters except size similar to minor workers including color variation and sculpture. Head proportionally stouter, as long as wide to 1.1 times longer than wide, central part of clypeus with 3-4 long erected setae, gular area with 5-12 short to long erected setae.

Scape proportionally shorter, approximately 1.3 times as long as width of head. Eyes proportionally smaller, 0.25 length of head.

Gyne as in Figs 60.4-6, mesosoma and gaster lacking erected setae, petiolar scale moderately broad with upper margin truncate or shallowly emarginate. Male as in Fig. 60.7, male genitalia as in Figs 60.8-11.

Comparative remarks. *Cataglyphis cretica* is similar to *C. hellenica* and *C. minos* but differs in bigger body size and additionally from *C. hellenica* can be separated also based on more evident and opalescent body sculpture. However, the most evident differences are in body setation, *C. cretica* has first three gastral tergites, occipital part of head and antennal scapus lacking long erected setae (only occasionally major workers have a pair of short setae in occipital part of head) while both relatives have at least promesonotum and occipital part of head with erected setae and often frontal face of head antennal scapus and propodeum are also setose. *Cataglyphis cretica* and *C. hellenica* differ also in the shape male genitalia, in *C. hellenica* median appendix of squamula is big and has a shape of widening distally shovel, while *C. cretica* has median appendix of squamula small and spherical. *Cataglyphis minos* is sympatric with *C. cretica* in Crete but both taxa are separated ecologically, *C. cretica* occupies lowlands and highlands with the highest locality placed at an altitude 1240 m while *Cataglyphis minos* was observed only in mountains at an altitude above 1300 m. *Cataglyphis hellenica* was recorded from continental Greece, Aegean Islands and Cyclades but is absent in Crete.

Biological notes. Very thermophilous species. Reported from open areas such as sandy roads in mountain plateau, seashore with frygana and pine trees and roadsides in oak forests. Workers are active only in strong sunlight, especially in the afternoon hours. All collecting sites were at low and mid altitude, from sea level to 1240 m.

61. *Cataglyphis hellenica* (Forel, 1886)

(Figs 61.1-14)

Formica aenescens Nylander, 1849: 37 auct. part;
Myrmecocystus cursor var. *hellenicus* Forel, 1886 a: 204.

Distribution in Greece: Aegean Islands (Legakis 2011: 33 – as *Cataglyphis aenescens*), **Cyclades**: (**new data:** Andros, 1.5 km SE of Kolimpos, 235 m, IV-XI 2006, 37.80056 / 24.84667; Naxos, Amiki Bay, 6 m, 30 VI 2016, 37.1328 / 25.4338; Naxos, Demeter Temple vic., 110 m, 2 VII 2016, 37.027 / 25.4288; Naxos, Kouros of Milonas, 200 m, 3 VII 2016, 37.1328 / 25.4338; Naxos, 850 m E of Pirgaki, 25 m, IV-XI 2006, 36.97389 / 25.4125; **Macedonia** (Borowiec & Salata 2012: 485 – as *Cataglyphis aenescens*); **Peloponnese** (Forel 1886: 204 - *Myrmecocystus cursor* var. *hellenicus*, Legakis 2011: 33, 34 – as *Cataglyphis hellenica*, Salata & Borowiec 2017: 299 – as *Cataglyphis aenescens*, Borowiec & Salata 2017: 207 – as *Cataglyphis aenescens*, Borowiec & Salata 2021 b: 6); **Sterea Ellas** (Forel 1886: clixi - as *Myrmecocystus viaticus* and *M. cursor*, Legakis 1984: 87 – as *Cataglyphis cursor*, 2011: 33, Borowiec & Salata 2018 e: 6 – as *Cataglyphis aenescens*, Salata & Borowiec 2019 b: 106 – as *Cataglyphis aenescens*; **new data:** Attica, Athens National Garden, 90 m,10 VII 2016, 37.97138 N / 23.7175 E; Phthiotis, 5 km W of Lamia, 10 V 2016, 22 m, 38.902898 / 22.495804); **Thessaly** (Borowiec & Salata 2018 b: 224).

Distribution in Europe and Mediterranean Basin: Albania; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Greece; Hungary; Moldova; North Macedonia; Romania; Serbia; Turkey.

Description. Moderately large, polymorphic; minor workers HL: 0.937-1.254 (mean 1.081); HW: 0.762-1.095 (mean 0.905); SL: 1.135-1.492 (mean 1.286); EL: 0.302-0.378 (mean 0.335); ML: 1.56-1.96; MW: 0.64-0.86. **Color.** Head, mesosoma and gaster reddish brown to dark brown (Figs 61.1, 2), head or head and pronotum often lighter than gaster, reddish, especially in southern populations (Figs 61.13, 14), mesonotum, propodeum and antennae from yellow bright brown to brown, femora brown, fore tibiae often paler than fore femora, yellowish, mid and hind femora brown or slightly paler than femora, tarsi yellowish. **Head.** 1.1-1.2 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded (Fig. 61.3). Clypeus trapezoidal, transverse, its anterior margin convex with crenulate anterior margin, sides strongly convergent posterad, posterior margin short, straight, whole surface distinctly microreticulated not tending to form longitudinal striation, surface opalescent dull; sides of clypeal surface with sparse and short, hardly visible appressed hairs, anterior margin with a row of 6-8 very long setae, central part of clypeus without or with a pair of moderately long erected setae. Head distinctly microreticulate not tending to form longitudinal striation, appears opalescent dull, only on sides with sparse and short appressed pubescence, appears mostly unhaired, frontal area without or with a pairs of long erected setae, ocellar area with 1-3 short erected setae, occipital part of head with 2-4 long erected setae, gular area with 4-6 short to long erected setae. Scape long, thin, 1.4-1.5 times longer than width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with very short and very sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 3.6 times as long as wide and approximately 1.7 times as long as second segment, third segment slightly shorter than second, the rest of funicular segments distinctly longer than broad (Fig. 61.3). Eyes big, elongate oval, 0.31 length of head. Mandibles very elongate, with longitudinal sculpture, surface shiny. **Mesosoma.** Elongate, 1.9-2.5 times as long as wide, dorsally and laterally distinctly microreticulated but surface not opalescent, indistinctly shiny to only slightly dull. In lateral view mesonotum usually placed slightly higher than pronotum, dorsum with deep mesonotal groove, propodeum high, regularly convex, rounded. Surface of pronotal dorsum and mesonotum with short and scarce, hardly visible depressed hairs, propodeum with slightly longer and dense pubescence than two anterior segments, whole dorsum lacking erected or pronotum centrally with single, long erected seta and mesonotum in posterior part with 1-3 short erected setae. **Waist and gaster.** Petiole in form of broad, thick scale with convex anterior and flat posterior face, apex regularly rounded; surface distinctly microreticulated covered with short and sparse appressed hairs, margins lacking erected setae. Gaster shorter than mesosoma, tergites with microreticulation partly tending to form transverse microstriation, dorsally not opalescent, indistinctly shiny, on sides shiny, covered with very short and scarce appressed hairs; first tergite lacking erected setae, second tergite without or with a pair of erected setae, third tergite with 2-4 erected setae. **Legs.** Very long and thin, hind femora longer than mesosoma, surface of legs covered with sparse hairs, inner margin of tibiae with row of thorns. Ventral surface of fore femora with 5-6 long erected setae.

Major workers: HL: 1.492-1.780 (mean 1.652); HW: 1.354-1.660 (mean 1.526); SL: 1.651-1.854 (mean 1.774); EL: 0.429-0.484 (mean 0.464); ML: 2.32-2.68; MW: 0.98-1.18.

In all characters except size similar to minor workers including color variation and sculpture. Head proportionally stouter, as long as wide to 1.1 times longer than wide, central part of clypeus with 2-4 long erected setae, frons wit 2-3 of long erected setae, occipital part of head with usually with 4 long erected setae but in the largest workers up to 10 setae, and gular area with 8-10 short to long erected setae. Scape proportionally shorter, approximately 1.2 times as long as width of head**.** Eyes proportionally smaller, 0.28 length of head. Second tergite with 2-4 erected setae. Ventral surface of fore femora with 7-11 long erected setae.

Gyne as in Figs 4-6, body predominantly brown to black, head and mesosoma sometimes partly reddish brown, mesosoma and gaster with erected setae. Male as in Fig. 61.7, male genitalia as in Figs 61.8-12.

Comparative remarks. With *Cataglyphis cretica* and *C. minos* it forms a separate group of similar species with dark, reddish brown, brown to almost black body. It is the less opalescent species of this complex with at least waist and gaster shiny while both relatives have mesosoma and at least dorsal half of gaster opalescent dull. For other distinguishing characters see comparative remarks in *C. cretica*.

Biological notes. Very thermophilous species. Reported from open areas such as pastures, sandy roads in pine forests, salines, mountain pastures with shrubs and rocks, and ruderal areas in towns. Nests in ground. Workers are active only in strong sunlight, especially in the afternoon hours. All collecting sites were at low and mid altitude, from sea level to 990 m.

Note. *Cataglyphis hellenica* was synonymized with *C. aenescens* (Nylander) by Borowiec & Salata 2013: 384 as a result of a broad treatment of taxa from the *Cataglyphis cursor* group from the Balkans, Eastern Europe and the Middle East. Recent genetic and biological studies show that the name *C. aenescens* hides a number of cryptic species and the populations from the Balkans are a distinct species from the true *C. aenescens* described from southern Russia (Kuhn et al. 2019). Homogenity of Greek populations classified as *Cataglyphis hellenica* needs further genetic study. Morphologically, populatios from central and northern Greece studied by Kuhn et al. (2019) slightly differ from populations of southern Greece in darker, uniform coloration, less setose head and mesosoma and male genitalia with setose apex of dorsolateral triangular plates (Fig. 61.9) while southern populations, conspecific with types of *C. hellenica*, tend to have indistinctly bicoloured body, distinctly setose head and mesosoma and male genitalia without setae on apex of dorsolateral triangular plates (Fig. 61.8).

62. *Cataglyphis minos* sp. nov.

(Figs 62.1-11)

Cataglyphis cf. *cretica* sp. 1: Salata et al. 2020 a: 25.

Etymology. Named after Minos, a mythical King of Crete, son of Zeus and Europa.

Type material. Holotype major worker: “GREECE Crete Rethymno | Prov. Nida Plateau, 1370 m | 35°15’N 24°50’E | 25.04.14 S. Salata” (preserved in MNHW-DBET); paratypes gyne and two major workers: “GREECE Crete Heraklion | Prov. Rouvas Forest loc. 1 | 1316 m 35°09N 2456’E | 05.05.14 S. Salata (MNHW-DBET); two paratypes major workers and one paratype minor worker: “GREECE, Crete, Iraklion | Rouvas Forest loc. 1, 1316 m | 35.15694 N / 24.93957 | 5 V 2014, S. Salata (MNHW-DBET, MHNG); three paratypes major workers and one paratype minor worker: “GREECE, Crete, Rethymno | Psiloritis, N

of Lochria 1950 m |35.2051 N / 24.7838 E | 2 VII 2000, E. Nikolakakis" (MNHW-DBET); two paratypes minor workers: "GREECE, Crete, Chania | dist. Lefka Ori, 1800m, | 35°16'N / 24°03' E, 26.09 | 91, Trichas A." (MNHW-DBET); two paratypes minor workers: "GREECE, Crete, Heraklion | Prov. Diplori, 1350 m | 35°10'N / 24°56'E, 17.8.99 | E. Nikolakakis" (MNHW-DBET); one paratype major worker: "GREECE Crete Rethymno | Psiloritis, 1950m, | 35°11'N / 24°47'E, 12.6.2001|91, E. Nikolakakis" (MNHW-DBET); one paratype major worker: "GREECE Crete Rethymno | distr. Psiloritis Mt. 2250 m | 35°12'N / 24°47'E, 31.10 |200, Stathi I." (MNHW-DBET).

Distribution in Greece: Crete (Salata et al. 2020 a: 25, as *Cataglyphis* cf. *cretica* sp. 1).

Distribution in Europe and Mediterranean Basin: Endemic to Crete.

Description. Moderately large, polymorphic; minor workers HL: 1.159-1.222 (mean 1.191); HW: 1.000-1.005 (mean 1.003); SL: 1.270-2.286 (mean 1.278); EL: 0.373-0.381 (mean 0.377); ML: 1.86-1.88; MW: 0.75-0.84. **Color.** Head and mesosoma reddish brown to brown, gaster sometimes paler than mesosoma, yellowish brown, antennae yellowish, legs from yellowish brown to mostly brown only tarsi yellowish, fore tibiae often paler than fore femora, in the darkest specimens mid and hind femora dark brown, slightly darker than tibiae, in many specimens the surface with a slight brass sheen (Figs 62.6-7). **Head.** 1.2 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded (Fig. 62.8). Clypeus trapezoidal, transverse, its anterior margin convex with crenulate anterior margin, sides strongly convergent posterad, posterior margin short, straight, whole surface distinctly microreticulated, in the middle of clypeal plate tending to form longitudinal striation, surface indistinctly dull; sides of clypeal surface with sparse and short, hardly visible appressed hairs, anterior margin with a row of 6 very long setae, central part of clypeus close to base with a pair of long erected setae. Head distinctly microreticulate, appears opalescent dull, only on sides with sparse and short appressed pubescence, appears mostly unhaired, sculpture on frons tending to form longitudinal striation, frontal area with one or two pairs of long erected setae, ocellar area with 1-3 short erected setae, occipital area without to with 4 long erected setae, gular area with 2-4 short to long erected setae. Scape long, thin, 1.3 times longer than width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with very short and very sparse appressed pubescence, in fresh specimens with 1-3 short erected setae. Funicular segments elongate, thin, first segment 3.6 times as long as wide and approximately 1.7 times as long as second segment, third segment as long as to slightly shorter than second, the rest of funicular segments distinctly longer than broad (Fig. 62.8). Eyes big, elongate oval, 0.32 length of head. Mandibles very elongate, with longitudinal sculpture, surface shiny. **Mesosoma.** Elongate 2.2-2.5 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly shiny, only slightly opalescent (Fig. 62.6). In lateral view dorsum with deep mesonotal groove, propodeum regularly convex, rounded (Fig. 62.7). Surface of pronotal dorsum and mesonotum with short and scarce, hardly visible depressed hairs, propodeum with slightly longer and dense pubescence than two anterior segments; pronotum with 1-2 long erected setae, mesonotum in posterior part with 3 short erected setae, propodeum without or with 1-2 short erected setae. **Waist and gaster.** Petiole in form of broad, moderately thick scale with convex anterior and flat posterior face, apex almost truncate; surface distinctly microreticulated covered with short and sparse appressed hairs, margins lacking erected setae. Gaster shorter than mesosoma, tergites with

microreticulation partly tending to form transverse microstriation, surface distinctly shiny, covered with very short and scarce appressed hairs; first two tergites lacking erected setae, third tergite with 2 erected setae (Fig. 62.7). **Legs.** Very long and thin, hind femora longer than mesosoma, surface of legs covered with sparse hairs, inner margin of tibiae with row of thorns. Ventral surface of fore femora with 2-3 long erected setae.

Major workers: HL: 1.429-1.700 (mean 1.582); HW: 1.302-1.500 (mean 1.429); SL: 1.556-1.762 (mean 1.643); EL: 0.437-0.476 (mean 0.461); ML: 2.13-2.40; MW: 1.02-1.12. In all characters except size similar to minor workers including color variation and sculpture (Figs 62.1-4). Head proportionally stouter, as long as wide to 1.1 times longer than wide (Fig. 62.5), central part of clypeus with 3-4 long erected setae, gular area with 4-6 short to long erected setae, occipital area with 4-6 erected setae. Scape proportionally shorter, 1.1-1.2 times as long as width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed pubescence, usually with 2-4 erected setae. Eyes proportionally smaller, 0.29 length of head; pronotum with 2-6 long erected setae, mesonotum with 2-4 erected setae anteriorly and 3-4 posteriorly, propodeum with 4-11 short to long erected setae; petiolar apex broadly truncate, often slightly excavate in the middle; first tergite with 0-3, second tergite 2-4, third tergite 4-6 erected setae; ventral surface of fore femora with 5-10 long erected setae.

Gyne: Gyne as in Figs 62.9-11, body predominantly brownisho black, head partly reddish brown, femora yellowish brown, tibiae and tarsi yellwissh, antennae yellow. Frons with two pairs of long erected setae, occipital part of head with 8 long erected setae. Pronotum along posterior marin with a row of long erected setae, whole surface of scutum and scutellum and propodeum with numerous erected setae. First gastral tergite only on anterior slope with several long erected setae, second tergite lacking erected setae, third tergite posterolaterally with one or two pairs of erected setae, fourth tergite across middle with a row of erected setae. Anterior face of antennal scapus with several short erct setae. Ventral side of fore femors with 7-9, mid femora 5-6 and hind femora at base with 2-3 long and 1-3 short erected setae. Petiolar scale very broad, thin in profile, upper margin deeply emarginate.

Comparative remarks. With *Cataglyphis cretica* and *C. hellenica* it forms a separate group of similar species with dark, reddish brown to almost black body. *Cataglyphis minos* is the most setose species in this group, the only species with erected setae on antennal scapi, pronotum, propodeum and in major workers on first gastral tergite. Gyne of *C. minos* differs from sympatric *C. cretica* in numerous setae on occipital part of head, dorsum of mesosoma and anterior slope of first gastral tergite. Both species differ also in shape of petiole, which is very broad, cordiform with deeply emarginate dorsal margin in *C. minos* and broad, with softly rounded sides and truncate or very shallowly emarginate dorsal margin in *C. cretica*. Although both species are spread on the whole Crete they are separated geographically because *C. minos* occurs only in upper parts of mountains between 1316 and 2250 m while *C. cretica* occurs only in low and mid altitudes from sea level to 1240 m.

Biological notes. Rare, mountain species, reported only from areas above the upper edge of the forest at the altitude between 1316 and 2250 m. Nests in soil.

63. *Cataglyphis nodus* (Brullé, 1833)

(Figs 63.1-9)

Formica nodus Brullé, 1833: 326;
Myrmecocystus viaticus var. *orientalis* Forel, 1895 a: 228;
Cataglyphis bicolor var. *rufiventris* Emery, 1925 d: 265;
Cataglyphis bicolor st. *nodus* var. *assyria* Santschi, 1929 c: 44 unavailable name;
Cataglyphis bicolor st. *nodus* var. *drusa* Santschi, 1929 c: 44 unavailable name;
Cataglyphis (*Cataglyphis*) *bicolor* st. *nodus* var. *helladica* Santschi, 1934: 281 unavailable name;
Cataglyphis nodus subsp. *caucasicola* Arnoldi, 1964: 1803;
Cataglyphis nodus subsp. *mesasiatica* Arnoldi, 1964: 1803.

Distribution in Greece: Aegean Islands (Finzi 1928: 791 - as *Cataglyphis bicolor* var. *nodus*, Finzi 1939: 160 - as *Cataglyphis bicolor* ssp. *nodus*, Collingwood 1993: 195, Legakis 2011: 35, Salata & Borowiec 2017: 295-299, 304, Borowiec & Salata 2018 c: 5; **new data:** Chios, Kerameia, 8 m, 15 V 2013, 38.2987 N / 26.1373 E; Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E; Lesbos, Argennos, 548 m, 12 VI 2015, 39.35494 N / 26.2661 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, Kalloni salines, 3 m, 10 VI 2015, 39.21687 N / 26.26662 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, M. Pythariou, 99 m, 8 VI 2015, 39.17322 N / 25,96195 E; Lesbos, n. Skalochori, 350 m, 29 VII 2009, 39.25 N / 26,06667 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E; Samos, Drakei, 290 m, 8 VI 2013, 37.76666 N / 26.63333 E; Samos, Klima, 10 m, 4 VI 2013, 37.76666 N / 26.88333 E; Samos, Psili Ammos, 15 m, 5 VI 2013, 37.7 N / 27 E); **?Crete** (Legakis 2011: 35, Salata et al. 2020 a: 26); **Dodecanese** (Forel 1889: 256 - as *Myrmecocystus viaticus*, Emery 1915: 2 - as *Cataglyphis bicolor*, Menozzi 1936: 305 - as *Cataglyphis bicolor* var. *nodus*, Legakis 2011: 35, Borowiec & Salata 2012: 487, Borowiec & Salata 2015: 53, Salata & Borowiec, 2016: 198, Salata & Borowiec 2017: 295-299, 304, Borowiec et al. 2021: 16); **Epirus** (Legakis 1983: 5, 2011: 35, Salata & Borowiec 2017: 295-299, 304, Borowiec & Salata 2018 a: 5, Salata & Borowiec 2019 b: 100; **new data:** Preveza, Parga, 30 m, 6 VI 2014, 39.287 / 20.4); **Ionian islands** (Collingwood 1993: 195, Legakis 2011: 35, Borowiec & Salata 2018 d: 5, Borowiec & Salata 2021 a: 7; **new data:** Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747); **Macedonia** (Petrov & Legakis 1996: 32, Legakis 2011: 35, Borowiec & Salata 2012: 487, Salata & Borowiec 2019 b: 104, 2022: 6; **new data:** Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Drama, Paranesti-Thermia, 350 m, 7 X 1999, 41.3861 N / 24.4737 E; Halkidiki, Holomontas, n. Arnea, 703 m, 1 IX 2009, 40.46666 N / 23.56666 E; Halkidiki, Kassandra, Agia Paraskevi, 213 m, 26 VIII 2009, 39.95 N / 23.6 E; Halkidiki, Kassandra, Cap Paliouri, 38 m, 31 VIII 2009, 39.91666 N / 23.7 E; Halkidiki, Kassandra, Elani, 281 m, 28 VIII 2009, 40.05 N / 23.35 E; Halkidiki, Kassandra, Fourka-Kassandrino rd., 69 m, 28 VIII 2009, 40.01666 N / 23.41666 E; Halkidiki, Kassandra, Kassandrino-Polihrono rd., 100 m, 29 VIII 2009, 40 N / 23.43333 E; Kavalas, Kotza Orman forest, 16 m, 13 VIII 1999, 40.8882 N / 24.7786 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E; Pieria, Nei Pori, 1-30 m, 13-20 VI 2013, 39.964 / 22.648; Pieria, Platamonas Castle hill, 60 m, 14 V 2019, 40.0073 / 22.59696); **Peloponnese** (Brullé 1833: 326 – as *Formica nodus*, Finzi 1939: 160 - as *Cataglyphis bicolor* ssp. *nodus*, Legakis 1984: 87, 2011: 35, Salata & Borowiec 2017: 295-299, 304, Borowiec & Salata 2017 b: 207, Salata & Borowiec

2019 b: 115, 120, Borowiec & Salata 2021 b: 7); **Sterea Ellas** (Roger 1859: 232 - as *Formica viatica*, Forel 1889: 256 - as *Myrmecocystus viaticus*, Finzi 1928: 791 - as *Cataglyphis bicolor* var. *nodus*, Finzi 1939: 160 - as *Cataglyphis bicolor* ssp. *nodus*, Legakis 1984: 87, 2011: 35, Borowiec & Salata 2017 a: 1-2, Salata & Borowiec 2017: 295-299, 304, Borowiec & Salata 2018 e: 6, Salata & Borowiec 2019 b: 106, 121, Borowiec & Salata 2021 b: 7); **Thessaly** (Finzi 1939: 160 - as *Cataglyphis bicolor* ssp. *nodus*, Legakis 2011: 35, Borowiec & Salata 2012: 487, Borowiec & Salata 2018 b: 224, Salata & Borowiec 2019 b: 107; **new data:** Ossa Mts., Kokkino Nero, 10 m, 25 VII 2009, 30 VII 2009, 39.833 N / 22.792 E; Ossa Mts., Kokkino Nero, 35 m, 4 VIII 2009, 39.836 N / 22.788 E); **Thrace** (Finzi 1939: 160 - as *Cataglyphis bicolor* ssp. *nodus*, Bračko et al. 2016: 15). It presence on Crete is doubtful, nevertheless, it could be unintentionally introduced by human. Recent explorations on Crete did not confirm its occurrence in this island.

Distribution in Europe and Mediterranean Basin: Albania; Armenia; Azerbaijan; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Georgia; Greece; Egypt; Hungary; Iran; Iraq; Montenegro; North Macedonia; Romania; Slovakia; Serbia; Syria; Turkey; United Arab Emirates.

Description. Moderately large to very large, polymorphic with a large difference in size between the smallest minor and the largest major workers; minor workers: HL: 1.317-1.568 (mean 1.422); HW: 1.008-1.254 (mean 1.122); SL: 1.468-1.896 (mean 1.668); EL: 0.357-0.429 (mean 0.393); ML: 2.17-2.52; MW: 0.83-0.98. **Color.** Head, mesosoma and petiolar node yellowish red to red (Figs 63.1, 2), only in rare melanistic form head reddish brown, mesosoma and petiole dark brown, dark forms are mostly observed in populations from Aegean Islands (Figs 63.5, 6); gaster in all forms dark, from reddish brown to black; antennae usually yellow or yellowish red only in melanistic forms yellowish brown, legs only in the palest form completely reddish, usually coxa and femora from reddish brown to brown, tibiae from yellowish brown to pale brown and tarsi yellowish, in melanistic forms legs black. **Head.** Approximately 1.3 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded (Fig. 63.3). Clypeus trapezoidal, transverse, its anterior margin convex with simple anterior margin, sides strongly convergent posterad, in the middle concave, posterior margin short, straight to shallowly concave, whole surface distinctly microreticulated, surface slightly dull, covered with sparse and short, hardly visible appressed hairs, anterior margin with a row of 7-8 very long setae and on sides with additional short setae, close to base with a pair of long erected setae. Head distinctly microreticulate, appears opalescent dull, only on gena, sides and around antennal scrobes with very sparse and short appressed pubescence, rest of head partly unhaired partly with short and sparse pubescence, lacking erected setae, only frontal area with 2-4, and ocellar area with 1-3 moderately long erected setae, occipital area with 6-10 long and several short erected setae. Scape long, thin, 1.5 times longer than width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with very short and very sparse appressed pubescence and apically with slightly decumbent hairs. Funicular segments elongate, thin, first segment 4.4 times as long as wide and approximately 1.8 times as long as second segment, third segment longer than second, the rest of funicular segments distinctly longer than broad (Fig. 63.3). Eyes big, elongate oval, 0.28 length of head. Mandibles elongate, with longitudinal sculpture, surface shiny. **Mesosoma.** Elongate 2.6-2.7 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull. In lateral view anterior part of mesonotum placed

slightly above pronotum, mesonotal groove distinct, propodeum regularly convex, rounded (Figs 63.2, 6). Surface of pronotal dorsum and mesonotum with short and scarce depressed hairs, propodeum with slightly longer and dense pubescence than on two anterior segments. Promesonotum with 4-6 short to moderately long erected setae, propodeum with 8-12 erected setae. **Waist and gaster.**Petiole in form of globular node with elongate posterior pedicel, surface distinctly microreticulated, covered with moderately elongate and moderately dense appressed hairs, top with 3-6 long erected setae. Gaster shorter than mesosoma, tergites with strong microreticulation partly tending to form transverse microstriation, dorsally opalescent dull, on sides and ventrally gradually less opalescent and less dull than dorsally, covered with very short and scarce appressed hairs; first tergite with a group of erected setae anteriorly, tergites 2 and 3 with a row of 4 long erected setae. **Legs.** Very long and thin, hind femora longer than mesosoma, surface of legs covered with sparse appressed hairs, inner margin of tibiae with row of thorns. Ventral surface of fore femora with 8-12 long erected setae.

Major workers: HL: 2.750-3.280 (mean 2.974); HW: 2.470-2.900 (mean 2.676); SL: 2.767-3.000 (mean 2.879); EL: 0.667-0.761 (mean 0.718); ML: 4.01-4.45; MW: 1.81-2.04. In all characters except size similar to minor workers including color variation and sculpture. Head proportionally stouter, approximately 1.1 times longer than wide, posterior margin of head shallowly concave. Scape proportionally shorter, approximately 1.1 times as long as width of head. Eyes proportionally smaller, 0.24 length of head. Number of erected setae on pronotum and mesonotum 6-8, on propodeum 12-20. Ventral surface of fore femora with 12-16 long erected setae.

Gyne as in Figs 63.4, 7, 8, male as in Fig. 63.9.

Comparative remarks. *Cataglyphis nodus* and *C. viaticoides* are the only Greek species with distinctly bicolored body, yellowish red to red head and mesosoma and brown to black gaster. *Cataglyphis viaticoides* differs in petiole in form of cubical node and distinctly smaller size with HL in minor workers < 1.3 mm, and in major workers with HL < 1.8 mm while *C. nodus* has petiole in form of globular node and body is large with HL in minor workers > 1.3 mm, and in major workers with HL > 2.5 mm. Melanistic forms of *C. nodus* differs from species of the *C. hellenica* complex in globular petiolar node while all dark colored Greek species have squamiform petiole.

Biological notes. Very thermophilous species. Reported from open areas and luminous sites in forests such as rocky seashore, pastures with shrubs, clay wasteland, sands near marshes, sandy cliffs, xerothermic meadows, beach areas, olive plantations, stream valley with plane trees, roadsides in oak forests, stream valleys with deciduous forest and dry gorges with frygana. Common in grassland and sandy roads in villages and tourist resorts. Nests in soil. Workers are active only in strong sunlight, especially in the afternoon hours. Most of collecting sites were at low and mid altitude, from sea level to 500 m with the highest locality on Mt Falakro, Macedonia at an altitude of 1300 m.

64. *Cataglyphis viaticoides* (André, 1881)

(Figs 64.1-6)

Myrmecocystus albicans var. *viaticoides* André, 1881: 57.

Distribution in Greece: Aegean Islands (Collingwood 1993: 195, Legakis 2011: 33, Borowiec & Salata 2018 c: 5; **new data:** Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015,

39.31839 N / 26.14776 E; Lesbos, Argennos, 548 m, 12 VI 2015, 39.35494 N / 26.2661 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E); **Dodecanese** (Forel 1889: 256 - as *Myrmecocystus albicans*, Legakis 2011: 33 - as *Myrmecocystus albicans*, Borowiec et al. 2021: 17); **Thrace** (Bračko et al. 2016: 15).

Distribution in Europe and Mediterranean Basin: Armenia; Bulgaria; Greece; Israel; Lebanon; Turkey; Saudi Arabia; United Arab Emirates.

Description. Moderately large, polymorphic; minor workers HL: 1.025-1.213 (mean 1.132); HW: 0.929-1.049 (mean 1.004); SL: 1.063-1.238 (mean 1.163); EL: 0.305-0.388 (mean 0.354); ML: 1.54-1.82; MW: 0.66-0.81. **Color.** Head, mesosoma and petiole in fresh specimens yellowish red to red, in dried specimens yellowish to brightly yellowish red, gaster in fresh specimens brown to almost black, often with slightly paler anterior face of first tergite, in dried specimens yellowish brown to dark brown, antennae and legs yellow (Figs 64.1, 2). **Head.** 1.1-1.2 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded (Fig. 64.3). Clypeus trapezoidal, transverse, its anterior margin convex anterior margin simple or in the middle slightly crenulate, sides strongly convergent posterad, posterior margin short, from slightly rounded to straight, whole surface with diffused microreticulation, surface shiny; sides of clypeal surface with sparse and short to moderate appressed hairs, anterior margin with a row of 4-6 very long setae, central part of clypeus with a pair of moderately long erected setae. Head with diffused microreticulation, appears shiny, only on sides with sparse and short appressed pubescence, appears mostly unhaired, frontal area a pair of long erected setae, ocellar area with 1-3 short erected setae, occipital part of head with 4-10 moderately long erected setae, gular area with 2 long erected setae. Scape long, thin, 1.1-1.1 times longer than width of head, slightly, regularly widened from base to apex, its surface microreticulate but shiny, with short and sparse appressed to subdecumbent pubescence, erected setae absent. Funicular segments elongate, thin, first segment 3.3 times as long as wide and approximately 1.7 times as long as second segment, third segment approximately as long as second, the rest of funicular segments distinctly longer than broad (Fig. 64.3). Eyes big, elongate oval, 0.31 length of head. Mandibles very elongate, in basal half smooth and shiny in apical half with longitudinal sculpture. **Mesosoma.** Elongate 2.2-2.3 times as long as wide, dorsally and laterally distinctly microreticulated but surface not opalescent, indistinctly shiny. In lateral view mesonotum not placed higher than pronotum, dorsum with deep mesonotal groove, propodeum moderately high, regularly convex, rounded (Fig. 64.2). Surface of pronotal dorsum and mesonotum with short and scarce depressed hairs, propodeum with slightly longer and denser pubescence than two anterior segments, whole dorsum lacking erected setae or propodeum with 2 short erected setae close to spiracles. **Waist and gaster.** Petiole in form of broad but low cubical node, apex in anterior view straight; surface anteriorly distinctly microreticulated covered with short and sparse appressed hairs, laterally and posteriorly with diffused microreticulation or smooth, apicolateral corners and lateral margins without or with 1-4 erected setae. Gaster shorter than mesosoma, tergites with fine microreticulation tending to form transverse microstriation, dorsally not opalescent, shiny, on sides shiny, covered with very short and scarce appressed hairs; first tergite without or with 2 erected setae, second tergite without or with a pair of erected setae, third tergite with 2 (occasionally 4) erected setae. **Legs.** Very long and thin, hind femora longer than mesosoma,

surface of legs covered with sparse hairs, inner margin of tibiae with row of thorns. Ventral surface of fore femora with 6-8 long erected setae.

Major workers: HL: 1.481-1.760 (mean 1.621); HW: 1.368-1.611 (mean 1.481); SL: 1.644-1.460 (mean 1.534); EL: 0.460-0.484 (mean 0.473); ML: 2.17-2.40; MW: 0.98-1.13. In all characters except size similar to minor workers including color variation and sculpture. Head proportionally stouter, as long as wide to 1.1 times longer than wide, central part of clypeus with 2-4 long erected setae, frons with one or two pairs of long erected setae, occipital part of head with usually with 12-16 short erected seta, and gular area with 2-4 long erected setae. Scape proportionally shorter, approximately as long as or 1.1 times longer than width of head. Eyes proportionally smaller, 0.29 length of head. Mesosoma stouter, 2.0-2.1 times as long as wide. Propodeum in posterior half with 8-14 short erected setae. First tergite with 2-8, second and third tergite 2-4 erected setae. Ventral surface of fore femora with 9-12 long erected setae.

Gyne as in Figs 64.5, 6.

Comparative remarks. *Cataglyphis viaticoides* and *C. nodus* are the only Greek species with distinctly bicolored body, yellowish red to red head and mesosoma and brown to black gaster. *Cataglyphis nodus* differs in petiole in form of globular node and large body with HL in minor workers > 1.3 mm, and in major workers with HL > 2.5 mm while *C. viaticoides* has petiole in form of cubical node and distinctly smaller size with HL in minor workers < 1.3 mm, and in major workers with HL < 1.8 mm.

Biological notes. Very thermophilous species. Reported from open areas such as dry hills with sparse vegetation, roadsides in Mediterranean oak forests, and grass and ruderal areas in tourist resorts. Nests in ground. Workers are active only in strong sunlight, especially in the afternoon hours. All collecting sites were at low and mid altitude, from 25 to 550 m.

Genus *Colobopsis* Mayr, 1861

Useful identification keys, revisions and taxonomic papers: Radchenko 1996 b.

Diagnosis. Body not linear from small to moderately large, strongly polymorphic, major workers with strongly modified head; clypeus broad with convex anterior margin, not armed with teeth; antennae 12-segmented, moderately elongate; antennal scape shorter than width of head; antennal sockets in distance from posterior margin of clypeus; mandibles moderately elongate, masticatory margin with spiniform denticles of unequal size; palp formula 6,4; eyes large; promesonotal suture present, from shallow to deep; propodeum unarmed but angulate; waist of one segment in form of thin scale; first gastral segment not separated from subsequent segments by a deep suture; mid and hind tibiae each with one pectinate spur; acidopore with a seta-fringed nozzle.

In Greece only one species.

65. *Colobopsis truncata* (Spinola, 1808)

(Figs 65.1-9)

Formica truncata Spinola, 1808: 244;
Formica fuscipes Mayr, 1853 b: 280.

Distribution in Greece: Aegean Islands (Forel 1889: 256, Collingwood 1993: 195 - as *Camponotus truncatus*, Legakis 2011: 33 - as *Camponotus truncatus*, Borowiec & Salata

2018 c: 5; **new data:** Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Samos, Klima, 10 m, 4 VI 2013, 37.76666 N / 26.88333 E; Samos, Nachtigallental, 50-100 m, 9 VI 2013, 37.7 N / 26.63333 E); **Crete** (Forel 1886: clxvii, Legakis 2011: 33 - as *Camponotus truncatus*, Borowiec & Salata 2012: 483 - as *Camponotus truncatus*, Salata et al. 2020 a: 31); **Dodecanese** (Menozzi 1936: 305 - as *Camponotus truncatus*, Salata & Borowiec, 2016: 198, Borowiec et al. 2021: 17); **Epirus** (Borowiec & Salata 2018 a: 5, Salata & Borowiec 2019 b: 100); **Ionian Islands** (Emery 1898: 125 - as *Camponotus truncatus*, Emery, 1901: 57 - as *Camponotus truncatus*, Collingwood 1993: 195 - as *Camponotus truncatus*, Legakis 2011: 33 - as *Camponotus truncatus*, Borowiec & Salata 2018 d: 5, Salata & Borowiec 2019 b: 113, Borowiec & Salata 2021 a: 7; **new data:** Cephalonia, Ainos Mts, 1512 m, 15 VI 2021, 38.12594 / 20.68345; Cephalonia, 1.9 km NE of Sami, 138 m, 14 VI 2021, 38.26483 / 20.66705; Cephalonia, Skala, 19 m, 17 VI 2021, 38.07683 / 20.79644; Lefkada, Dragano, 374 m, 11 VI 2021, 38.6805 / 20.57827; Lefkada, Vasiliki beach, 2 m, 12 VI 2021, 38.63156 / 20.59903); **Macedonia** (Petrov & Legakis 1996: 31 – as *Camponotus trunctatus*, Legakis 2011: 33 - as *Camponotus truncatus*, Borowiec & Salata 2012: 483 - as *Camponotus truncatus*, Borowiec & Salata 2022: 6; **new data:** Halkidiki, Kassandra, Siviri, 6 m, 5 IX 2009, 40.03333 N / 23.35 E; Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971); **Peloponnese** (Borowiec & Salata 2017: 207); **Sterea Ellas** (Roger 1859: 231 - as *Formica truncata*, Legakis 2011: 33 - as *Camponotus truncatus*); **Thessaly** (Legakis 1984: 87, 2011: 33 - as *Camponotus truncatus*, Borowiec & Salata 2012: 483 - as *Camponotus truncatus*, Borowiec & Salata 2018 b: 224, Salata & Borowiec 2019 b: 107); **Thrace** (Bračko et al. 2016: 17 - as *Camponotus truncatus*).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Azerbaijan; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czech Rep.; France: Corsica, mainland; Georgia; Greece; Cyprus; Czech Rep.; Germany; Hungary; Israel; Italy: mainland, Sardinia, Sicily; Jordan; Madeira; Malta; Moldova; Montenegro; Morocco; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Switzerland; Turkey; Ukraine.

Description. Moderately large, polymorphic; minor workers HL: 0.841-1.000 (mean 0.931); HW: 0.683-0.889 (mean 0.794); SL: 0.675-0.794 (mean 0.807); EL: 0.254-0.303 (mean 0.275); ML: 1.11-1.34; MW: 0.52-0.63. **Color.** Head, mesosoma and petiolar scale from uniformly yellow reddish to completely dark brown, often head darker than mesosoma, or mesosoma bicolored with dark dorsum and pale sides; gaster dark brown to black, second tergite in anterolateral corners often with pale, white to yellowish spot, antennae from yellow with slightly infuscate funicle to almost completely brown, legs from mostly yellow with slightly infuscate femora to mostly brown with yellowish tarsi (Figs 65.1-4). **Head.** 1.1-1.2 times longer than wide, broadly oval, softly rounded in front of eyes and regularly rounded behind eyes, occipital margin convex (Fig. 65.5). Clypeus trapezoidal, stout, its anterior margin convex, sides convergent posterad, posterior margin shallowly concave in the middle, on the whole surface distinctly microreticulated, surface from shiny to slightly dull; whole clypeal surface with sparse and short, hardly visible appressed hairs, a row of short to moderately long hairs at anterior margin, a row of four long setae close to anterior margin, a pair of erected setae in the middle and on to two erected setae in posterolateral corners. Head distinctly microreticulate, from shiny to slightly dull, with sparse and short appressed pubescence, with a pair of erected setae on frontal plate close to lateral margin and a pair of

long erected setae in postocular area, without setae on genae and in occipital part of head, gular area and ventral side of head lacking erected setae. Scape short, slightly shorter than width of head, moderately thick, distinctly, regularly widened from base to apex, its surface microreticulate but shiny, with very short and very sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.1 times as long as wide and approximately 2.3 times as long as second segment, the second segment approximately as long as wide, third segment 1.3 times as long as second, the rest of funicular segments slightly longer than broad (Fig. 65.5). Eyes big, elongate oval, 0.29 length of head. Mandibles very short and stout, without longitudinal sculpture, surface shiny. **Mesosoma.** Elongate 2.1 times as long as wide, dorsally distinctly microreticulated, laterally with microstriation, surface indistinctly shiny. In lateral view mesosomal dorsuml profile with three concavities – between promesonotum, between mesonotum and propodeum and in the middle of propodeum (Figs 65.2, 4). Surface of pronotal dorsum with short and scarce, hardly visible depressed hairs, resto of mesosoma appears unhairy, erected setae absent. **Waist and gaster.** Petiolar scale broad, thick in lateral view, widest in the middle and distinctly narrowed to base and to apex, apical margin deeply emarginate medially thus petiole appears bidentate; surface of petiole transversely striate, margins lacking erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation, surface shiny, covered with short and scarce, hardly visible appressed hairs only posterior margin with more visible hairs; first tergite with a pair of long erected setae in the middle and row of 4-6 erected setae close to posterior margin, second and third gastral segment with 2-4 long erected setae anteriorly and a row of 6-8 moderately long erected setae close to posterior margin. Ventral surface of femora lacking erected setae. **Legs.** Moderately long, covered with short and sparse appressed hairs, inner margin of hind tibiae lacking row of thorns.

Major workers: HL: 0.998-1.095 (mean 1.063); HW: 0.935-1.063 (mean 0.988); SL: 0.603-0.717 (mean 0.659); EL: 0.306-0.336 (mean 0.325); ML: 1.35-1.44; MW: 0.73-0.82. **Color.** Color variation as in minor worker. **Head.** Large, approximately 1.1 times as long as wide, in front of eyes parallelsided or slightly widened anterad, behind eyes regularly rounded, occipital margin straight. Anterior part truncate, narrow clypeus and the perpendicularly pivoted apical part of the gene form a plate that is perpendicular to the surface of the forehead (Fig. 65.4); surface of this plate with rugose sculpture, the rugosities occur also on dorsal part of clypeus and lateral parts of gena, surface of perpendicular plate without setae or hairs, rugose parts of gena and dorsal part of clypeus with sparse, short erected setae, partly clavate (Fig. 65.6). Mandibles very short, triangular, their surface with rugose sculpture. Surface of frons anteriorly with rugose sculpture, posteriorly microretiulate, rest of head with microreticulation and occipital part with transverse striation, rugose and posterior part of frons with sparse, long erected setae, interocular area with two pairs of erected setae, occipital part lacking erected setae. Scape very short, 0.6-0.7 times as long as width of head, thick, distinctly widened from base to apex, flattened dorso-ventrally, its surface with diffused microreticulation, shiny, appears unhaired, erected setae absent. Funicular segments elongate, thin, first segment twice as long as wide and twice as long as second segment, the second funicular segment approximately as long as wide, third segment as long as second, the rest of funicular segments as long aa to slightly wider than long. Eyes big, elongate oval, 0.31 length of head. **Mesosoma.** Elongate 1.7-1.9 times as long as wide dorsally distinctly microreticulated, laterally with microstriation, surface shiny. In lateral view mesosomal dorsuml profile almost

regular, with concavities characteristic for minor worker only with three slightly marked grooves (Fig. 65.4). Surface of dorsum without or with hardly visible depressed hairs, erected setae absent. **Waist and gaster.** Petiolar scale very broad, moderately thick in lateral view, widest in the middle and only slightly narrowed to base and to apex, apical margin shallowly emarginate medially thus lateral corners rounded; surface of petiole transversely striate, margins lacking erected setae. Gaster shorter than mesosoma, tergites with transverse microstriation, surface shiny, covered with short and scarce, hardly visible appressed hairs only posterior margin with more visible hairs; first tergite with 2-4 short erected setae anteriorly and a row of 4-6 short, erected setae close to posterior margin, second and third gastral segment with 2-4 long erected setae anteriorly and a row of 6-8 moderately long erected setae close to posterior margin. **Legs.** Moderately long, appears unhaired and shiny, inner margin of hind tibiae lacking row of thorns. Ventral surface of femora lacking erected setae.

Gyne as in Figs 65.7-9. Head as in major worker with truncate anterior slope.

Comparative remarks. *Colobopsis* and *Camponotus* are the only Greek genera with antennal insertions placed distinctly behind clypeal margin. *Colobopsis* by many years was treated as a subgenus of *Camponotus* but molecular studies showed that it represents a separate line within the subfamily and should be treated as distinct genus (Ward et al. 2016). *Colobopsis* differs from *Camponotus* in a special polymorphism manifested by sharply truncated heads in which the anterior truncated surface of the head in the major workers and the females is distinctly marginate and in which even the mandibles have a sharp external ridge separating an anterior from a latero-ventral face. In the members of *Camponotus* with distinct polymorphism the difference is manifested only in body size and different proportions of head but never in special structure of head. *Colobopsis truncata* differs also from members of the genus *Camponotus* in straight frontal carinae, slightly converging to the front (*Camponotus* has frontal carinae arched, distinctly converging to the front). In field, minor workers of *Colobopsis truncata* are similar to *Dolichoderus quadripunctatus* especially due to pale spots on gaster and similar behavior. Both arboricolous species are observed furaging tree trunks and do not show aggressive behavior towards each other. In Greek populations, minor workers of *C. truncata* usually have dark colored, reddish brown to brown mesosoma while workers of *D. quadripunctatus* usually has uniformly red mesosoma.

Biological notes. Arboricolous, common species in various types of habitats as deciduous forests along streams, roadsides with bushes and herbs, roadsides in *Quercus ilex* forests, old olive trees overgrown by *Hedera helix*, pine forests summer resort, pastures with fig trees and beaches with deciduous trees. Nests in dead wood or bark of trees, initial colonies are also in hollow plants. All collecting sites were at low and mid altitude, from sea level to 895 m.

Genus *Formica* Linnaeus, 1758

Useful identification keys, revisions and taxonomic papers: Seifert 2000, 2002, 2018, Seifert & Schultz 2009, 2021.

Diagnosis. Monomorphic but sometimes with visible body size-variation, moderately large to large, mandibles with 7-10 teeth, third smaller than second and fourth; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape moderately elongate, longer than width of head, without projected setae; antennal sockets close to the posterior

clypeal margin; eyes large, elongate oval, placed behind the midlength of head; ocelli present; mesothorax moderately constricted in its anterior half; metapleural gland present; propodeum unarmed; propodeal spiracle elongate oval; petiole in form of unarmed scale; fore tibia with broad, apical pectinate spur, mid and hind tibia with single spurs apically; acidopore with a seta-fringed nozzle.

In Greece 15 species divided into four subgenera.

A key to subgenera of the genus *Formica*

1. Posterior margin of head convex, straight or only weakly excavated (Figs 66.4, 67.4, 68.4, 69.4) ..... 2.

─. Posterior margin of head deeply excavated (Figs 70.4, 71.4) .... ***Coptoformica*** **Müller**, p. 161

2. Anterior margin of clypeus not emarginate (Figs 66.4, 67.4, 68.4, 69.4) ..... 3.

─. Anterior margin of clypeus with clear median emargination (Fig. 72.3) .... ***Raptiformica*** **Forel**, p. 164

3. Frontal triangle significantly more shining than adjacent surface. Mesosoma distinctly bicolored, at least partly red (Figs 66.2, 67.2, 68.2, 69.2) ..... ***Formica*** **s. str.** , p. 153

─. Frontal triangle slightly to distinctly matt, if shining then whole dorsal head, mesosoma and gaster shining. Mesosoma from distinctly bicolored (Figs 74.2, 75.2, 80.2) to mostly or completely brown or black (Figs 73.2, 76.2, 78.2, 79.2) .... ***Serviformica*** **Forel**, p. 167

Subgenus *Formica* s. str.

A key to species of the subgenus *Formica* s. str.

1. Occipital margin of head with more than 10 erected setae. Mesonotum and propodeum usually with numerous erected setae ..... 2.

─. Occipital margin of head without or less than 5 erected setae. Mesonotum and propodeum without or with only few erected setae ..... 3.

2. Pitch-black large patch on promesonotum with sharp margins. Frons perfectly matt. Setation of mesosomal dorsum and gastral tergites denser, gaster on dorsal surface always with numerous erected setae ..... ***F. pratensis*** **Retzius**, p. 157

─. Pitch-black or brown large patch on promesonotum (if present) with diffused margins. Frons appearing at low magnification not perfectly matt, with a mild silky shine. Setation of mesosomal dorsum and gastral tergites less dense, especially gaster on dorsal surface without or with only few erected setae ..... ***F. lugubris*** **Zetterstedt**, p. 154

3. Each segment of mesosoma usually lacking erected setae, in rare cases with up to 5 setae. Ventral side of head without or with a few suberect setae ..... ***F. polyctena*** Förster, p. 156

–. Each segment of mesosoma with at least 6 erected setae (often many more, only occasionally with 2-3). Ventral side of head with long erect setae .... ***F. rufa*** **Linnaeus**, p. 159

Review of species

66. *Formica lugubris* Zetterstedt, 1838, 1850

(Figs 66.1-7)

Formica (*Formica*) *lugubris* Zetterstedt, 1838: 449;
Formica congerens Nylander, 1846 a: 906;
Formica rufa var. *alpina* Santschi, 1911 b: 349;
Formica rufa var. *nylanderi* Bondroit, 1920: 145;
Formica rufa var. *santschii* Wheeler, 1913: 90 (= *Formica rufa* var. *alpina* Santschi, 1911 b: 349 not *Formica adamsi* var. *alpina* Wheeler, 1909: 85);
Formica pratensis subsp. *unicolor* Ruzsky, 1926: 110 (= *Formica rufa pratensis* var. *unicolor* Ruzsky, 1914: 102 unavailable name);
Formica rufa var. *montana* Sadil 1953: 198.

Distribution in Greece: Epirus (Legakis 1983: 5); **Macedonia** (**new data:** Drama, Kara Ntere, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 N / 24.2835 E; Drama, Mt. Falakro, 2200 m, 6 VII 1996, 41.2939 / 24.0948; Drama, Prasinada ad monastery, 700 m, 10 VIII 1999, 41.3694 / 24.5489).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Belarus; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Estonia; Finland; France: mainland; Germany; Greece; mainland; Ireland; Italy: mainland, Sardinia; Latvia; North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Very large, HL: 1.270-2.160 (mean 1.705); HW: 1.048-1.960 (mean 1.449); SL: 1.048-1.740 (mean 1.406); EL: 0.321-0.587 (mean 0.444); ML: 1.72-2.97; MW: 0.78-1.41. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish red to red, rest of surface brown to black, yellowish red of anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts, sometimes brown limited only to frons and frons; mesosoma rarely uniformly yellowish red to red, usually promesonotum at top with obscure spot with diffused borders but yellow or reddish always predominate, petiolar scale usually yellowish red to red, gaster brown to black with transparent white posterior margin of tergites, anterior slope of first tergite often yellowish brown, antennal scapi from yellowish brown to brown, funicle from yellowish brown to dark brown, legs from uniformly reddish to indistinctly infuscated, in the darkest form completely brown (Figs 66.1-4). **Head.** Broad, 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 66.4). Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, without or with a row of 8-10 short setae close to the anterior margin

and group of 2-3 long erected setae in lateral corners, rest of clypeal surface without or with 1-2 pairs of long erected setae, the longest anterior seta with length 0.238. Head distinctly microreticulate, appears mostly dull and opaque but at least partly with a mild silky shine, with very short and very sparse appressed pubescence not covering head surface, interocular and ocellar area usually with few moderately long, erected yellow setae, occasionally frons without setae, gena without setae, whole occipital area or only in lateral corners with erected setae, ventral side of head with several long, erected setae. Scape short, 0.9-1.0 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.5 times as long as second segment, the second segment 1.9-2.0 times as long as wide, not or only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 66.3). Eyes big, elongate oval, approximately 0.26 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.1-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 66.2). Whole mesosomal surface covered with moderately long and moderately dense appressed pubescence not covering the mesosomal surface, usually on dorsum with numerous short, erected setae, the longest with length 0.127 but setation varies in and between nests, sometimes is reduced to 1-3 setae on pronotum and 0-5 setae on mesonotum and propodeum and number of setae is not correlated with size of worker. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded or truncate but usually with very shallow median emargination, anterior sides usually with several short, erected setae. All tergites close to posterior margin without or with only few short setae, surface of tergites in Greek populations lacking erected setae or with only few setae, only first tergite on anterior slope always with numerous short to moderately long erected setae. **Legs.** Ventral surface of both fore and mid femora with row of 2-10 short erected setae.

Gyne as in Figs 66.5-7.

Comparative remarks. *Formica lugubris* and *F. pratensis* are the only members of the nominative subgenus with distinctly setose occipital margin of head (*F. polyctena* and *F. rufa* have no or occasionally 1-3 erected setae in occipital part of head). *Formica pratensis* is the most setose species with distinctly higher number of erected setae on head and mesosoma than in *F. lugubris*. Especially gaster setation in *F. pratensis* is denser than in *F. lugubris* as Greek populations of *F. lugubris* have setation of first two gastral tergites often limited to the anterior slope of the first tergite while in *F. pratensis* entire surface of all tergites is densely setose. Aditionally, in *F. pratensis* dark spot on mesosomal dorsum usually has sharp borders between dark and pale color while in *F. lugubris* such spot, if present, has diffused borders.

Biological notes. Few Greek records come from coniferous forest. Nest in form of small mound to 110 cm in diameter. Mountain species, collected in area from an altitude 700 to 2200 m.

67. *Formica polyctena* Förster, 1850

(Figs 67.1-7)

Formica polyctena Förster, 1850 a: 15;

Formica (*Formica*) *rufa* var. *nuda* Karavaiev, 1930: 148;
Formica rufa subsp. *polyctena* ab. *bondroiti* Stärcke, 1942 b: 43 unavailable name;
Formica minor Gösswald, 1951: 436.

Distribution in Greece: Macedonia (**new data:** Drama, Kara Ntere, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 N / 24.2835 E).

Distribution in Europe and Mediterranean Basin: Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Germany; Greece; mainland; Hungary; Italy: mainland; Latvia; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Ukraine.

Description. Very large, HL: 1.780-2.160 (mean 1.928); HW: 1.508-1.920 (mean 1.660); SL: 1.508-1.820 (mean 1.646); EL: 0.479-0.571 (mean 0.512); ML: 2.36-2.83; MW: 1.14-1.37. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish red to red, rest of surface brown to black, sometimes clypeus in the middle with obscure spot or dark pattern of head limited only to occipital part of head, yellowish red of anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma uniformly yellowish red to red, often pro- and anterior part of mesonotum at top with dark brown to black spot with relatively sharp borders but yellow or reddish always predominate, petiolar scale usually yellowish red to red, occasionally upper margin slightly obscure, gaster brown to black with transparent white posterior margin of tergites, anterior slope of first tergite often with yellowish red to pale brown spot, antennal scapi from uniformly reddish to completely brown, funicle from yellowish brown to dark brown, legs in pale forms with reddish coxa and trochanters, reddish brown femora and tibiae and reddish tarsi, in dark forms completely brown with slightly paler brown tarsi (Figs 67.1, 2). **Head.** Broad, 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly concave (Fig. 67.4). Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, often partly longitudinally striate, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, anterior margin with a row of 14-16 moderately long to long setae, the longest in the middle with length 0.114, rest of clypeal surface without or with a row of 4 long setae close to anterior margin and 2-6 short erected setae in the middle and close to base of clypeus. Head distinctly microreticulate, appears indistinctly dull and opaque, with very short and very sparse appressed pubescence not covering head surface, usually lacking erected setae, occasionally with single seta in ocellar area and 1-2 short setae in occipital corners, ventral side of head without, erected setae. Scape short, 0.9-1.0 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.6 times as long as second segment, the second segment 1.6-1.7 times as long as wide, distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 67.3). Eyes big, elongate oval, approximately 0.26 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.0-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum

convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 67.4). Whole mesosomal surface covered with long and sparse appressed pubescence not covering the mesosomal surface, usually on dorsum lacking erected setae, occasionally each segment wit 1-5 very short standing setae, the longest with length 0.048**. Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex truncate usually with very shallow median emargination, margins without or with 2-4 short, erected setae. Tergites 1-2 and often also tergite 3 lacking row of apical setae, surface of tergites numerous short to moderately long erected setae. **Legs.** Ventral surface of both fore femora usually with 2-5 short erected setae, of mid femora without setae.

Gyne as in Figs 67.5-7.

Comparative remarks. *Formica polyctena* and *F. rufa* form a group of species without with less than 3 erected setae in occipital part of head. They have also less setae on mesosomal dorsum than both congeners: *F. lugubris* and *F. pratensis*. *Formica polyctena* and *F. rufa* are very similar thus for their identification should be based on numerous nest samples. Generally, *F. polyctena* is slightly smaller and less setose than *F. rufa*, usually its mesosoma completely lacking erected setae or in rare cases has up to 5 setae on each segment while in *F. rufa* most often each segment of mesosoma has at least 6 erected setae (often many more). Also, in *F. polyctena* ventral side of head usually has no or only few suberect setae while in *F. rufa* such setae are usually present and rather numerous.

Biological notes. The only Greek known locality of this species is placed in area with deciduous forest. In neighboring countries it occurs mainly in deciduous forests, less frequently in coniferous forests, especially in fir forests. Nest large, especially in fir forests nests of vegetable mounds can have up to 2 m height. In deciduous forests nests are smaller while in open warm places nests are flat with rudimentary layer of plant material or only with crater of mineralic soil material in which the plant material is restricted to a rudimentary central disc. Workers and gyne were collected at an altitude 974 m.

68. *Formica pratensis* Retzius, 1783

(Figs 68.1-7)

Formica pratensis Retzius, 1783: 75;
Formica rufa r. *pratensis* var. *rufoides* Forel, 1874: 368 unavailable name;
Formica pratensis var. *nigricans* Bondroit, 1912: 352 (= *Formica rufa pratensis* var. *nigricans* Emery, 1909 a: 187 unavailable name);
Formica pratensis var. *cordieri* Bondroit, 1917 b: 174;
Formica rufa var. *grouvellei* Bondroit, 1918: 60;
Formica rufa subsp. *pratensis* var. *incisa* Krausse, 1922: 155;
Formica pratensis var. *ciliata* Ruzsky, 1926: 110;
Formica rufa subsp. *pratensis* var. *foreli* Krausse, 1926 a: 108 unavailable name;
Formica rufa subsp. *pratensis* var. *santschii* Krausse, 1926 b: 115 unavailable name;
Formica rufa subsp. *pratensis* var. *major* Gösswald, 1941: 78 unavailable name;
Formica pratensis ab. *thyssei* Stärcke, 1942 b: 43;
Formica minor subsp. *pratensoides* Gösswald, 1951: 436;
Formica nigricans var. *staerckei* Betrem, 1960: 132.

Distribution in Greece: Greece generally (Seifert 1992: 218); **Macedonia** (Legakis 2011: 36; **new data:** Drama, Elatia Forest, 1590 m, 10 VIII 1999, 7 X 1999, 41.4926 N / 24.3165 E; Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 N / 24.6356 E; Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Drama, Prasinada, 700 m, 10 VIII 1999, 41.3694 N / 24.5489 E; Drama, 1 km S of Skaloti, 954 m, 8 VII 1996, 41.4073 N / 24.2766 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E); **Thessaly** (Borowiec & Salata 2018: 227; **new data:** Larissa, Mt. Olympus, Vrisopoules loc. 1, 1550 m, 15 V 2019, 40.03372 / 22.31675; Larissa, Kalipefki, 1120 m, 16 V 2019, 39.97026 / 22.45771); **Thrace** (Bračko et al. 2016: 18).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Channel Is.; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Italy: mainland; Latvia; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Very large, HL: 1.413-2.220 (mean 1.766); HW: 1.127-2.064 (mean 1.502); SL: 1.206-1.910 (mean 1.504); EL: 0.365-0.5556 (mean 0.452); ML: 2.00-3.17; MW: 0.84-1.43. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish red to red, rest of surface brown to black, yellowish red of anterior part of head usually distinctly bordered from the dark posterior part of head; mesosoma mostly yellowish red to red, usually promesonotum at top with dark brown to black spot of sharp borders but usually pale parts predominate; occasionally only pronotum with dorsal dark spot with indistinctly diffused borders or in melanistic forms dark color occupies great part of mesosoma; petiolar scale uniformly yellowish red to red or upper margin indistinctly infuscated, gaster dark brown to black with transparent white posterior margin of tergites, anterior slope of first tergite at base often with yellowish red spot, antennal scapi usually with dark brown to black anterior surface and yellowish brown to red brown posterior surface, funicle from brown to black, coxa and trochanters usually partly yellowish to reddish partly brown, femora and tibiae usually completely brown to almost black, tarsi yellowish brown, occasionally legs yellowish brown or almost completely black (Figs 68.1, 2). **Head.** Broad, 1.1-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 68.4). Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, a row of 12-16 long and long setae, the longest in the middle and in lateral corners with length up to 0.254; Clypeus usually with two pairs of long erected setae and few sort erected setae. Head distinctly microreticulate, appears mostly dull and opaque, frons appears perfectly matt, whole interantennal, interocular and ocellar areas with moderately long to long erected setae usually with few moderately long, erected yellow setae, occasionally frons without also whole occipital area with long erected setae, ventral side of head with numerous long, erected setae). Scape short, 0.9-1.1 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.5 times as long as second segment, the second segment 1.9-2.0 times as long as wide, not or only slightly shorter

than third segment, the rest of funicular segments clearly longer than broad (Fig. 68.3). Eyes big, elongate oval, approximately 0.26 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.1-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 68.2). Whole mesosomal surface covered with moderately long and moderately dense appressed pubescence not covering the mesosomal surface, whole dorsal and lateral parts of mesosoma with numerous moderately long, erected setae, the longest with length 0.151**. Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded or truncate, usually without or with very shallow median emargination, whole margin with several short, erected setae on top of petiolar scale directed both forward and backward. All tergites close to posterior margin with row of short setae, sometimes margin of first segment with only 2-3 setae laterally, whole surface of all tergites with long and dense erected setae. **Legs.** Ventral surface of both fore and mid femora with row of at least 10, often above 15 short to moderately long erected setae.

Gyne as in Figs 68.5-7.

Comparative remarks. *Formica pratensis* and *F. lugubris* are the only members of the nominative subgenus with distinctly setose occipital margin (*F. polyctena* and *F. rufa* have to or at most 3 short setae on occipitum). *Formica pratensis* is the most setose species with distinctly higer number of erected setae on head and mesosoma than in *F. lugubris*. Especially setation of gaster in *F. pratensis* is more evident as its Greek populations have setation of first two gastral tergites limited to the anterior slope of the first tergite while in *F. pratensis* the whole surface of all tergites is densely setose. Aditionally, in *F. pratensis* dark spot on mesosomal dorsum usually has sharp borders between dark and pale color while in *F. lugubris* such spot, if present, has diffused borders.

Biological notes. Inhabits open rocky mountain pastures or borders between pastures and coniferous forests, only one locality was from meadow close to river. Nests in ground, usually entrances are with a flat cover or a flat mound of plant which are frequently mixed with coarse sand or small pebbles. In high altitude locations, nests were also found under stones. In Greece, this is mainly alpine species, collected in area from an altitude 700 to 2200 m, only one collecting site was from lowland at an altitude 100 m.

69. *Formica rufa* Linnaeus, 1761

(Figs 69.1-7)

Formica rufa Linnaeus, 1761: 426;
Formica ferruginea Christ, 1791: 512;
Formica dorsata Panzer, 1798: 1651;
Formica major Nylander, 1849: 29;
Formica piniphila Schenck, 1852: 28;
Formica apicalis Smith, 1858: 49 not Latreille, 1802 a: 204;
Formica rufa var. *rufopratensis* Forel, 1874: 53;
Formica rufa var. *rufopratensoides* Forel, 1874: 368;
Formica rufa var. *meridionalis* Nasonov, 1889: 17;
Formica rufa var. *tshugunovi* Ruzsky, 1914: 102;

Formica gaullei Bondroit, 1917 b: 176;
Formica rufa var. *obscurata* Santschi, 1925: 351;
Formica rufa ab. *emeryi* Krausse, 1926 a: 108;
Formica rufa subsp. *brevisetosa* Ruzsky, 1926: 110;
Formica rufa var. *rufobrevisetosa* Ruzsky, 1926: 110;
Formica (*Formica*) *rufa* var. *constricta* Karavaiev, 1929: 215;
Formica rufa subsp. *rufa* ab. *tir* Stärcke, 1942 c: 22 unavailable name;
Formica rufa var. *angusticeps* Stärcke, 1947: 146.

Distribution in Greece: Macedonia (Legakis 2011: 36); **Thrace** (Legakis 2011: 36, Bračko et al. 2016: 19).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Italy: mainland; Latvia; Lithuania; Luxembourg; Malta; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Very large, HL: 1.492-2.110 (mean 1.838); HW: 1.178-1.940 (mean 1.615); SL: 1.349-1.880 (mean 1.641); EL: 0.413-0.563 (mean 0.498); ML: 2.00-2.97; MW: 0.87-1.37. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish red to red, rest of surface brown to black, sometimes clypeus in the middle with obscure spot or dark pattern of head limited only to occipital part of head, yellowish red of anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma uniformly yellowish red to red, often pro- and anterior part of mesonotum at top with dark brown to black spot with relatively sharp borders but yellow or reddish always predominate, petiolar scale usually yellowish red to red, occasionally upper margin slightly obscure, gaster brown to black with transparent white posterior margin of tergites, anterior slope of first tergite often with yellowish red to pale brown spot, antennal scapi from uniformly reddish to completely brown, funicle from yellowish brown to dark brown, legs in pale forms with reddish coxa and trochanters, reddish brown femora and tibiae and reddish tarsi, in dark forms completely brown with slightly paler brown tarsi (Figs 69.1, 2). **Head.** Broad, 1.1-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly concave (Fig. 69.4). Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, often partly longitudinally striate, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, anterior margin with a row of 14-16 moderately long to long setae, the longest in the middle with length 0.116, rest of clypeal surface usually with a row of 4 long setae close to anterior margin and 2-6 short erected setae in the middle and close to base of clypeus. Head distinctly microreticulate, appears indistinctly dull and opaque, with very short and very sparse appressed pubescence not covering head surface, usually with 2-3 short erected setae in interocular area and 1-2 setae in ocellar area, without or 1-5 short setae in occipital corners, ventral side of head usually with several erected setae; in the most setose specimens frons also with few erected setae and ocellar area with 3-5 setae, in the less setose

specimens whole dorsal head without setae. Scape short, 0.9-1.1 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.6 times as long as second segment, the second segment 1.6-1.7 times as long as wide, distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 69.3). Eyes big, elongate oval, approximately 0.27 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.1-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 69.2). Whole mesosomal surface covered with long and sparse appressed pubescence not covering the mesosomal surface, usually each mesosomal segment with more than 5 short erected setae, often many more, the longest with length 0.048. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex truncate usually with very shallow median emargination, margins usually with several short, erected setae. Tergites 1-2 and often also tergite 3 lacking row of apical setae, surface of tergites numerous short to moderately long erected setae. **Legs.** Ventral surface of both fore femora usually with 2-6 short erected setae, of mid femora without or with 1-2 setae close to trochanter.

Gyne as in Figs 69.5-7.

Comparative remarks. Formica *rufa* and *F. polyctena* form a group of species without or with not more 3 erected setae in occipital part of head. They also have lower number of setae on mesosomal dorsum than in both congeners: *F. lugubris* and *F. pratensis*. They are very similar in difficult to identification without a series of specimens from a nest sample. For comparative characters see remarks under *F. polyctena*.

Biological notes. A single nest observed in Greece was placed in coniferous forest at an altitude 932 m. Nest was typical for this species, mound of 70 cm height composed of plant debris, needles and small sticks.

Subgenus *Coptoformica* Müller, 1923

A key to species of the subgenus *Coptoformica*

1. Erect seta on the surface of gaster tergites start with the first or second tergite, sometimes only as a row of setae at the posterior margin of the tergite (Figs 71.1, 2). Microsetae on eyes at least in fraction of colony clearly protruding above ommatidiae (use magnification 60x or more) ..... ***F. exsecta* Nylander**, p. 163

─. Erect seta on the surface of gaster tergites start with the third or fourth tergite (Figs 70.1, 2). Microsetae on eyes usually not protruding above ommatidiae (use magnification 60x or more) ..... ***F. bruni* Kutter**, p. 162

Review of species

70. *Formica bruni* Kutter, 1967

(Figs 70.1-4)

Formica (*Coptoformica*) *bruni* Kutter, 1967: 229.

Distribution in Greece: Macedonia (Borowiec & Salata 2012: 492; **new data:** Drama, Mt. Falakro, 2200 m, 6 VII 1996, 41.239 / 24.0948).

Distribution in Europe and Mediterranean Basin: Austria; France: mainland; Germany; Greece; Serbia; Spain: mainland, Sweden; Switzerland.

Description. Large, HL: 1.238-2.325 (mean 1.288); HW: 0.976-1.071 (mean 1.029); SL: 1.159-1.270 (mean 1.217); EL: 0.349-0.384 (mean 0.361); ML: 1.64-1.79; MW: 0.70-0.76. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish to yellowish red, rest of surface brown to black, pale anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma usually uniformly yellowish to yellowish red, occasionally pronotum at top with obscure spot of diffused borders, petiolar scale usually yellowish to yellowish red, gaster brown to black with transparent white posterior margin of tergites, anterior slope of first tergite often yellowish brown, antennae yellowish red to red, sometimes apical antennomeres gradually infuscate, legs usually completely yellowish to yellowish brown (Figs 70.1,2). **Head.** Broad, 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin deeply emarginate (Fig. 70.4). Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex**,** sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, clypeal margin with 3 long setae centrally and 4-5 short setae laterally, without setae in central and basal part of clypeal surface, the longest anterior seta with length 0.159. Head distinctly microreticulate, appears dull and opaque, with very short and very sparse appressed pubescence not covering head surface, erected setae absent. Scape moderately long, approximately 1.2 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.7 times as long as second segment, the second segment 1.7 times as long as wide, only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 70.3). Eyes big, elongate oval, approximately 0.28 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.3-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 70.2). Whole mesosomal surface covered with short and sparse appressed pubescence not covering the mesosomal surface, erected setae absent. **Waist and gaster.** Petiolar scale moderately broad, moderately thick in lateral view, apex straight but with very shallow median emargination, without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with short and sparse appressed pubescence not covering surface of tergites. Tergites 1-2 completely without setae, also close to posterior margin a row of setae, tergite 3 without setae or close to posterior margin with 1-2 setae. **Legs.** Ventral surface of fore and mid femora with lacking erected setae.

Gyne not studied.

Comparative remarks. *Formica bruni* and *F. exsecta* are the only *Coptoformica* species recorded from Greece. *Formica exsecta* differs in microsetae on eyes at least in fraction of colony clearly protruding above ommatidiae (in *F. bruni* these microsetae are short,

not protruding above ommatidiae). Aditionally, *F. bruni* has first two or three gastral tergites lacking erected setae on dorsal surface and their posterior margin is lacking a row of setae. While *F. exsecta* has at least second gastral tergite with few setae close to posterior margin and sometimes dorsal surfaces of first and second tergites have also erected setae. However, in Greece, was observed hitherto only "*rubens*" morph of *F. exsecta* which is lacking erected setae on dorsal surface of first two gastral tergites.

Biological notes. Workers were collected on pastures in mountain plateau with limestone rocks. Nests in ground, entrance surrounded with a mound of finely cut grass and plant particles, the mound usually smaller than 40 cm in diameter. Mountain species, in Greece recorded from two localities at an altitude of 1485 m and 2200 m.

71. *Formica exsecta* Nylander, 1846

(Figs 71.1-4)

Formica exsecta Nylander, 1846 a: 909;
Formica exsectopressilabris Forel, 1874: 52;
Formica exsecta var. *rubens* Forel, 1874: 51;
Formica exsecta var. *etrusca* Emery, 1909 a: 191;
Formica dalcqi Bondroit, 1918: 63;
Formica exsecta var. *sudetica* Scholz, 1924: 48;
Formica kontuniemii Betrem, 1954: 230;
Formica nemoralis Dlussky, 1964: 1037.

Distribution in Greece: Macedonia (Legakis 2011: 352; **new data:** Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E). Greek specimens belong to the "*rubens*" morph sensu Seifert (2018: 136).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Germany; Greece; France: mainland; Hungary; Italy: mainland; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherland; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL: 1.241-1.556 (mean 1.414); HW: 1.048-1.381 (mean 1.188); SL: 1.270-1.540 (mean 1.328); EL: 0.354-0.571 (mean 0.511); ML: 1.64-2.07; MW: 0.74-0.94. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish to yellowish red, rest of surface brown to black, pale anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma usually uniformly yellowish to yellowish red, occasionally pronotum at top with obscure spot of diffused borders, petiolar scale usually yellowish to yellowish red, gaster brown to black with transparent white posterior margin of tergites, anterior slope of first tergite often yellowish brown, antennae yellowish red to red, sometimes apical antennomeres gradually infuscate, legs usually completely yellowish to yellowish brown (Figs 71.1, 2). **Head.** Broad, 1.1-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin deeply emarginate (Fig. 71.4). Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior

margin convex, sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, clypeal margin with 3 long setae centrally and 4-5 short setae laterally, usually also with a row of 4 setae in anterior part, sometimes with only two setae anteriorly, occasionally also with a pair of erected setae close to base, the longest anterior seta with length 0.190. Head distinctly microreticulate, appears dull and opaque, with very short and very sparse appressed pubescence not covering head surface, erected setae absent or with a pair of short erected setae in interocular area and in ocellar area. Scape moderately long, approximately 1.1 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.7 times as long as second segment, the second segment 1.7 times as long as wide, only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 71.3). Eyes big, elongate oval, approximately 0.27 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.1-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 71.2). Whole mesosomal surface covered with short and sparse appressed pubescence not covering the mesosomal surface, erected setae absent. **Waist and gaster.** Petiolar scale moderately broad, moderately thick in lateral view, apex straight but with deep median emargination, without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with short and sparse appressed pubescence not covering surface of tergites. Tergites 1-2 or only tergite 2 with a row of setae, sometimes reduced to 2-3 setae, tergite 3 with a row of setae close to posterior margin and few erected setae on dorsal surface. **Legs.** Ventral surface of fore and mid femora with lacking erected setae.

Gyne not studied.

Comparative remarks. *Formica exsecta* and *F. bruni* are the only *Coptoformica* species recorded from Greece. They look very similar and for distinguishing characters see comparative remarks under *F. bruni*.

Biological notes. In neighboring countries prefers open to slightly shaded habitats such as subalpine and boreomontane pastures, margins of woodland, sunny forests, semidry to xerothermous grassland, heathland and boogs and fens except their wettest parts. Nests in ground, around entrance with a mound of finely cut grass, plant particles and some mineral components, the mound usually from smaller than 40 cm in diameter to very large of 300 cm in diameter and 50 cm height.

Subgenus *Raptiformica* Forel, 1913

Only one species in Greece.

72. *Formica sanguinea* Latreille, 1798

(Figs 72.1-7)

Formica sanguinea Latreille, 1798: 37;
Formica dominula Nylander, 1846 a: 905;
Formica sanguinea var. *fusciceps* Emery, 1895 b: 335;

Formica sanguinea var. *mollesonae* Ruzsky, 1903 a: 206;
Formica (*Raptiformica*) *sanguinea* var. *clarior* Ruzsky, 1905: 420;
Formica sanguinea var. *flavorubra* Forel, 1909: 105;
Formica (*Raptiformica*) *sanguinea* var. *borea* Santschi, 1925: 351;
Formica (*Raptiformica*) *sanguinea* var. *strennua* Santschi, 1925: 352;
Formica sanguinea var. *rotundata* Kuznetsov-Ugamsky, 1926: 95;
Formica sanguinea var. *griseopubescens* Kuznetsov-Ugamsky, 1926: 95;
Formica sanguinea subsp. *monticola* Kuznetsov-Ugamsky, 1926: 95;
Formica sanguinea subsp. *monticola* var. *minuta* Kuznetsov-Ugamsky, 1926: 95 unavailable name;
Formica sanguinea subsp. *arenicola* Kuznetsov-Ugamsky, 1928: 15;
Formica leninei Santschi, 1928: 46;
Formica (*Raptiformica*) *sanguinea* var. *tristis* Karavaiev, 1929: 217.

Distribution in Greece: Greece generally (Legakis 2011: 36); **Macedonia** (Borowiec & Salata 2012: 497; **new data:** Drama, Elatia, 1590 m, 10 VIII 1999, 41.4926 / 24.3165; Drama, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 N / 24.2835; Drama, Elatia Forest, 1590 m, 10 VIII 1999, 7 X 1999, 41.4926 N / 24.3165 E; Drama, Livadero-Drama, 900 m, 9 X 1999, 41.303 N / 24.219 E); **Peloponnese** (Borowiec & Salata 2013: 353, Borowiec & Salata 2017: 209, Borowiec & Salata 2021 b: 8); **Sterea Ellas** (Borowiec & Salata 2018 e: 7); **Thessaly** (Borowiec & Salata 2018 b: 227; **new data:** Larissa, Mt. Olympus, Vrisopoules loc. 1, 1550 m, 15 V 2019, 40.03372 / 22.31675; Larissa, Mt. Olympus, Vrisopoules loc. 3, 1400 m, 15 V 2019, 40.92936 / 22.30328; Larissa, Mt. Olympus, Vrisopoules loc. 4, 1315 m, 15 V 2019, 40.02392 / 22.30774); **Thrace** (Bračko et al. 2016: 19).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Georgia; Germany; Gibraltar; Greece; Hungary; Iran; Italy: mainland, Sicily; Latvia; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, Canary Is.; Sweden; Switzerland; Turkey; Ukraine - Palearctic.

Description. Very large, HL: 1.540-2.130 (mean 1.846); HW: 1.365-2.090 (mean 1.682); SL: 1.437-1.860 (mean 1.680); EL: 0.421-0.571 (mean 0.511); ML: 2.30-2.97; MW: 1.05-1.44. **Color.** Head bicolours, clypeus, genae, sides behind eyes and ventral side yellowish red to red, rest of surface brown to black, yellowish red of anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma usually uniformly yellowish red to red, occasionally promesonotum at top with obscure spot with diffused borders but reddish always predominate, petiolar scale usually yellowish red to red, in rare melanistic forms whole mesosoma and petiolar scale brown except pale intersegmental sutures then head always bicolored with pale anterior part and dark frons and occipital part of head brown, gaster brown to black with transparent white posterior margin of tergites, antennae yellowish red to red, sometimes apical 3-5 antennomeres gradually infuscate, legs usually completely reddish, only in dark forms coxa partly brown, femora, tibiae and tarsi indistinctly infuscated (Figs 72.1-4). **Head.** Broad, usually 1.1 times only in small workers 1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 72.4).

Clypeus without or with obtuse median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex but in the middle with distinct emargination, sides convergent posterad, posterior margin truncate, whole clypeal surface with very short and sparse appressed pubescence, a row of 10-13 long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, sometimes with additional short, 2-3 erected setae, the longest anterior seta with length 0.224. Head distinctly microreticulate, appears dull and opaque, with very short and very sparse appressed pubescence not covering head surface, interocular and ocellar area usually with two pairs of moderately long, erected yellow setae, sometimes ocellar area with 1-3 additional short to moderately long erected setae, occasionally frons with only a pair of setae, ventral side of head lacking erected setae. Scape short, 0.9-1.1 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.2 times as long as second segment, the second segment 1.6 times as long as wide, only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 72.3). Eyes big, elongate oval, approximately 0.28 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.1-22 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove deep, propodeum strongly, obtusely convex (Fig. 72.2). Whole mesosomal surface covered with long and dense appressed pubescence not covering the mesosomal surface, pronotum without o with 1-8 short erected setae, the longest with length 0.095, mesonotum and propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded but with shallow median emargination, without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with moderately long and dense appressed pubescence not completely covering surface of tergites. All tergites close to posterior margin with a row of setae, surface of tergites with short, sparse erected setae. **Legs.** Ventral surface of fore femora with row of 3-4 erected setae, of mid femora lacking erected setae.

Gyne as in Figs 72.5-7.

Comparative remarks. *Formica sanguinea* differs from all large Greek *Formica* species with not emarginated occipital margin of head in presence of median emargination on anterior margin of clypeus.

Biological notes. Reported from mountain deciduous forests, coniferous forests, mountain pastures and alpine pastures with shrubs and rocks. Nests in soil sometimes with soil mound, under stones and in rotten logs. In Greece, this is mainly mountain species, collected in area from an altitude 450 to 1720 m.

Subgenus *Serviformica* Forel, 1913

A key to species of the subgenus *Serviformica*

1. Whole body brown, dark brown to black (Figs 73.2, 76.2, 77.2, 78.2, 79.2) ..... 2.

—. Body bicoloured, at least mesosoma partly reddish to pale brown (Figs 73.1, 74.2, 75.2, 80.2), sometimes pale color is limited to sutural parts of mesosoma and anterior third of head dorsum (Fig. 75.3) ..... 6.

2. Body with superficial microsculpture, appears shiny (Figs 77.1, 2, 79.1, 2) ..... 3.

—. Body distinctly sculptured, appears dull (Figs 73.2, 76.2, 78.2) ..... 4.

3. First gastral tergite with very sparse pubescence, distance between nearest hairs subequal to or longer than the length of hairs (Fig. 79.1) ..... ***F. picea*** **Nylander**, p. 179

—. First gastral tergite with dense pubescence, distance between nearest hairs distinctly shorter than the length of hairs (Fig. 77.1) ..... ***F. gagates*** **Latreille**, p. 176

4. Occipital margin of head lacking erected setae or at most with four short hairs (Fig. 76.3, 4, 78.3, 4). Mesosomal dorsum without or at most with few erected setae on promesonotum (Figs 76.2, 78.2) ..... 5.

—. Occipital margin of head and promesonotal dorsum with numerous erected setae (Figs 73.2, 3, 4) ..... ***F. cinerea*** **Mayr**, p. 168

5. Promesotum without or with at most 5 erected setae. Femora of fore legs with at most 4 erected setae on ventral side , femora of mid legs usually lacking erected setae, occasionally at most 2 hairs at base of ventral surface ..... ***F. fusca*** **Linnaeus**, p. 174

—. Promesotum with 5-20 erected setae, occasionally with 2-4 hairs. Femora on ventral side of fore legs with 3-12 erected setae, of mid legs with 3-7 erected setae .... ***F. lemani*** **Bondroit**, p. 178

6. Occipital margin of head lacking erected setae (Figs 74.3, 4, 75.4, 5, 80.3, 4). Mesosomal dorsum lacking or with several erected setae on promesonotum (Figs 74.1, 75.2,3, 80.2) ..... 7.

—. Occipital margin of head with numerous erected setae (Figs 73.3, 4). Mesosomal dorsum with numerous erected setae on promesonotum (Fig.73.2) …… ..... ***F. cinerea*** **Mayr** – the palest form, p. 168

7. Petiolar scale lacking setae or rarely with few directed usually upwards short setae. Mesosomal dorsum with at most to 20 erected setae, placed mostly or exclusively on pronotum ..... 8.

—. Petiolar scale with several erected setae directed both forward and backward. Mesosomal dorsum with at least 10 erected setae, usually up to 30 distributed on the whole promesonotum ..... ***F. rufibarbis*** **Fabricius**, p. 181

8. Border between red spot of anterior part of head and its dark posterior part sharp and well marked (Figs 75.4, 5). Mesosoma uniformly reddish with sometimes dark patches to mostly dark only with reddish sutures (Fig. 75.3), usually with up to 5 (at most 15) short and erected setae (Figs 75.1, 2) ..... ***F. cunicularia*** **Latreille**, p. 171

—. Border between red spot of anterior part of head and its dark posterior part difussed with visible gradual transition zone (Figs 74.1, 2). Mesosoma usually uniformly reddish, only occasionally with small dark patches of diffused borders, usually with 6-20 short and erected setae, only occasionally without hairs (Figs 74.1, 2) ..... ***F. clara*** **Forel**, p. 169

Review of species

73. *Formica cinerea* Mayr, 1853

(Figs 73.1-4)

Formica cinerea Mayr, 1853 b: 281;
Formica cinerea var. *imitans* Ruzsky, 1902 b: 472;
Formica cinerea var. *armeniaca* Ruzsky, 1905: 406;
Formica cinerea var. *cinereoimitans* Ruzsky, 1905: 405;
Formica cinerea var. *subrufoides* Forel, 1913 d: 360;
Formica lefrancoisi Bondroit, 1918: 54;
Formica cinerea var. *cinereoglebaria* Kulmatycki, 1922: 85 nomen nudum;
Formica (*Serviformica*) *cinerea* var. *brevisetosa* Karavaiev, 1927: 302;
Formica cinerea var. *iberica* Finzi, 1928: 71;
Formica cinerea var. *italica* Finzi, 1928: 70;
Formica (*Serviformica*) *cinerea* var. *sabulosa* Karavaiev, 1931: 315;
Formica (*Serviformica*) *cinerea* var. *ochracea* Karavaiev, 1937: 177;
Formica cinerea var. *novaki* Kratochvil, 1941: 106;
Formica balkanina Petrov & Collingwood, 1993: 349.

Distribution in Greece: Epirus (Legakis 2011: 35); **Macedonia** (Seifert 2002: 253, Legakis 2011: 35 - as *Formica balkanina* and *Formica cinerea*; **new data:** Drama, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 N / 24.2835; Drama, Paranesti-Thermia, 350 m, 7 X 1999, 41.3861 N / 24.4737 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E; Pieria, Nei Pori, 1 m, 12 VI 2013, 39.964 / 22.648); **Thessaly** (Legakis 2011: 35 - as *Formica balkanina* and *Formica cinerea*); **Thrace** (Bračko et al. 2016: 18).

Distribution in Europe and Mediterranean Basin: Armenia; Austria; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Italy: mainland; Latvia; Lithuania; Luxembourg; Moldova; Montenegro; North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL: 1.222-1.397 (mean 1.302); HW: 0.929-1.183 (mean 1.033); SL: 1.119-1.357 (mean 1.255); EL: 0.397-0.452 (mean 0.431); ML: 1.72-2.14; MW: 0.73-0.92. **Color.** Head reddish brown to dark brown, gena usually slightly paler than the rest of head but without distinct border between pale and dark parts, mesosoma yellowish brown to brown, pronotum often partly paler than rest of mesosoma, often with yellow to reddish sides, occasionally completely yellowish to reddish, petiolar scale yellowish brown to brown, gaster brown to dark brown with yellowish posterior margin of tergites, antennae yellowish, sometimes apical 3-4 antennomeres indistinctly infuscated, coxa brown with expanded yellowish spot, femora, tibiae and tarsi yellow. (Figs 73.1-4). **Head.** 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 73.4). Clypeus with median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate or shallowly concave in the middle, whole clypeal surface with moderately long and dense appressed pubescence, a row of 10-12 moderately long

setae close at the anterior margin and numerous erected setae on the whole surface of clypeus, the longest anterior seta with length 0.151. Head distinctly microreticulate, appears dull and opaque, with moderately long and dense appressed pubescence almost completely covering head surface, on the whole surface with short to moderately long erected setae, including gena and occipital part of head, ventral side of head with several erected setae. Scape moderately long, 1.1-1.2 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.4 times as long as second segment, the second segment 1.5 times as long as wide, distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 73.3). Eyes big, elongate oval, approximately 0.33 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.2-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface slightly dull and opaque. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum regularly convex (Fig. 73.2). Whole mesosomal surface covered with moderately long and dense appressed pubescence, pronotum with numerous short erected setae, the longest with length 0.083, mesonotum with several erected setae mostly twice shorter than those on pronotum, propodeum without or with 1-4 very short erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded with several short setae. Gaster shorter than mesosoma, all tergites covered with moderately long but dense appressed pubescence completely covering surface of tergites with moderately dense, moderately long erected setae. **Legs.** Ventral surface of fore femora with row of more than 10 erected setae.

Gyne not studied.

Comparative remarks. *Formica cinerea* is distinct from all members of the subgenus *Serviformica* and differs in occipital margin of head with numerous erected setae. In body color only pale specimens of *F. fusca* looks similar but differ in occipital part of head lacking erected setae.

Biological notes. Prefers open habitats such as beaches, sandbanks near the rivers and gravel pits of periodic rivers. Nests in cohesive soil substrates. Recorded from the lowlands and lower mountain sites, the highest locality was from the height of 975 m.

74. *Formica clara* Forel, 1886

(Figs 74.1-4)

Formica rufibarbis var. *clara* Forel, 1886 a: 206;
Formica rufibarbis subsp. *clara* var. *subpilosoclara* Ruzsky, 1905: 400 unavailable name;
Formica rufibarbis var. *caucasica* Wheeler, 1913: 517 (= *Formica rufibarbis* ssp. *clara* var. *caucasica* Ruzsky, 1905: 401 unavailable name);
Formica (*Serviformica*) *rizadaghi* Arnoldi, 1968: 1819;
Formica lusatica Seifert, 1997 a: 13.

Distribution in Greece: Aegean Islands (**new data:** Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E); **Epirus** (Borowiec & Salata 2018 a: 6); **Macedonia** (Seifert & Schultz 2009: digital supplementary material, Legakis 2011: 35, Borowiec & Salata 2012: 493, 2022: 7; **new data:** Drama, Elatia Forest, 1590 m, 10 VIII 1999, 7 X

1999, 41.4926 N / 24.3165 E; Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 N / 24.6356 E; Kavalas, Kotza Orman forest, 16 m, 13 VIII 1999, 40.8882 N / 24.7786 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E); **Peloponnese** (Seifert & Schultz 2009: digital supplementary material, Legakis 2011: 35, Borowiec & Salata 2017: 208, Salata & Borowiec 2019 b: 114, 115); **Thessaly** (Borowiec & Salata 2018: 225); **Thrace** (Bračko et al. 2016: 18).

Distribution in Europe and Mediterranean Basin: Austria; Azerbaijan; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Cyprus; Czech Rep.; Denmark; Finland; France: mainland; Georgia; Germany; Greece: mainland; Hungary; Iran; Israel; Italy: Sardinia; Montenegro; Netherlands; Poland; Romania; Slovakia; Slovenia; Switzerland; Syria; Turkey.

Description. Large with strongly marked size-variation, HL: 1.198-1.820 (mean 1.499); HW: 0.968-1.429 (mean 1.196); SL: 1.238-1.780 (mean 1.504); EL: 0.405-0.516 (mean 0.466); ML: 1.80-2.62; MW: 0.75-1.15. **Color.** Head bicolor, clypeus, genae, sides behind eyes and ventral side yellowish red, rest of surface brown to black, yellowish red of anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma usually uniformly yellowish red to red, occasionally promesonotum at top with obscure spot with diffused borders but reddish always predominate, petiolar scale usually yellowish red to red, occasionally with obscure upper margin, in rare melanistic forms whole mesosoma and petiolar scale brown then head always bicolored with pale anterior part and dark frons and occipital part of head brown, gaster brown to dark brown with transparent white posterior margin of tergites, antennae yellowish, sometimes apical 3-4 antennomeres gradually infuscate, coxa yellowish to yellowish brown, femora from uniformly yellowish or yellowish red to reddish brown only in melanistic forms brown, tibiae and tarsi yellow or in melanistic forms reddish brown to brown (Figs 74.1-4). **Head.** 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 74.4). Clypeus with median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate or shallowly concave in the middle, whole clypeal surface with moderately long and moderately dense appressed pubescence, a row of 10-12 long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, sometimes with additional very short, 2-3 erected setae, the longest anterior seta with length 0.143. Head distinctly microreticulate, appears dull and opaque, with short and sparse appressed pubescence not covering head surface, interocular and ocellar area usually with a pair of moderately long, erected yellow setae, sometimes ocellar area with 1-3 additional short erected setae, occasionally frons without setae, ventral side of head lacking erected setae. Scape moderately long, 1.2-1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.4 times as long as second segment, the second segment approximately twice as long as wide, only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 74.3). Eyes big, elongate oval, approximately 0.31 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.2-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum

convex, mesonotal groove moderately deep, propodeum strongly, regularly convex (Fig. 74.2). Whole mesosomal surface covered with long and moderately dense appressed pubescence not covering the mesosomal surface, pronotum rarely without, usually with 6-15 very short erected setae, the longest with length 0.079, mesonotum without or with 1-4 short erected setae, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with moderately long and dense appressed pubescence almost completely covering surface of tergites. All tergites close to posterior margin with a row of setae, surface of tergites with short, sparse erected setae. **Legs.** Ventral surface of fore femora with row of 4-5 erected setae, of mid femora lacking erected setae or at most with two setae close to trochanter.

Gyne not studied.

Comparative remarks. *Formica clara* belongs to the group of members of the subgenus *Serviformica* with distinctly bicolored head and at least partly yellowish, yellowish red to red mesosoma. *Formica rufibarbis* differs in petiolar scale with several erected setae directed both forward and backward and in mesosoma with usually more numerous erected setae (up to 30 in *F. rufibarbis* and usually below 20 in *F. clara*). However, setation of mesosoma partly overlap in both species. Melanistic forms of *F. clara* appear similar to brown forms of *F. fusca* and *F. lemani* but *F. clara* differs in head with genae always paler than the rest of head (in both relatives head is uniformly dark colored). *Formica cunicularia* appears the most similar (especially forms with uniformly pale mesosoma), but differs in red spot of anterior part of head sharply separated from dark posterior part of head while in *F. clara* the red spot of anterior part of head gradually transitions into the dark posterior part of head. Aditionally, *Formica clara* usually has more erected setae on mesosoma (up to 20 in *F. clara* and usually less than 12 in *F. cunicularia*) but this character broadly overlaps in both species.

Biological notes. Thermophilous species, noted from dry hills, mountain pastures at side of coniferous forests, roadsides in pine forests, gorges with luminous deciduous forests, olive plantations and in salines. Often observed in grasslands, gardens and parks in towns and tourist resorts. Nests in soil or under stones. Most records are from low altitude but on the sunny slopes of the mountains can reach a height of 1590 m.

75. *Formica cunicularia* Latreille, 1798

(Figs 75.1-5)

Formica cunicularia Latreille, 1798: 40.

Formica glebaria Nylander, 1846 a: 917;

Formica fusca var. *fuscorufibarbis* Forel, 1874: 54;

Formica rufibarbis var. *glauca* Ruzsky, 1896: 70;

Formica fusca var. *rubescens* Forel, 1904 c: 423;

Formica rufibarbis subsp. *volgensis* Ruzsky, 1914 b: 323;

Formica (*Serviformica*) *rufibarbis* var. *katuniensis* Ruzsky, 1915 b: 13;

Formica rufibarbis natio *montana* Kuznetsov-Ugamsky, 1923: 245;

Formica (*Serviformica*) *rufibarbis* st. *montivaga* Santschi, 1928 f: 45 (=*Formica rufibarbis* natio *montana* Kuznetsov-Ugamsky, 1923: 245 not *Formica subpolita* var. *montana* Wheeler, 1910 a: 571;

Formica rufibarbis var. *montaniformis* Kuznetsov-Ugamsky, 1929 b: 39;
Formica cunicularia fuscoides Dlussky, 1967: 74.

Distribution in Greece: Greece generally (Roger 1859: 235); **Crete** (Salata et al. 2020 a: 24, Salata et al. 2020 a: 24); **Epirus** (Legakis 1983: 5, 2011: 35, Borowiec & Salata 2018 a: 6); **Macedonia** (Seifert & Schultz 2009: digital supplementary material, Legakis 2011: 35, Borowiec & Salata 2012: 493, 2022: 7; **new data:** Drama, Kara Ntere, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 N / 24.2835; Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 N / 24.6356 E; Drama, Livadero-Drama, 900 m, 9 X 1999, 41.303 N / 24.219 E; Drama, Paranesti-Thermia, 350 m, 7 X 1999, 41.3861 N / 24.4737 E; Drama, 1 km S of Skaloti, 954 m, 8 VII 1996, 41.4073 N / 24.2766 E; Halkidiki, Holomontas, Stagira, 539 m, 3 IX 2009, 40.52896 N / 23.74872 E; Halkidiki, Holomontas, Holomontas, Stagira-Neochori rd., 512 m, 3 IX 2009, 40,51666 N / 23.7 E; Kavalas, Kotza Orman forest, 16 m, 13 VIII 1999, 40.8882 N / 24.7786 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E; Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971; Pieria, P. Poroi, 510 m, 17 V 2019, 39.96797 / 22.58846); **Peloponnese** (Borowiec & Salata 2017: 209, Salata & Borowiec 2019 b: 120, Borowiec & Salata 2021 b: 7); **Sterea Ellas** (Finzi 1928: 791 - as *Formica glebaria*, Legakis 1984: 87, 2011: 35); **Thessaly** (Borowiec & Salata 2018: 227, Salata & Borowiec 2019 b: 107, 121; **new data:** Larissa, Kalipefki, 1120 m, 16 V 2019, 39.97026 / 22.45771; Larissa, Mt. Olympus, 3.9 km E of Karya, 790 m, 13 V 2019, 39.99133 / 22.44169; Larissa, Mt. Olympus, 4.6 km E of Karya, 830 m, 13 V 2019, 39.99709 / 22.44375; Larissa, Mt. Olympus, Mt. Olympus, 6.2 km NE of Karya, 935 m, 13 V 2019, 40.00703 / 22.46108; Larissa, Mt. Olympus, Vrisopoules loc. 1, 1550 m, 15 V 2019, 40.03372 / 22.31675; Larissa, Mt. Olympus, Vrisopoules loc. 2, 1430 m, 15 V 2019, 40.02795 / 22.30612; Larissa, Mt. Olympus, Vrisopoules loc. 4, 1315 m, 15 V 2019, 40.02392 / 22.30774); **Thrace** (Bračko et al. 2016: 18).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Channel Is.; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Georgia; Germany; Greece: Aegean Is., Crete, mainland; Hungary; Iran; Italy: mainland, Sardinia, Sicily; Latvia; Lithuania; Luxembourg; Moldova; Montenegro; Morocco; Netherlands; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large with strongly marked size-variation, HL: 1.174-1.680 (mean 1.421); HW: 0.937-1.349 (mean 1.127); SL: 1.222-1.730 (mean 1.449); EL: 0.397-0.495 (mean 0.444); ML: 1.86-2.56; MW: 0.77-1.16. **Color.** Head bicolor, clypeus and genae, yellowish to red, rest of surface brown to black, the pale genae sharply limited from the dark posterior part of head also when the area above the genae is lighter brown colored than frontal and occipital parts of head; this sharp border between the light anterior and dark posterior parts of the head is also visible in the color of the underside of the head; mesosoma variably colored, from uniformly yellowish red or red to mostly brown infuscate, often only upper parts of pronotum and mesonotum with obscure spots of diffused borders, these dark spots can also cover the sides of the mesosoma or almost the entire mesosoma is brown and only the intersegmental sutures are lighter; in rare melanistic forms whole mesosoma and petiolar scale are uniformly brown then head always bicolored with gena distinctly paler than dark frons and occipital part of head brown, gaster from yellowish brown to dark brown with transparent white

posterior margin of tergites, often anterior slope of first tergite paper colored than dorsal surface of the tergite, antennae yellowish, apical 3-6 antennomeres often gradually infuscate; legs variable colored from uniformly yellowish red to mostly brown, coxa often darker than femora and tibiae, or coxa and femora darker than tibiae and tarsi (Figs 75.1-3). **Head.** 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 75.5). Clypeus with median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate or shallowly concave in the middle, whole clypeal surface with moderately long and moderately dense appressed pubescence, a row of 10-12 moderately long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, sometimes with additional very short, 2-3 erected setae, the longest anterior seta with length 0.190. Head distinctly microreticulate, appears dull and opaque, with short and sparse appressed pubescence not covering head surface, interocular are with two pairs and ocellar area with a pair of moderately long, erected yellow setae, sometimes ocellar area with 1-3 additional short erected setae, occasionally frons with only a pair or without setae, ventral side of head lacking erected setae. Scape moderately long, 1.2-1.4 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.5-1.6 times as long as second segment, the second segment approximately twice as long as wide, only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 75.4). Eyes big, elongate oval, approximately 0.31 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.2-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum strongly, regularly convex (Figs 75.2, 3). Whole mesosomal surface covered with moderately long and moderately dense appressed pubescence not covering the mesosomal surface, pronotum sometimes without, usually with 4-10 (at most 15) short erected setae, the longest with length 0.087, mesonotum without or with 1-6 short erected setae, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with moderately long and dense appressed pubescence not completely covering surface of tergites. All tergites close to posterior margin with a row of setae, surface of tergites with short, sparse erected setae. **Legs.** Ventral surface of fore femora with row of 1-5 erected setae, sometimes without setae, of mid femora lacking erected setae or at most with single seta close to trochanter.

Comparative remarks. *Formica cunicularia* belongs to the group of members of the subgenus *Serviformica* with distinctly bicolored head and at least partly yellowish, yellowish red to red mesosoma. *Formica rufibarbis* differs in petiolar scale with several erected setae directed both forward and backward and in usually more numerous erected setae (up to 30 in *F. rufibarbis* and usually below 15 in *F. cunicularia*). However, setation of mesosoma partly overlaps in both species. Melanistic forms of *F. cunicularia* appear similar to brown forms of *F. fusca* or *F. lemani* but differ in head with genae always paler than the rest of head (in both relatives head is uniformly dark colored). *Formica clara* differs in red spot of anterior part of head gradually transitioning into the dark posterior part while in *F. cunicularia* the red spot

of anterior part of head is sharply separated from dark posterior part of head. Also, *Formica clara* usually has more erected setae on mesosoma (up to 20 and usually less than 12 in *F. cunicularia*) but this character broadly overlaps in both species.

Biological notes. Thermophilous species, noted from both deciduous and coniferous forests, gorges with deciduous forests, mountain pastures, roadsides in coniferous forests, rest area in village with stone walls, old quarry close to coniferous forests, beaches with sparse deciduous trees and in salines. Often observed in grasslands, gardens and parks in towns and tourist resorts. Nests in soil or under stones. Most records are from low altitude but on sunny slopes of mountains can reach a height of 1550 m.

76. *Formica fusca* Linnaeus, 1758

(Figs 76.1-8)

Formica fusca Linnaeus, 1758: 580;
Formica libera Scopoli, 1763: 313;
Formica flavipes Geoffroy, 1785: 452;
Formica barbata Razoumowsky, 1789: 225;
Formica tristis Christ, 1791: 513;
Formica fusca var. *alpicola* Gredler, 1858: 10;
Formica fusca var. *marcida* Wheeler, 1913: 398;
Formica tombeuri Bondroit, 1917 b: 187;
Formica fusca var. *pallipes* Kuznetsov-Ugamsky, 1926: 97;
Formica glebaria var. *maura* Santschi, 1929 a: 164;
Formica fusca var. *rufipes* Stitz, 1930: 238;
Formica fusca form. *fuscolemani* Samsinak, 1951: 126;
Formica (*Serviformica*) *fusca* subsp. *hyrcana* Arnoldi, 1968: 1821.

Distribution in Greece: Epirus (Legakis 1983: 5, 2011: 35, Borowiec & Salata 2018 a: 6); **Ionian Islands** (Emery, 1901: 57, Legakis 2011: 35, Borowiec & Salata 2014 a: 515; **new data:** Cephalonia, Ainos Mts. loc. 1, 1598 m, 8 VI 2019, 38.1387 / 20.66157; Cephalonia, Ainos Mts. loc. 3, 1330 m, 8 VI 2019, 38.15258 / 20.63944; Cephalonia, 3.8 km W of Tzanata, 759 m, 14 VI 2021, 38.1355 / 20.70529); **Macedonia** (Legakis 2011: 35, Borowiec & Salata 2012: 493; **new data:** Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Pieria, Mt. Olympus, Litohoro-Prionia rd., 1010 m, 12 V 2019, 40.1078 / 22.46315; Pieria, Mt. Olympus, Prionia-Mt. Olympus trail loc. 1, 1200 m, 12 V 2019, 40.08122 / 22.400123); **Peloponnese** (Legakis 1984: 87, 2011: 35, Borowiec & Salata 2017: 209, Salata & Borowiec 2019 b: 120, Borowiec & Salata 2021 b: 7); **Sterea Ellas** (Borowiec & Salata 2018 e: 7, Salata & Borowiec 2019 b: 106, Borowiec & Salata 2021 b: 7; **new data:** Fokida, Mt Parnassos, ad ski center, 1758 m, 8 VI 2021, 38.55506 / 22.57166); **Thessaly** (Borowiec & Salata 2018 b: 227; **new data:** Larissa, Mt. Olympus, 3.9 km E of Karya, 790 m, 13 V 2019, 39.99133 / 22.44169; Larissa, Mt. Olympus, Vrisopoules loc. 1, 1550 m, 15 V 2019, 40.03372 / 22.31675; Larissa, Mt. Olympus, Vrisopoules loc. 3, 1400 m, 15 V 2019, 40.92936 / 22.30328); **Thrace** (Bračko et al. 2016: 17).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Channel Is.;

Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Ireland; Italy: mainland, Sardinia; Latvia; Lithuania; Luxembourg; Malta; Moldova; Montenegro; Morocco; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large with strongly marked size-variation, HL: 1.079-1.492 (mean 1.262); HW: 0.825-1.190 (mean 0.981); SL: 1.119-1.492 (mean 1.290); EL: 0.362-0.492 (mean 0.417); ML: 1.51-2.10; MW: 0.65-0.92. **Color.** Body usually uniformly dark brown to black, sometimes reddish brown, antennae yellowish brown to brown, in the darkest form coxa, trochanters and femora dark brown to black, tibiae brown, tarsi yellowish brown, in the palest form coxa yellowish brown, trochanters yellowish, femora yellowish brown, tibiae and tarsi yellowish, all intermediate forms occur between the darkest and the lightest forms (Figs 76.1-5). **Head.** 1.3-1.4 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 76.4). Clypeus with median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin shallowly concave in the middle, whole clypeal surface with short and very sparse appressed pubescence, a row of moderately long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, the longest anterior seta with length 0.112. Head distinctly microreticulate, appears dull and opaque, with short and sparse appressed pubescence not covering head surface, interocular and ocellar area with a pair of moderately long, erected yellow setae, ventral side of head lacking erected setae. Scape moderately long, 1.3-1.4 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.6 times as long as second segment, the second segment 1.5 times as long as wide, distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 76.3). Eyes big, elongate oval, approximately 0.33 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.1-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum regularly convex (Fig. 76.2). Whole mesosomal surface covered with short and sparse appressed pubescence not covering the mesosomal surface, pronotum without or with 1-5 very short erected setae, the longest with length 0.032, mesonotum without or with 1-2 short erected setae, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with short and moderate dense appressed pubescence not completely covering surface of tergites and. All tergites close to posterior margin with a row of setae, first tergite lacking erected setae or with not more than 10 very short erected setae, second tergite across the middle with irregular row of erected setae twice shorter than those close to tergal margin, sometimes also with few additional setae close to base or with only 2-4 setae. **Legs.** Ventral surface of fore femora with row of 2-4 erected setae, of mid femora lacking erected setae or at most with two setae close to trochanter.

Gyne as in figs 76.6-8.

Comparative remarks. *Formica fusca* belongs to the species of the subgenus *Serviformica* with body mostly unicolor brown to black. *Formica cinerea* differs in strongly setose body with occipital margin of head with numerous erected setae (no setae in *F. fusca*). *Formica gagates* and *F. picea* distinctly differ in shiny body with reduced and superficial microsculpture (in *F. fusca* body is dull and distinctly microsculptured). *Formica lemani* is the most similar and some its specimens are very difficult to distinguish from *F. fusca*. The best distinguishing character between these two species is the number of erected setae on ventral side of fore and mid femora. In *F. fusca* femora of fore legs have 2-4 erected setae on ventral side, and femora of mid legs usually are lacking erected setae (occasionally with 1-2 hairs at base of ventral surface). While in *F. lemani* fore femora have usually 3-12 and mid femora 3-7 erected setae. Also, in F. *fusca* pronotum has up to 5 short erected setae while *F. lemani* usually has 5-20 erected setae.

Biological notes. Prefers shady mountain habitats. Most records are from coniferous forests and mountain pastures, but noted also from mixed forests, mountain deciduous forests, luminous oak forests, pine forests with mediterranean shrubs and stream valleys in deciduous forest. Nests in soil or under stones, occasionally in dead wood. All records are from mid and high altitude between 600 and 2200 m.

77. *Formica gagates* Latreille, 1798

(Figs 77.1-4)

Formica gagates Latreille, 1798: 36;
Formica morio Latreille, 1798: 36;
Formica capsincola Schilling, 1839: 54;
Formica fusca var. *fuscogagates* Forel, 1874: 54;
Formica fusca r. *gagates* var. *cinereofuscoides* Forel, 1892 b: 307 unavailable name;
Formica fusca subsp. *gagates* var. *muralewiczi* Ruzsky, 1905: 384 unavailable name;
Formica fusca subsp. *gagates* var. *transcaucasicogagates* Ruzsky, 1905: 379 unavailable name.

Distribution in Greece: Epirus (Legakis 1983: 5, 2011: 35, Borowiec & Salata 2018 a: 6; **new data:** Thesprotia, Ag. Kyriaki vic., 870 m, 20 VI 2007, 39.48867 / 20.53374); **Ionian Islands** (Borowiec & Salata 2013: 352, Salata & Borowiec 2017: 298, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 7); **Macedonia** (Legakis 2011: 35, Borowiec & Salata 2012: 493, Salata & Borowiec 2019 b: 104, 2022: 7; **new data:** Drama, Livadero-Drama, 900 m, 9 X 1999, 41.303 N / 24.219 E); **Peloponnese** (Borowiec & Salata 2017: 209, Borowiec & Salata 2021 b: 8); **Sterea Ellas** (Legakis 2011: 35, Borowiec & Salata 2018 e: 7, Borowiec & Salata 2021 b: 8); **Thessaly** (Borowiec & Salata 2012: 493, Borowiec & Salata 2018 b: 227, Salata & Borowiec 2019 b: 107; **new data:** Larissa, Mt. Olympus, Vrisopoules loc. 4, 1315 m, 15 V 2019, 40.02392 / 22.30774); **Thrace** (Bračko et al. 2016: 18).

Distribution in Europe and Mediterranean Basin: Albania; Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; France: mainland; Germany; Greece; Hungary; Italy: mainland; Moldova; Montenegro; North Macedonia; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Switzerland; Turkey; Ukraine.

Description. Large with strongly marked size-variation, HL: 1.048-1.840 (mean 1.512); HW: 0.873-1.640 (mean 1.316); SL: 1.150-1.820 (mean 1.560); EL: 0.302-0.511 (mean 0.417); ML: 1.52-2.54; MW: 0.68-1.14. **Color.** Body usually uniformly dark brown to black, antennae yellowish to yellowish brown, in the darkest form coxa, trochanters and femora dark brown, tibiae brown, tarsi yellowish brown, in the palest form coxa yellowish brown, trochanters yellowish, femora yellowish brown, tibiae and tarsi yellowish, all intermediate forms occur between the darkest and the lightest forms (Figs 77.1-4). **Head.** 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 77.4). Clypeus with median keel, on the whole surface microsculptured but shiny, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin shallowly concave in the middle, whole clypeal surface with short and very sparse appressed pubescence, a row of moderately long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, the longest anterior seta with length 0.238. Head distinctly sculptured but shiny, with short and sparse appressed pubescence not covering head surface, interocular area with one to two pairs of long erected setae and ocellar usually with one pair of long, erected yellow setae, in large workers sometimes with additional 1-2 setae, ventral side of head lacking erected setae only in the largest workers sometimes with single seta on each side of gular area. Scape moderately long, 1.1-1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.6-1.7 times as long as second segment, the second segment 1.7 times as long as wide, distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 77.3). Eyes big, elongate oval, approximately 0.28 length of head. **Mesosoma.** Elongate in dorsal view distinctly constricted in the middle, 2.2-2.3 times as long as wide, dorsally and laterally with superficial microreticulation, surface shiny, sculpture on sides of pronotum often tends to form relatively regular striation. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum regularly convex (Fig. 77.2). Whole mesosomal surface covered with short and sparse appressed pubescence not covering the mesosomal surface, setation of pronotum variable, without or up to 20 short erected setae, the longest with length 0.095, setae if present then directed mostly upward, mesonotum without or with 1-6 very short erected setae in posterior half, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate but appears indistinctly shiny, covered with short and moderate dense appressed pubescence not completely covering surface of tergites distance between hairs smaller than half length of hair. All tergites close to posterior margin with a row of setae and whore surface of tergites with sparse and long erected setae. **Legs.** Ventral surface of fore femora without or 1-6 erected setae, of mid femora lacking erected setae or at most two setae close to trochanter.

Gyne not studied.

Comparative remarks. *Formica gagates* belongs to the species of the subgenus *Serviformica* with body mostly uniformly brown to black. *Formica cinerea* differs in strongly setose body with occipital margin of head with numerous erected setae (no setae in *F. gagates*). *Formica fusca* and *F. lemani* well differ in strongly microsculptured and dull body while in *F. gagates* body is shiny with superficial microsculpture. The most similar species - *F. picea*

differs in pubescence characteristics of gastral tergites. In *F. picea*, the distance between hairs is subequal to longer than length of hairs while in *F. gagates* appressed pubescence on gaster is dense and distance between hairs is smaller than half length of hairs.

Biological notes. Thermophilous species noted from luminous deciduous and coniferous forests, roadsides with shrubs, olive plantations, stream valleys with plane trees, pastures with sparse deciduous trees and shrubs around the old monastery. Nests in soil and under stones. Absent in high mountains, all collecting sites come from low and mid altitude of up to 1165 m.

78. *Formica lemani* Bondroit, 1917

(Figs 78.1-7)

Formica lemani Bondroit, 1917 a: 186;
Formica fusca subsp. *borealis* Vashkevich, 1924: 147;
Formica fusca r. *lemani* var. *sulci* Samsinak, 1951: 126.

Distribution in Greece: Macedonia (Legakis 2011: 35).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Finland; France: Corsica; Georgia; Germany; Greece; Hungary; Ireland; Italy: mainland; Montenegro; North Ireland; ?North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large with strongly marked size-variation, HL: 1.071-1.587 (mean 1.327); HW: 0.817-1.333 (mean 1.085); SL: 1.024-1.476 (mean 1.254); EL: 0.341-0.492 (mean 0.415); ML: 1.52-2.28; MW: 0.64-1,03. **Color.** Body usually uniformly dark brown to black, antennae in the palest form yellowish indistinctly infuscated apical funicular segments, in the darkest form with yellowish brown scapus and dark brown funicle; coxa and trochanters from yellowish brown to dark brown, femora, tibiae and tarsi in the palest form mostly yellowish, in the darkest form femora dark brown, tibiae yellowish brown, tarsi yellowish, all intermediate forms occur between the darkest and the lightest forms (Figs 78.1-4). **Head.** 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 78.4). Clypeus with median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin shallowly concave in the middle, whole clypeal surface with short and very sparse appressed pubescence, a row of long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, the longest anterior seta with length 0.119. Head distinctly microreticulate, appears dull and opaque, with short and sparse appressed pubescence not covering head surface, interocular and ocellar area with a pair of moderately long, erected yellow setae, sometimes ocellar area with two pairs of setae, ventral side of head lacking erected setae. Scape moderately long, 1.0-1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.6 times as long as second segment, the second segment 1.5 times as long as wide, distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 78.3). Eyes big, elongate oval, approximately 0.313 length of head. **Mesosoma.**

Elongate, in dorsal view distinctly constricted in the middle, 2.2-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum regularly convex (Fig. 78.2). Whole mesosomal surface covered with short and sparse appressed pubescence not covering the mesosomal surface, pronotum usually with 4-16 very short erected setae, occasionally with less than 4 setae, the longest with length 0.036, mesonotum with 2-6 short erected setae, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded without setae. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with short and moderate dense appressed pubescence not completely covering surface of tergites and. All tergites close to posterior margin with a row of setae, first tergite lacking erected setae or with not more than 10 very short erected setae, second tergite across the middle with irregular row of erected setae twice shorter than those close to tergal margin, usually also with few additional setae close to base and behind median row. **Legs.** Ventral surface of fore femora with row of 3-12 erected setae, of mid femora with 3-7 erected setae.

Gyne as in Figs 78.5-7.

Comparative remarks. *Formica lemani* belongs to the species of the subgenus *Serviformica* with body mostly unicolor brown to black. *Formica cinerea* differs in strongly setose body with occipital margin of head with numerous erected setae (no setae in *F. lemani*). *Formica gagates* and *F. picea* distinctly differ in shiny body with reduced and superficial microsculpture (in *F. lemani* body is dull and distinctly microsculptured). *Formica fusca* is the most similar and some specimens of *F. lemani* with reduced setation are very difficult to distinguish from *F. fusca*. The best distinguishing character between these two species is the number of erected setae on ventral side of fore and mid femora.In in *F. lemani* fore femora have usually 3-12 and mid femora 3-7 erected setae. While *F. fusca* femora of fore legs have 2-4 erected setae on ventral side, and femora of mid legs usually are lacking erected setae (occasionally with 1-2 hairs at base of ventral surface). Also, in F. *fusca* pronotum has up to 5 short erected setae while *F. lemani* usually has 5-20 erected setae.

Biological notes. No confirmed or recent data from Greece. Mountain species, preferring open grassland, pastures, montane heathland, bogs, clearcuttings of montane and boreal pastures. Nests in the soil, under stones, in grass tussocks, moss and tree stumps under loose bark.

79. *Formica picea* Nylander, 1846

(Figs 79.1-4)

Formica picea Nylander, 1846 a: 917;
Formica glabra White, 1884: 253;
Formica transkaucasica Nasonov, 1889: 21.

Distribution in Greece: Macedonia (Legakis 2011: 36).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Italy: mainland; Latvia; Lithuania; Luxembourg; Netherlands; Norway; Poland; Romania; Russia; Serbia; Spain: mainland; Sweden; Switzerland; Ukraine.

Description. Large with strongly marked size-variation, HL: 1.040-1.302 (mean 1.207); HW: 0.857-1.111 (mean 1.021); SL: 1.003-1.262 (mean 1.187); EL: 0.333-0.413 (mean 0.386); ML: 1.50-1.94; MW: 0.65-0.87. **Color.** Body usually uniformly dark brown to black, antennae yellowish to yellowish brown, funicular segments usually gradually infuscate from basal to apical antennomeres, coxa, trochanters and femora dark brown, tibiae brown, tarsi yellowish brown, in the darkest form femora predominantly blakc (Figs 79.1-4). **Head.** 1.1-1.2 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 79.4). Clypeus with median keel, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin shallowly concave in the middle, on the whole surface microsculptured but shiny, sculpture often tend to form longitudinal striation, whole clypeal surface with short and sparse appressed pubescence, appears unpubescent, with a row of moderately long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, the longest anterior seta with length 0.143. Head distinctly sculptured but shiny, with short and sparse appressed pubescence not covering head surface, distance between hairs mostly larger than length of the hair, interocular area with two pairs of long erected setae and ocellar usually with one pair of long, erected yellow setae, in large workers sometimes with additional 1-2 setae in occipital area, ventral side of head lacking erected setae only in the largest workers sometimes with single seta on each side of gular area. Scape moderately long, 1.1-1.2 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.7 times as long as second segment, the second segment 1.5-1.6 times as long as wide, approximately as long as third segment, the rest of funicular segments clearly longer than broad (Fig. 79.3). Eyes big, elongate oval, approximately 0.32 length of head. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.2-2.3 times as long as wide, dorsally and laterally with superficial microreticulation, surface shiny, sculpture on sides of pronotum often tends to form relatively regular striation. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum regularly convex (Fig. 79.2). Whole mesosomal surface covered with short and sparse appressed pubescence not covering the mesosomal surface, pronotum with 6-18 short erected setae, most directed somewhat forward, the longest with length 0.143, mesonotum without or with 0-4 very short erected setae in anterior half and 0-4 setae in posterior half, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded without setae or at most with 1-2 very short setae. Gaster shorter than mesosoma, all tergites indistinctly microreticulated, often tends to form transverse striation, appears indistinctly shiny, covered with short and sparse appressed pubescence not covering surface of tergites, distance between hairs mostly longer than length of hair. All tergites close to posterior margin with a row of setae and whore surface of tergites with sparse and long erected setae. **Legs.** Ventral surface of fore femora without or 1-6 erected setae, of mid femora lacking erected setae or at most two setae close to trochanter.

Comparative remarks. *Formica picea* belongs to the species of the subgenus *Serviformica* with body mostly uniformly brown to black. *Formica cinerea* differs in strongly setose body with occipital margin of head with numerous erected setae (no setae in *F. picea*). *Formica fusca* and *F. lemani* well differ in strongly microsculptured and dull body while in

F. picea body is shiny with superficial microsculpture. The most similar is *F. gagates* but it differs from *F. picea* in pubescence characteristics of gastral tergites. In *F. gagates*. the distance between hairs is smaller than half length of hairs while in *F. picea* the pubescence is scarce and distance between hairs is subequal to longer than length of hairs.

Biological notes. No recent and confirmed data from Greece. Mountain species, more hygrophilous of all European *Formica* species.

80. *Formica rufibarbis* Fabricius, 1793

(Figs 80.1-7)

Formica rufibarbis Fabricius, 1793: 355;
Formica nicaeensis Leach, 1825: 291;
Formica stenoptera Förster, 1850 a: 26;
Formica fusca var. *cinereorufibarbis* Forel, 1874: 55;
Formica fusca subsp. *rufibarbis* var. *cinereoides* Forel, 1874: 312;
Formica defensor Smith, 1878: 11;
Formica rufibarbis var. *subpilosorufibarbis* Ruzsky, 1905: 398;
Formica rufibarbis var. *clarorufibarbis* Wheeler & Mann, 1916: 173;
Formica rufibarbis var. *piligera* Lomnicki, 1925 a: 175.

Distribution in Greece: Cyclades (Forel 1889: 256, Legakis 2011: 36); **Epirus** (Legakis 1983: 5, 2011: 36); **Macedonia** (Legakis 2011: 36, Borowiec & Salata 2012: 496; **new data:** Drama, Kara Ntere, 5 km S of Elatia, 974 m, 9 VII 1996, 41.4166 N / 24.2835; Drama, Livadero-Drama, 900 m, 9 X 1999, 41.303 N / 24.219 E; Drama, Partheno Dasos, 995 m, 7 X 1999, 41.5056 N / 24.4288 E; Halkidiki, Kassandra, Elani, 281 m, 28 VIII 2009, 40.05 N / 23.35 E); **Peloponnese** (Legakis 2011: 36), **Sterea Ellas** (Forel 1889: 256, Legakis 2011: 36; **new data:** Fokida, Mt Parnassos, ad ski center, 1758 m, 8 VI 2021, 38.55506 / 22.57166); **Thessaly** (Legakis 1984: 87, 2011: 36, Borowiec & Salata 2012: 496, Borowiec & Salata 2018: 227); **Thrace** (Bračko et al. 2016: 19).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica; Georgia; Germany; Greece; Hungary; Iran; Italy: mainland, Sardinia; Latvia; Lebanon; Lithuania; Luxembourg; Moldova; Montenegro; Morocco; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large with strongly marked size-variation, HL: 1.365-1.850 (mean 1.550); HW: 1.095-1.587 (mean 1.262); SL: 1.397-1.720 (mean 1.545); EL: 0.429-0.537 (mean 0.485); ML: 2.00-2.76; MW: 0.95-1.21. **Color.** Head bicolor, clypeus, genae, sides behind eyes and ventral side yellowish red, rest of surface brown to black, yellowish red of anterior part of head gradually turn into the dark posterior part of head without sharp border between pale and dark parts; mesosoma usually uniformly yellowish red to red, sometimes promesonotum at top with obscure spot with diffused borders, occasionally mesosoma mostly brown with reddish sutural parts but never completely brown, petiolar scale usually yellowish red to red, only occasionally in the darkest forms partly brown, gaster brown to dark brown with transparent white posterior margin of tergites, antennae yellowish,

sometimes apical 4-6 antennomeres gradually infuscate, legs often uniformly reddish, or coxa yellowish to yellowish brown, femora from uniformly yellowish or yellowish red to reddish brown, tibiae and tarsi yellow or in melanistic forms reddish brown to brown (Figs 80.1-4). **Head.** 1.2-1.3 times longer than wide, in front of eyes softly converging anterad, behind eyes softly rounded, occipital margin straight to slightly convex (Fig. 80.4). Clypeus with median keel, on the whole surface distinctly microsculptured, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate or shallowly concave in the middle, whole clypeal surface with moderately long and moderately dense appressed pubescence, a row of 10-12 moderately long setae close at the anterior margin and usually 8 long erected setae arranged in three rows 4-2-2, sometimes with additional very short, 2-5 erected setae, the longest anterior seta with length 0.191. Head distinctly microreticulate, appears dull and opaque, with short and moderately dense appressed pubescence not covering head surface, interocular are with two pairs and ocellar area usually with a pair of moderately long, erected yellow setae, sometimes frontal and ocellar area with 1-3 additional short erected setae, occasionally frons without setae, ventral side of head lacking erected setae. Scape moderately long, 1.1-1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from base to apex, its surface microreticulate, with short and dense appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 1.4-1.5 times as long as second segment, the second segment approximately twice as long as wide, only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 80.3). Eyes big, elongate oval, approximately 0.31 length of head. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.1-2.4 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull and opaque. In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum strongly, regularly convex (Fig. 80.2). Whole mesosomal surface covered with moderately long and moderately dense appressed pubescence not covering the mesosomal surface, pronotum always with erected setae, usually 15-35, the longest with length 0.103, mesonotum with 10-30 short erected setae, propodeum lacking erected setae. **Waist and gaster.** Petiolar scale broad, moderately thick in lateral view, apex rounded with several erected setae directed both forward and backward. Gaster shorter than mesosoma, all tergites distinctly microreticulate, appears dull and opaque, covered with moderately long and dense appressed pubescence almost completely covering surface of tergites. All tergites close to posterior margin with a row of setae, surface of tergites with short to moderately long, sparse erected setae. **Legs.** Ventral surface of fore femora with row of 4-7 erected setae, of mid femora lacking erected setae or at most with two setae close to trochanter.

Gyne as in Figs 80.5-7.

Comparative remarks. *Formica rufibarbis* belongs to the group of members of the subgenus *Serviformica* with distinctly bicolored head and at least partly yellowish, yellowish red to red mesosoma. *Formica rufibarbis* differs from both relatives in petiolar scale with several erected setae directed both forward and backward. While in *F. clara* and *F. cunicularia* upper margin of petiolar scale is always without setae or with few setae directed upward. Also, *F. rufibarbis* is more setose with up to 30 erected setae on mesosoma (usually below 15 in *F. cunicularia* and below 20 in *F. clara*) but setation of mesosoma partly overlaps in all three species.

Biological notes. Thermophilous species, noted from mountain deciduous forests, mountain pastures with limestone rocks, only one record from coniferous forests, reported also from summer resort in a pine forest. Nests in soil or under stones. Most records are from low and mid altitude but on sunny slopes of mountains the species can reach a height of 1642 m.

Genus *Lasius* Fabricius, 1804

Useful identification keys, revisions and taxonomic papers: Seifert 1988, 1992, 2020.

Diagnosis. Body not linear from small to moderately large, not polymorphic; clypeus broad with convex anterior margin, not armed with teeth; antennae 12-segmented, moderately elongate without club; antennal scape slightly shorter to slightly longer than width of head; antennal insertions close to posterior margin of clypeus; mandibles moderately elongate, masticatory margin with spiniform denticles of unequal size; palp formula 6,4; eyes large; promesonotal suture present, shallow; propodeum unarmed but often convex; waist of one segment in form of thin scale; first gastral segment not separated from subsequent segments by a deep suture; mid and hind tibiae each with one spur.

In Greece 32 species divided into five subgenera.

Taxonomical note. Recently Boudinot et al. (2021), based on molecural data, described *Metalasius* – a new ant genus that consists of one extant species *Metalasius myrmidon* and one fossil species †*M. pumilus*. *Metalasius myrmidon* is known only from Greece and was originally described as *Lasius myrmidon.* As the revision of *Lasius* was published recently we couldn't implement proposed changes in our monograph. *Metalasius* differs from *Lasius* in eyes situated in anterior half of head as measured in full-face view (eyes situated in posterior half of head in *Lasius*), reduced metapleural gland orifice with opening directed posteriorly (metapleural gland orifice small to very large and opening laterally as well as posteriorly in *Lasius*), propodeal spiracle situated in lower half of propodeum in profile view (propodeal spiracle situated at or above midheight of propodeum in *Lasius*), antennomere III broader than long (usually longer than broad in *Lasius*), and hypostoma lacking carina along lateral margin (carina present in *Lasius*).

A key to subgenera of the genus *Lasius* and the genus *Metalasius*

1. Small, CW 0.60-1.28 mm. Body never shinning black, from yellow to brownish black or bicoloured (Figs 83.2, 85.2, 90.2, 93.2, 96.2, 98.2, 100.2, 105.2). Head with convex, straight or very shallowly excavated posterior margin (Figs 82.4, 84.4, 85.4, 86.4, 97.4, 99.4) ..... 2.

—. Large, CW 1.25-1.55 mm. Body shinning black (Figs 11.1, 2). Head with distinctly excavated posterior margin (Fig. 111.4) ..... ***Dendrolasius* Ruzsky**, p. 224

2. Maxillary palps short, not reaching beyond midpoint between mouth and occipital foramen. Workers yellow of various tint ..... 3.

—. Maxillary palps elongate, distinctly reaching beyond midpoint between mouth and occipital foramen. Workers brownish to greyish-black, sometimes bicolored, never pure yellow ..... ***Lasius* s. str.**, p 184

3. Petiolar scale thin, with tapered crest. Queens large, body length never below 6 mm .... 4.

—. Petiolar scale thick, with rounded crest. Queens small, body length not more 4 mm .... ***Austrolasius*** **Faber**, p. 207

4. Workers polymorphic. Ventral side of head lacking erected setae .... ***Cautolasius*** **Wilson and** ***Metalasius*** **Boudinot, Borowiec & Prebus**, p. 209

—. Workers monomorphic. Ventral side of head with numerous erected setae .... ***Chthonolasius*** **Ruzsky**, p. 213

Subgenus *Lasius* s. str.

A key to species of the subgenus *Lasius* s. str.

Note: Due to the presence of many cryptic taxa, species of the subgenus *Lasius* s. str. are very difficult in identification. For correct identification, it is sometimes necessary to make a series of morphometric measurements, remove of allometric variance, and use statistical testing. The following identification key is therefore indicative only, and in doubtful cases, the reader should use the comments contained in Seifert's (2020) paper.

1. Pubescence on the whole body and appendages very smooth, appressed and short, all body surface completely smooth (Figs 83.1, 89.1). Dorsal plane of scape, tibiae and genae lacking erected setae, number of mandibular dents only 6–8 ..... 2.

—. Pubescence on the whole body and appendages moderate to dense, not very short, all body surface pubescent. Dorsal plane of scape, tibiae and genae with or lacking erected setae, number of mandibular dents usually above 8 ..... 3.

2. Scape shorter, SL/HL < 0.890. Larger and stouter, HL 0.9312 ± 0.111, head from slightly wider than long to slightly longer than wide HL/HW 1.0353 ± 0.0292. Body often distinctly bicoloured with mesosoma lighter than head and gaster. First gastral tergite in central part without or with few erected setae ..... ***L. brunneus*** **(Latreille)**, p. 190

—. Scape longer, SL/HL > 0.890. Smaller and slimmer, HL 0.8411± 0.426, head always longer than wide HL/HW 1.0688 ± 0.0147. Body usually unicolor with mesosoma the same color as head and gaster. First gastral tergite in central part with several erected setae ..... ***L. lasioides*** **(Emery)**, p. 198

3. Larger, HL > 0.75, mesonotal groove deep (Figs 90.2, 92.2, 95.2) …….....….. 4.

—. All workers in a nest very small, HL 0.66–0.75 mm, metanotal groove very shallow (Fig. 94.2). Pubescence on head sides ventral of the eye reduced. Endemic to Crete .... ***L. tapinomoides*** **Salata & Borowiec**, p. 204

4. Antennal scapi and hind tibiae with numerous erected setae ..... 5.

—. Antennal scapi and hind tibiae lacking erected setae or only hind tibiae with few erected setae ..... 8.

5. Pubescence of clypeus sparse, surface of the clypeus well visible (Fig. 92.4). Erected setae on mesosoma relatively long (Fig. 92.2). Body often bicoloured ..... 6.

—. Pubescence of clypeus dense, covers a large part of the surface of the clypeus (Fig. 90.4). Erected setae on mesosoma relatively short (Fig. 90.2). Body always uniformly brown to black ……..…….. ***L. niger*** **Linnaeus**, p. 200

6. Head and scape long (HL/HW 1.082-1.085, SL/CS 1.067-1.073). Body often bicolored but also uniformly brown to black. In Greece, widespread ..... 7.

—. Head and scape short (HL/HW 1.051, SL/CS 0.981). Body always uniformly brown to black. In Greece, rare, only in northern provinces ……. ***L. platythorax*** **Seifert**, p. 202

7. Scape in frontal view on dorsal apical 1/3 length has 2-3 erected setae (Fig. 86.4), anterior surface of the scape in dorsal view with up to 4 erected setae (occasionally up to 11 in large specimens) (Fig. 86.5) Setation on external edge of hind tibia sparser, with 6-18 erected setae (mean 13 ± 3) ..... ***L. illyricus*** **Zimmermann**, p. 194 (part)

—. Scape in frontal view on dorsal apical 1/3 length has more than three erected setae (Fig. 85.7), anterior surface of the scape in dorsal view always with numerous erected setae, usually 15-20 (up to 34 in large specimens) (Fig. 85.8). Setation on external edge of hind tibia denser, with 13-27 erected setae (mean 20.8 ± 3.9) .... ***L. emarginatus*** **(Olivier)**, p. 192

8. Scape shorter, SL/HL < 0.975 ..... 10.

—. Scape longer, SL/HL > 0.975 ..... 9.

9. Pubescence of clypeus dense, clypeal carina clearly developed (Fig. 87.3). Body brown, mesosoma slightly lighter than head and gaster, reddish brown. Known only from Pindos Mts ..... ***L. karpinisi*** **Seifert**, p. 196

—. Pubescence of clypeus sparse (Fig. 86.7). Body bicolored or almost completely dark brown. Wide spread in continental Greece, Ionian islands and Crete ....***L. illyricus*** **Zimmermann** (part) p. 194

10. Pubescence of clypeus dense, covers a large part of the surface of the clypeus (Figs 82.4, 88.4, 91.4) ..... 10.

—. Pubescence of clypeus sparse, surface of the clypeus well visible (Figs 81.4, 84.4, 93.4, 95.4) ..... 12.

10. Species outside of Crete. Maxillary palps short to moderately elongate with length of sixth segment 0.102-0.176 ..... 11.

—. Species endemic to Crete. Maxillary palps elongate with length of sixth segment 0.176-0.202 (mean 0.190) ..... ***L. kritikos*** **Seifert**, p. 197

11. Terminal (6th) segment of maxillary palps longer (0.142-0.176, mean 0.160) and longest hair on pronotum shorter (length of the longest seta 0.075-0.134, mean 0.109). Very rare in Greece, only in north-western provinces ..... ***L. paralienus*** **Seifert**, p. 201

–. Terminal (6th) segment of maxillary palps shorter (0.102-0.151, mean 0.151) and longest hair on pronotum longer (length of the longest setae 0.108-0.185, mean 0.145). Wide spread in Greece, except Crete, Cyclades and Dodecanese ..... ***L. bombycina* Seifert & Galkowski**, p. 188

12. Area between propodeal spiracle and metapleural gland with 2-6 erected setae. Occipital margin of head usually with more than 15 erected setae ..... 13.

–. Area between propodeal spiracle and metapleural gland lacking erected setae or at most with a single seta. Occipital margin of head with less than 15 (usually 8-12) standing setae. Pronotal setae rather long PnHL/CS 0.152 ± 0.007. Clypeal pubescence moderately dense (Fig. 81.4). Propodeum high and angular in profile (Fig. 81.2) ..... ***L. alienus* (Förster)**, p. 186

13. Mean number of mandibular dents > 8. External margin of hind tibiae usually with 1-4 erected setae. Pubescence distance on clypeus moderately large (Figs 84.4, 93.4). Propodeum high (Figs 84.2, 93.2) ..... 14.

–. Mean number of mandibular dents < 8. Setae on hind tibiae usually absent. Pubescence distance on clypeus very large (Figs 95.4, 95.8). Pronotal setae short, barely longer than gular setae, PnHL/CS 0.127 ±0.007. Propodeum low (Fig. 95.2) ..... ***L. turcicus* complex**, p. 205

14. Short setae on hind margin of head and gula ($GuHL/CS_{900}$ 0.097). Continental Greece, dominant ant species on mountain pastures at altitude between 1000 to 1720 m ..... ***L. psammophilus* Seifert**, p. 203

–. Long setae on hind margin of head and gula ($GuHL/CS_{900}$ 0.125). Crete and Dodecanese, thermophilous species of low and mid habitats from sea level to 1000 m ..... ***L. creticus* Seifert**, p. 191

Review of species

81. *Lasius alienus* (Förster, 1850)

(Figs 81.1-4)

Formica aliena Förster, 1850 a: 36;
Lasius niger r. *alienus* var. *brunneoalienus* Kulmatyck,i 1922: 81 unavailable name;
Acanthomyops niger subsp. *alienus* var. *flavidus* Kuznetsov-Ugamsky, 1927 b: 189 unavailable name;
Acanthomyops niger subsp. *alienus* var. *pilicornis* Kuznetsov-Ugamsky, 1927 b: 189 unavailable name;
Acanthomyops niger subsp. *alienus* var. *turkmenus* Kuznetsov-Ugamsky, 1927 b: 189 unavailable name;
Lasius alienus var. *pannonica* Röszler, 1942 a: 40.

Distribution in Greece: Aegean Islands (Forel 1889: 256 - as *Lasius niger* r. *alienus*, Legakis 2011: 26, Salata & Borowiec 2017: 296, Borowiec & Salata 2018 c: 6; **new data:**

Lesbos, Argennos, 548 m, 12 VI 2015, 39.35494 N / 26.2661 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, Mt. Olympos, 814 m, 10 VI 2015, 39,06958 N / 26.34976 E; Lesbos, Piges Pesa, 113 m, 10 VI 2015, 39.12736 N / 26.26342 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E); Cyclades (Forel 1889: 256 - as *Lasius niger* r. *alienus*, Legakis 2011: 26); **Dodecanese** (Forel 1889: 256 - as *Lasius niger* r. *alienus*, Legakis 2011: 26, Borowiec et al. 2021: 18); **Epirus** (Legakis 2011: 26, Borowiec & Salata 2018 a: 6, Seifert 2020 a: supplementary material; Zagori, Pindus Mts., 4 V 2017); **Ionian Islands** (Borowiec & Salata 2018 d: 6, Salata & Borowiec 2019 b: 113, 114, Borowiec & Salata 2021 a: 8); **Macedonia** (Legakis 2011: 26, Borowiec & Salata 2012: 498, Seifert 2020 a: supplementary material; **new data:** Drama, Elatia Forest, 1590 m, 10 VIII 1999, 7 X 1999, 41.4926 N / 24.3165 E; Drama, Lepida-Megalo Livadi, 1240 m, 8 X 1999, 41.3786 N / 24.6356 E; Drama, Livadero-Drama, 900 m, 9 X 1999, 41.303 N / 24.219 E; Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Drama, Partheno Dasos, 995 m, 7 X 1999, 41.5056 N / 24.4288 E; Drama, Prasinada, 700 m, 10 VIII 1999, 41.3694 N / 24.5489 E; Halkidiki, Holomontas, n. Taxiarhis, 594 m, 30 VIII 2009, 40.4 N / 23.51666 E; Halkidiki, Kassandra, Loutra, 10 m, 26 VIII 2009, 39.91666 N / 23.58333 E; Pieria, Mt. Olympus, Litohoro-Prionia rd., 1010 m, 12 V 2019, 40.1078 / 22.46315; Pieria, Mt. Olympus, Prionia loc. 1, 1065 m, 12 V 2019, 40.08523 / 22.40733; Pieria, Mt. Olympus, Prionia-Mt. Olympus trail loc. 1, 1200 m, 12 V 2019, 40.08122 / 22.400123); **Peloponnese** (Forel 1886: clxvii, Legakis 2011: 26, Borowiec & Salata 2017: 209, Seifert 2020 a: supplementary material, Borowiec & Salata 2021 b: 8); **Sterea Ellas** (Forel 1886: clxvii, Forel 1889: 256 - as *Lasius niger* r. *alienus*, Legakis 1984: 87, 2011: 26, Borowiec & Salata 2018 e: 7, Borowiec & Salata 2021 b: 8; **new data:** Fokida, Mt Parnassos, ad ski center, 1758 m, 8 VI 2021, 38.55506 / 22.57166); **Thessaly** (Legakis 2011: 26, Borowiec & Salata 2012: 498, Borowiec & Salata 2018 b: 227, Salata & Borowiec 2019 b: 107, 121, Seifert 2020 a: supplementary material; **new data:** Larissa, Mt. Olympus, 4.6 km E of Karya, 830 m, 13 V 2019, 39.99709 / 22.44375; Larissa, Mt. Olympus, Vrisopoules loc. 3, 1400 m, 15 V 2019, 40.92936 / 22.30328; Larissa, Mt. Olympus, Vrisopoules loc. 4, 1315 m, 15 V 2019, 40.02392 / 22.30774); **Thrace** (Bračko et al. 2016: 19).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Iran; Ireland; ?Israel; Italy: mainland; Latvia; Lithuania; Luxembourg; North Macedonia; Moldova; Montenegro; Netherlands; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Small to moderately large, HL 0.742-1.035 (mean 0.836), HW 0.663-0.977 (mean 0.807), ML 0.80-1.06. Scape moderately elongate, SL 0.684-0.926 (mean 0.788). **Color.** Body unicolor with head, mesosoma, coxae and gaster medium brown. Antennae, tibiae and tarsi light yellowish brown, mandibles light reddish brown (Figs 81.1-4). Sometimes whole body and appendages are yellowish brown. **Structure and setation.** Head oval, always longer than wide, lateral surfaces above eyes convex, occipital margin of head straight to slightly concave (Fig. 81.4). Occipital part of head with less than 15 (usually 8-12) erected setae, ventral part of head lacking erected setae, mesosomal dorsum with numerous, long erected setae. Below propodeal spiracle usually no erected setae or at most single short

seta. Mandibles usually with 8 dents. Antennal scapi with smooth pubescence lacking erected setae, at most with few semierect hair, hind tibiae lacking erected setae or at most with 1-2, occasionally 3-4, short setae in basal part. Ventral surface of fore femora with 4-6 and mid femora 2-4 erected setae, of hind femora without or 1-2 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body with rather dense, appressed pubescence, surface with weak microreticulation, appears rather shining. Pubescence of clypeus dense, not as dense as in *L. paralienus* or *L. bombycina* but denser than in *L. psammophilus* or *L. creticus* (Fig. 81.4). First gastral tergite on the whole surface with numerous erected setae. Propodeum in lateral view with straight anterior and posterior surface, conical and equal in height or slightly higher to mesonotum, metanotal groove deep (Fig. 81.2).

Comparative remarks. *Lasius alienus* differs from all similar Greek species in reduced pilosity of scape and tibiae, strongly reduced number of erected setae below propodeal spiracle and less numerous setae on occipital part of head. Its specimens with 2-4 erected setae on hind tibia are similar to *L. psammophilus* or *L. creticus* but differs in denser clypeal pubescence and less numerous erected setae on occipital part of head.

Biological notes. In Greece, common species, inhabits a wide variety of habitats from sea level to 1590 m a.s.l. Observed in open areas inside tourist resorts, urban ruderal areas, on roadsides with bushes, on pastures, olive plantations, all types of forests, on higher altitudes in coniferous forests and on pastures with shrubs. Nests were observed under stones or on sandy roadsides.

82. *Lasius bombycina* Seifert & Galkowski, 2016

(Figs 82.1-4)

Lasius (*Lasius*) *bombycina* Seifert & Galkowski, 2016: 45.

Distribution in Greece: Aegean Islands (Legakis 2011: 27 - as *Lasius paralienus*); Dodecanese (Salata & Borowiec 2017: 297, 304 - as *Lasius paralienus*); **Epirus** (Borowiec & Salata 2018 a: 6); **Ionian Islands** (Borowiec & Salata 2013: 357 - as *Lasius paralienus*, Salata & Borowiec 2017: 297, 304 - as *Lasius paralienus*, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 8; **Macedonia** (Borowiec & Salata 2012: 504 - as *Lasius paralienus*, Borowiec & Salata 2022: 7; **new data:** Drama, Paranesti-Thermia, 350 m, 7 X 1999, 41.3861 N / 24.4737 E; Halkidiki, Kassandra, Loutra, 22 m, 31 VIII 2009, 39.91666 N / 23.58333 E; Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971); **Peloponnese** (Borowiec & Salata 2013: 357 - as *Lasius paralienus*, Borowiec & Salata 2017: 210, Salata & Borowiec 2019 b: 120, Borowiec & Salata 2021 b: 8); **Sterea Ellas** (Borowiec & Salata 2018 e: 7); **Thessaly** (Borowiec & Salata 2012: 504 - as *Lasius paralienus*, Borowiec & Salata 2018 b: 228; **new data:** Larissa, Kalipefki, 1120 m, 16 V 2019, 39.97026 / 22.45771; Larissa, Mt. Olympus, 3.9 km E of Karya, 790 m, 13 V 2019, 39.99133 / 22.44169; Larissa, Kryovrysi, 985 m, 16 V 2019, 39.98888 / 22.32645); **Thrace** (Bračko et al. 2016: 21 - as *Lasius paralienus*, Seifert & Galkowski 2016: 45, Seifert 2020 a: supplementary material).

Distribution in Europe and Mediterranean Basin: Austria; Azerbaijan; Bulgaria; Greece; Hungary; Slovakia; Turkey.

Description. Large, HL 0.777-1.037 (mean 0.926), HW 0.712-0.982 (mean 0.860), ML 0.84-1.11. Scape moderately elongate, SL 0.721-0.978 (mean 0.868). **Color.** Body and femora concoloured, medium to dark brown (Figs 82.1-4). Mandibles, scapi and tibiae lighter

reddish to yellowish brown. **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Fig. 82.4). Terminal segment of maxillary palpi rather short with length of sixth segment 0.102-0.151 (mean 0.135). Occipital part of head with 12-24 erected setae. Gena with up to two erected setae, underside of head with 2-8 erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.108-0.185, mean 0.145). Below propodeal spiracle 3-5 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with smooth pubescence lacking erected setae or at most with 2 erected setae. Hind tibiae on external surface in basal parts without or with 1-4 erected setae. Ventral surface of fore femora with 3-6 and mid femora 2-5 erected setae, of hind femora with 2-4 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus dense, mostly covering Clypeus (Fig. 82.4). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view rather low and obtuse, metanotal groove moderately deep (Fig. 82.2).

Comparative remarks. *Lasius bombycina* together with *L. kritikos* and *L. paralienus* form a complex of species characterized by antennal scapi lacking erected setae, hind tibiae with up to 4 erected setae in basal part, numerous erected setae in area below propodeal stigma, and especially by very dense pubescence of clypeus that mostly covers the clypeal surface. Identificaton of members of this complex is challenging and correct determinaton has to be supported with subtle biometric measurements. *L. bombycina* is the largest species of this complex and has the shortest maxillary palpi with length of sixth segment 0.102-0.151 (mean 0.135). While in both relatives the length of sixth segment always exceeds 0.140 and reaches up to 0.202. *L. kritikos* as an endemic of Crete is separated geographically while *L. paralienus* is sympatric with *L. bombycina* in northern Greece. *L. paralienus* differs from *L. bombycina* in longer terminal (6th) segment of maxillary palps with length 0.142-0.176, mean 0.160 (in *L. bombycina* 0.102-0.151, mean 0.151) and the longest hair on pronotum shorter (length of the longest seta 0.108-0.185, mean 0.145 vs 0.075-0.134, mean 0.109 in *L. paralienus*).

Biological notes. In Greece, the species prefers open areas such as grasslands inside mountain forests. In mountains it was observed also in all types of forests but most often in deciduous forests, in lower altitude it was observed also in xerothermous grasslands, shady olive plantations, small gorges with shrubs and in ruderal sites inside tourist resorts. All nests were located under large stones, workers were observed also on trunk of trees or on herbs.

83. *Lasius brunneus* (Latreille, 1798)

(Figs 83.1-4)

Formica brunnea Latreille, 1798: 41;
Formica pallida Latreille, 1798: 41;
Formica timida Förster, 1850 a: 35;
Lasius niger var. *alienobrunneus* Forel, 1874: 47;
Lasius brunneus var. *emarginatobrunneus* Ruzsky, 1902 c: 17;
Acanthomyops (*Dendrolasius*) *brunneus* var. *nigrobrunneus* Donisthorpe, 1926: 18.

Distribution in Greece: Greece general (Forel 1886: clxvii - as *Lasius alieno-brunneus*); Aegean Islands (Legakis 2011: 26); **Epirus** (Borowiec & Salata 2018 a: 6);

Ionian Islands (Emery 1901: 57, Legakis 2011: 26, Salata & Borowiec 2017: 298, Borowiec & Salata 2021 a: 8); **Macedonia** (Legakis 2011: 26, Borowiec & Salata 2012: 498, Seifert 2020 a: supplementary material; **new data:** Drama, Prasinada, 700 m, 10 VIII 1999, 41.3694 N / 24.5489 E; Kavalas, Kotza Orman forest, 16 m, 13 VIII 1999, 40.8882 N / 24.7786 E); **Peloponnese** (Borowiec & Salata 2017: 210, Borowiec & Salata 2021 b: 8); **Sterea Ellas** (Forel 1889: 256 - as *Lasius niger* r. *brunneus*, Legakis 2011: 26, Borowiec & Salata 2018 e: 7, Borowiec & Salata 2021 b: 8); **Thessaly** (Legakis 2011: 26, Borowiec & Salata 2012: 498, Borowiec & Salata 2018 b: 228; **new data:** Larissa, Mt. Olympus, 4.6 km E of Karya, 830 m, 13 V 2019, 39.99709 / 22.44375; Larissa, Mt. Olympus, Mt. Olympus, 6.2 km NE of Karya, 935 m, 13 V 2019, 40.00703 / 22.46108); Thrace (**Bračko** et al. 2016: 19).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Iran; Israel; Italy: mainland, Sardinia, Sicily; Latvia; Lithuania; Luxembourg; North Macedonia; Moldova; Montenegro; Netherlands; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL 0.780-1.067 (mean 0.931), HW 0.722-1.129 (mean 0.893) ML 0.79-1.35. Scape short, SL 0.651-0.9500 (mean 0.788). **Color.** Body bicoloured with head from yellowish-brown to reddish brown, gaster from reddish-brown to dark brown and mesosoma yellowish brown, sometimes head only slightly darker than mesosoma, occasionally as pale colored as mesosoma, especially in initial colonies. Legs usually light yellowish to yellowish-brown (Figs 83.1-4). **Structure and setation.** Head broadly oval, from slightly wider than long to slightly longer than wide, with rounded sides, occipital margin of head straight to slightly concave (Fig. 83.4). Occipital part of head with 4-8 erected setae also mesosomal dorsum with only few erected setae, genal setae absent. Below propodeal spiracle 0-1 erected setae. Mandibles usually with 7 dents. Antennal scapi and tibiae with smooth pubescence lacking erected setae. Ventral surface of fore femora with 3-4 and mid femora 1-2 erected setae, of hind femora without setae or 1-2 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very smooth, appressed and short (Fig. 83.1). Pubescence of clypeus short and sparse (Fig. 83.4). Frontal and mesosomal pubescence very smooth, appressed and short, all body surface completely smooth, surface shinning, with weak microsculpture**.** Gaster with very smooth, appressed and short pubescence, surface of gastral tergites distinctly sculptured , first gastral tergite in central part without or with few erected setae. Propodeum in lateral view with straight anterior and posterior surface, conical and equal in height to mesonotum, metanotal groove deep (Fig. 83.2).

Comparative remarks. Very smooth body with appressed and short pubescence on its whole surface place this species close only to *Lasius lasioides*. Morphological characters of both species largely overlap which may cause difficulties in their separation. However, *L. brunneus* is generally larger with stouter head (often wider than long in large workers) while in *L. lasioides* head is slimmer and always slightly longer than wide (also in large workers). *L. brunneus* is usually bicolored, especially large workers, with mesosoma lighter than head and gaster. While in *L. lasioides* head, mesosoma and gaster are usually the same color or mesosoma is only indistinctly paler than head and gaster. In *L. brunneus* first gastral tergite in central part is often lacking erected setae or have only few short setae while in

L. lasioides surface of first gastral tergite is usually uniformly setose on the whole surface. In Greece, both species are partly separated ecologically, *L. brunneus* prefers shady mountain forests or, in northern Greece, wet and shady forests or trees close to water resources, streams and rivers. While *L. lasioides* prefers warm, luminous forest, seashores with *Pinus* trees and fryganas, also is common in parks and gardens inside tourist resorts and urban areas.

Biological notes. In Greece, *Lasius brunneus* was observed in the wide range of altitudes from sea level to 1470 m, but most of collecting localities were placed between 600 and 1000 m. In low altitude areas it was observed only in shady places, especially on trees along the banks of streams. Overall, the species prefers shady forests, both coniferous and deciduous, but was observed also in old quarry close to coniferous forests, stream valleys with plane trees, alpine zone with limestone rocks and pastures, occasionally on trees in gardens of tourist resorts.

84. *Lasius creticus* Seifert, 2020

(Figs 84.1-4)

Lasius creticus Seifert, 2020 a: 57.

Distribution in Greece: Crete (Salata et al. 2020 a: 23 – as *Lasius psammophilus*, Seifert 2020 a: 57 and supplementary material); **Dodecanese** (Seifert 2020 a: supplementary material, Borowiec et al. 2021: 18).

Distribution in Europe and Mediterranean Basin: Greece; Iran; Turkey.

Description. Moderately large, HL 0.819-0.953 (mean 0.897), HW 0.775-0.872 (mean 0.822), ML 0.79-1.02. Scape moderately elongate, SL 0.779-0.891 (mean 0.836). **Color.** Body concoloured light reddish brown to medium brown with reddish tinge, mesosoma often slightly lighter than gaster and head (Figs 84.1-4). Mandibles, scapi and tibiae lighter than mesosoma, yellowish brown. **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Fig. 84.4). Terminal segment of maxillary palpi elongate with length of sixth segment 0.166-0.181 (mean 0.171). Occipital part of head with 14-22 very long erected setae. Gena with up to two erected setae, underside of head with 4-8 long erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.110-0.147, mean 0.124). Below propodeal spiracle 1-4 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with smooth pubescence lacking erected setae. Hind tibiae on external surface in basal parts without or with 0-3 erected setae. Ventral surface of fore femora with 3-7 and mid femora 2-6 erected setae, of hind femora with 2-5 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus very sparse, not covering Clypeus (Fig. 84.4). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view low and obtuse, metanotal groove moderately deep (Fig. 84.2).

Comparative remarks. *Lasius creticus* with *L. psammophilus* form a complex of species characterized by antennal scapi lacking erected setae, hind tibiae with up to 4 erected setae in basal part, numerous erected setae in area below propodeal stigma, and especially by short and sparse pubescence of clypeus that do not cover entirely the clypeal surface. Identificaton of members of this complex is challenging and correct determinaton has to be supported with subtle biometric measurements. *L. creticus* is distributed in southern islands,

from Crete to Dodecanese, while *L. psammophilus* is known only from Greek mainland. Also, *L. creticus* has longer maxillary palpi with length of terminal segment 0.166-0.181 (mean 0.171) vs. 0.0.091-0.134 (mean 0.117) in *L. psammophilus*. *L. creticus* differs also in slightly longer hair of mesosoma with length of the longest hair 0.110-0.147 (mean 0.124) vs. 0.091-0.143 (mean 0.114) in *L. psammophilus*.

Biological notes. Thermophilous species, in Greece observed in areas from sea level to 1000 m a.s.l. (but Seifert (2020 a) noted sample in Turkey from 1900 m). Ants were observed on sandy beach areas, seashores with frygana and *Pinus* trees, deciduous light forests along stream banks and in one case in the urban area.

85. *Lasius emarginatus* (Olivier, 1792)

(Figs 85.1-8)

Formica emarginata Olivier, 1792: 494;
Lasius emarginatus var. *brunneoemarginatus* Forel, 1874: 47;
Lasius niger var. *brunneoides* Forel, 1874: 47;
Lasius niger var. *nigroemarginatus* Forel, 1874: 47;
Lasius alienus var. *pontica* Stärcke, 1944: 157.

Distribution in Greece: Greece generally (Seifert 1992: 34); **Dodecanese** (Legakis 2011: 26); **Epirus** (Legakis 1983: 5, 2011: 26, Borowiec & Salata 2018 a: 6, Seifert 2020 a: supplementary material); **Macedonia** (Legakis 2011: 26, Borowiec & Salata 2012: 500, Salata & Borowiec 2019 b: 104-105, Seifert 2020 a: supplementary material; **new data:** Kastoria, Vitsi n. Ag. Antonios, 1350 m, 2 VI 2007, 40.65114 / 21.33816; Kavalas, Kotza Orman forest, 16 m, 13 VIII 1999, 40.8882 N / 24.7786 E; Pieria, Mt. Olympus, Ag. Joannis n. Litohoro, 580 m, 14 V 2019, 40.08377 / 22.48775; Pieria, Mt. Olympus, Litohoro vic., 470 m, 14 V 2019, 40.09677 / 22.49301; Pieria, Mt. Olympus, 1.6 km SW of Litohoro, 575 m, 14 V 2019, 40.08929 / 22.48804; Pieria, Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971; Pieria, 2 km W of Panteleimonas, 305 m, 15 V 2019, 39.98563 / 22.59513; Pieria, P. Poroi, 510 m, 17 V 2019, 39.96797 / 22.58846; Pieria, road to P. Poroi loc. 4, 370 m, 17 V 2019, 39.96824 / 22.59625); **Peloponnese** (Legakis 2011: 26, Borowiec & Salata 2017: 210, Seifert 2020 a: supplementary material); **Sterea Ellas** (Legakis 2011: 26, Seifert 2020 a: supplementary material); **Thessaly** (Borowiec & Salata 2012: 500, Borowiec & Salata 2018: 228, Salata & Borowiec 2019 b: 107, Seifert 2020 a: supplementary material; **new data:** Larissa, Kalipefki, 1120 m, 16 V 2019, 39.97026 / 22.45771; Larissa, Mt. Olympus, 3.9 km E of Karya, 790 m, 13 V 2019, 39.99133 / 22.44169; Larissa, Mt. Olympus, 4.6 km E of Karya, 830 m, 13 V 2019, 39.99709 / 22.44375; Larissa, Mt. Olympus, Mt. Olympus, 6.2 km NE of Karya, 935 m, 13 V 2019, 40.00703 / 22.46108; Larissa, Mt. Olympus, Vrisopoules loc. 1, 1550 m, 15 V 2019, 40.03372 / 22.31675; Larissa, Mt. Olympus, Vrisopoules loc. 2, 1430 m, 15 V 2019, 40.02795 / 22.30612; Larissa, Mt. Olympus, Vrisopoules loc. 3, 1400 m, 15 V 2019, 40.92936 / 22.30328; Larissa, Mt. Olympus, Vrisopoules loc. 4, 1315 m, 15 V 2019, 40.02392 / 22.30774; Larissa, Ossa Mts., Kokkino Nero, 35 m, 29 VII 2009, 39.836 N / 22.788 E).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; France:

Corsica, mainland; Germany; Gibraltar; Great Britain; Greece: Dodecanese, Ionian Is., mainland; Hungary; Italy: mainland, Sardinia, Sicily; Luxembourg; Malta; Moldova; Monaco; Montenegro; Netherlands; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, Canary Is., mainland; Switzerland; Turkey; Ukraine.

Description. In Greece, *Lasius emarginatus* forms two distinct eco-morphotypes which differ significantly in morphology and habitat preferences.

Morphotype 1 (dominant and corresponding to the typical morphology described for this species): large, HL 0.848-1.078 (mean 1.024), HW 0.816-1.042 (mean 0.962), ML 1.24-1.40. **Color.** Body bicoloured with head and gaster brown and mesosoma from yellowish-red or red to reddish brown, rarely mesosoma as dark colored as head and gaster (although Greek populations, especially from southern provinces, are generally darker than populations from Central Europe). Legs usually yellowish, in the darkest specimens femora and part of tibiae infuscate (Figs 85.1-4). **Structure and setation.** Head broadly oval, only slightly longer than wide, lateral surfaces above eyes convex, occipital margin of head straight to slightly concave (Fig. 85.4). Terminal segment of maxillary palpi elongate with length of sixth segment 0.194-0.222 (mean 0.210). Temporal part of head with numerous long, erected setae also ventral part of head and mesosomal dorsum with numerous erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.105-0.154, mean 0.137). Below propodeal spiracle 3-5 erected setae. Antennal scapi with numerous erected setae, also lateral margin of mid- and hind tibiae with numerous erected setae. Ventral surface of femora and anterior surface of fore coxa with several long erected setae. Pubescence of clypeus dilute, denser on base and sides and sparser in central part (Fig. 85.4), frontal and mesosomal pubescence short and sparse. Gaster with dense appressed pubescence and sparse erected setae, surface of gastral tergites distinctly sculptured. Propodeum high and almost conical in lateral view thus metanotal groove very deep (Fig. 85.2) but some populations from southern provinces have propodeum less convex, less conical in profile than most of Greek populations.

Morphotype 2: distinctly smaller than morphotype 1, HW 0.603-0.730 (mean 0.672), ML 0.89-1.03. Body always uniformly brown colored, legs indistinctly infuscated (Fig. 85.5). Setation of head, mesosoma and legs sparser than in morphotype 1, especially antennal scapi with less numerous erected setae in extreme case with only 1-2 setae on frontal surface and up to two setae on posterior surface but this reduced number of setae is probably correlated with small size. Clypeal plate more sparsely pubescent than in morphotype 1, promesonotum less convex but propodeum as distinctly as or ever more conical as in morphotype 1 but a single population from Peloponnese has propodeum extremely high (Fig. 85.6).

Comparative remarks. *Lasius emarginatus* belongs to the group of species with rather numerous erected setae on antennal scapi, and mid and hind tibiae. Morphotype 2 is similar to *L. niger* but differs in sparsely pubescent clypeus, head and mesosoma. Morphotype 1 is the most similar to *L. illyricus* and *L. platythorax*. The latter species differs in slimmer head, shorter scapus, longer pronotal setae and lower propodeum. *Lasius illyricus* differs from *L. emarginatus* in distinctly lower number of erected setae on scapus, legs and metapleuron. In *L. illyricus* the scape in frontal view on dorsal apical 1/3 length has only suberect hairs and at most 3 erected setae (Fig. 86.4), while in the same area in *L. emarginatus* erected setae predominate and their number is 6-11 (Fig. 85.8). The difference in chaetotaxy is more clearly visible on the anterior surface of the scape in dorsal view of antenna. In *L. illyricus* the

surface has up to 4 erected setae (occasionally up to 11 setae in large specimens) (Fig. 86.5). While in *L. emarginatus* the number of long erected setae reaches usually 15-20 (up to 34) and only occasionally, in small specimens, the number can be lower (9-10 setae) (Fig.85.8). *Lasius illyricus* has sparser setation on external edge of hind tibia with 6-18 erected setae (mean 13 ± 3), while in *L. emarginatus* this place has 13-27 erected setae (mean 20.8 ± 3.9).

Biological notes. Morphotype 1 prefers warm, luminous deciduous and mixed forests, especially oak forests growing in rocky areas. Also, it often inhabits parks or trees in tourist resorts. In southern provinces, this species is frequently nesting inside dark broad-leaved woodlands. Often inhabits xerothermic shrubs growing along roadsides or shrubs on mountain pastures. Nests mainly in rock, under stones or in rotten logs, rarely in hollow tree trunks or under moss that overgrows large stones or trunks at the base of trees. Nest cores often contain a brown carton structure of diverse organic and mineral materials. In Greece, nests ware placed up to two meters above the ground. Foraging workers often penetrate tree trunks to great heights, in particular for honeydew insects.

Morphotype 2 prefers very dark and humid sites, deep gorges inside dark deciduous forests especially stream banks in such localities. Small nests of this morphotype were found always under stones close to streams. These nests have never had a carton structures that is so common in nests of Morphotype 1. *Lasius emarginatus* in Greece was observed in the whole range of altitudes, excluding the alpine zone. It was observed on the coasts of the sea, and the highest point of occurrence was observed on the southern slopes of Mount Olympus at an altitude of 1720 m.

86. *Lasius illyricus* Zimmermann, 1935

(Figs 86.1-7)

Lasius alienus ssp. *illyricus* Zimmermann, 1935: 50.

Distribution in Greece: Crete (Salata et al. 2020 a: 22); **Dodecanese** (Borowiec et al. 2021: 18); **Epirus** (Borowiec & Salata 2018 a: 7, Seifert 2020 a: supplementary material); **Ionian Islands** (Emery, 1901: 57 - as *Lasius emarginatus*, Borowiec & Salata 2013: 353, Borowiec & Salata 2014 a: 515, Salata & Borowiec 2017: 298-299, Salata & Borowiec 2019 b: 100-104, 113, Seifert 2020 a: supplementary material, Borowiec & Salata 2021 a: 8; **new data:** Cephalonia, Ainos Mts. loc. 1, 1598 m, 8 VI 2019, 38.1387 / 20.66157; Cephalonia, Ainos Mts. loc. 3, 1330 m, 8 VI 2019, 38.15258 / 20.63944; Cephalonia, Ainos Mts. loc. 4, 1135 m, 8 VI 2019, 38.1571 / 20.62602); Cephalonia, Ainos Mts, 1430 m, 15 VI 2021, 38.12251 / 20.68765; Cephalonia, 3.8 km SW of Digaleto, 760 m, 11 VI 2019, 38.16577 / 20.64259); Cephalonia, 800 m S of Kateleios, 20 m, 9 VI 2019, 38.07066 / 20.75329; Cephalonia, Paralia Petani, 56 m, 13 VI 2021, 38.25966 / 20.37607; Cephalonia, 3.8 km W of Tzanata, 759 m, 14 VI 2021, 38.1355 / 20.70529); **Macedonia** (Borowiec & Salata 2013: 353, 2022: 7; **new data:** Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Drama, Prasinada, 700 m, 10 VIII 1999, 41.3694 N / 24.5489 E; Drama, 1 km S of Skaloti, 954 m, 8 VII 1996, 41.4073 N / 24.2766 E); **Peloponnese** (Borowiec & Salata 2013: 353, Salata & Borowiec 2017: 298-299, Borowiec & Salata 2017 b: 211, Salata & Borowiec 2019 b: 105-106, 114, 115, 120, Seifert 2020 a: supplementary material, Borowiec & Salata 2021 b: 8); **Sterea Ellas** (Borowiec & Salata 2017 a: 2, Borowiec & Salata 2018 e: 8, Salata & Borowiec 2019 b: 106, Borowiec & Salata 2021 b: 8); **Thessaly** (Seifert 2020 a: supplemen-

tary material; **new data:** Ossa Mts., Kokkino Nero, 35 m, 4 VIII 2009, 39.836 N / 22.788 E); **Thrace** (Bračko et al. 2016: 20).

Distribution in Europe and Mediterranean Basin: Armenia, Austria; Azerbaijan; Bulgaria; Croatia; Georgia; Greece; Iran; Turkey; S Ukraine (Crimea).

Description. In Greece, *Lasius illyricus* forms two distinct eco-morphotypes which differ significantly in morphology and habitat preferences.

Morphotype 1: Large, HL 0.861-1.139 (mean 0.993), HW 0.784-1.098 (mean 0.936), ML 1.10 -1.37. **Color.** Body bicoloured with head and gaster yellowish-brown to brown and mesosoma from yellowish-red or red to reddish brown (Figs 86.1, 2, 6, 7), sometimes mesosoma as dark colored as head and gaster, as a rule, in nests with small specimens the body color is rather uniform, in nests with large specimens the color is more contrasting. Legs usually yellowish, in the darkest specimens femora and part of tibiae infuscate. **Structure and setation.** Head broadly oval, only slightly longer than wide, lateral surfaces above eyes convex, occipital margin of head straight to slightly concave (Fig. 86.7). Terminal segment of maxillary palpi elongate with length of sixth segment 0.169-0.232 (mean 0.203). Temporal part of head with numerous long, erected setae also ventral part of head and mesosomal dorsum with several erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.113-0.164, mean 0.137). Below propodeal spiracle up to two erected setae. Anterior surface of antennal scapi usually with 0-4, at most to 11 erected setae in the largest specimens. Exterior surface of hind tibiae with 6-18 erected setae, of mid tibiae with 1-8 erected setae. Ventral surface of femora and anterior surface of fore coxa with several long erected setae. Pubescence of clypeus sparse (Fig. 86.7), frontal and mesosomal pubescence short and sparse. Gaster with dense appressed pubescence and sparse erected setae, surface of gastral tergites distinctly sculptured. Propodeum high and almost conical in lateral view thus metanotal groove very deep (Fig. 86.2).

Morphotype 2: distinctly smaller than morphotype 1, HW 0.492-0.611 (0.556), ML 0.73-0.87. Body always uniformly brown colored, legs indistinctly infuscated (Fig. 86.3). Setation of head, mesosoma and legs sparser than in morphotype 1, especially antennal scapi with less numerous erected setae in extreme case with only 1-2 setae on frontal surface and up to two setae on posterior surface but this reduced number of setae is probably correlated with small size. Clypeal plate more sparsely pubescent than in morphotype 1, promesonotum less convex but propodeum as distinctly as or ever more conical than in morphotype 1 (Fig. 86.3).

Comparative remarks. *Lasius illyricus* belongs to the group of species with moderately numerous erected setae on antennal scapi and mid and hind tibiae. Morphotype 2 is similar to *L. niger* but differs in sparsely pubescent clypeus, head and mesosoma. Morphotype 1 is the most similar to *L. emarginatus* and *L. platythorax*. The latter species differs in slimmer head, shorter scapus, longer pronotal setae and lower propodeum. Both morphotypes of *L. emarginatus* differ from *L. illyricus* in distinctly higher number of erected setae on scapus, legs and metapleuron. In *L. illyricus* the scape in frontal view on dorsal apical 1/3 length has only suberect hairs and at most 3 erected setae (Fig. 86.4), while in the same area in *L. emarginatus* erected setae predominate and their number is 6-11 (Fig. 85.8). The difference in chaetotaxy is more clearly visible on the anterior surface of the scape in dorsal view of antenna. In *L. illyricus* the surface has up to 4 erected setae (occasionally up to 11 setae in large specimens) (Fig. 86.5). While in *L. emarginatus* the number of long erected setae reaches

usually 15-20 (up to 34) and only occasionally, in small specimens, the number can be lower (9-10 setae) (Fig.85.8). *L. illyricus* has sparser setation on external edge of hind tibia with 6-18 erected setae (mean 13 ± 3), while in *L. emarginatus* this place has 13-27 erected setae (mean 20.8 ± 3.9). In *L. illyricus* the area below propodeal spiracle has usually up to two erected setae while in *L. emarginatus* the number of erected setae is 3-5. Greek specimens of *L. illyricus*, in comparison with Greek populations of *L. emarginatus*, are slightly larger (ML 1.352 ± 115.9 vs. 1.213.7 ± 94.7; HL 1.020 ± 72 vs. 1.002.3 ± 78.2, HW 0.981±99.5 vs. 0.952±97.6) and more distinctly bicolored with thorax usually distinctly paler from head and gaster.

Biological notes. *Lasius illyricus* is more ubiquistic than similar *L. emarginatus* and was observed in a wide variety of habitats. The species is the most frequent in deciduous and coniferous forests, it is also a dominant *Lasius* species in fir forests. Also often found in stream valleys insides plane forests or in shrubs on mountain pastures, in olive plantations, on trees in mountain villages, on roadsides with mediterranean shrubs, rarely in frygana. Morphotype 1 prefers warm, luminous areas inside forests. Morphotype 2, like morphotype 2 of *L. emarginatus*, prefers very dark and humid sites, deep gorges inside dark forests and especially stream banks in such forests and gorges or these in lowlands overgrown with tall reeds. Nests mainly in rocks, stoneworks, under stones or in rotten logs, or under moss that overgrows large stones or trunks at the base of trees. Nest cores often contain a brown carton structure of diversed organic and mineral materials. *L. illyricus*, in Greece, was observed in the whole range of altitudes, excluding the alpine zone. It was observed on the coasts of the sea, and the highest point of occurrence was observed on the southern slopes of Dikti Mts., Crete at an altitude of 1750 m.

87. *Lasius karpinisi* Seifert, 1992

(Figs 87.1-3)

Lasius karpinisi Seifert, 1992: 23.

Distribution in Greece: Sterea Ellas (Seifert 1992: 23).

Distribution in Europe and Mediterranean Basin: Endemic to Mt. Timfristos in Phthiotis region.

Description. Large, HL 0.899-0.916 (mean 0.928), HW 0.850-0.977 (mean 0.897). Scape elongate, SL 0.897-0.993 (mean 0.932). **Color.** Head and gaster medium with a reddish tinge, mesosoma, coxae and femora reddish brown, scape and tibiae reddish yellow, distal half of antennal funicle darker than basal part (Figs 87.1-3). **Structure and setation.** Head almost as long as wide, with convex sides and shallowly concave posterior margin (Fig. 87.3). Terminal segment of maxillary palpi moderately long with length of sixth segment 0.155-0.168 (mean 0.160). Occipital part of head with 12-16 erected setae. Gena with up to two erected setae, underside of head with 1-3 erected setae. Mesosomal dorsum with rather short erected setae (length of the longest seta 0.078-0.121, mean 0.099). Below propodeal spiracle 0-3 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with smooth pubescence lacking erected setae. Hind tibiae on external surface in basal parts without or with 1-4 erected setae. Pubescence on the whole body and appendages dense and whitish. Pubescence of clypeus dense, clypeus well visible (Fig. 87.3). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view conical, metanotal groove deep (Fig. 87.2).

Comparative remarks. *Lasius karpinisi* is difficult to identify as it lacks unambiguous identification characters. It is distinguished from other species with antennal scapi lacking erected setae and dense pubescence of clypeus by a combination of characters: elongate scape (Sl/HL 0.998-1.014), head broad with shallowly concave occipital margin, well developed clypeal carina and mesosoma reddish brown. Only *L. illyricus* have similar combination of characters but differs in antennal scapi with at least partly erect or semierect hair or setae and usually with more than 4 erected setae on hind tibiae.

Biological notes. Biology unknown, this species is known only from short type series lacking biological data on labels.

88. *Lasius kritikos* Seifert, 2020

(Figs 88.1-4)

Lasius kritikos Seifert, 2020 a: 60.

Distribution in Greece: Crete (Salata et al. 2020 a: 21 – as *Lasius bombycina*, Seifert 2020 a: 60 and supplementary material).

Distribution in Europe and Mediterranean Basin: Endemic to Crete.

Description. Moderately large, HL 0.834-0.951 (mean 0.900), HW 0.753-0.894 (mean 0.832), ML 0.94-1.08. Scape moderately elongate, SL 0.798-0.932 (mean 0.878). **Color.** Body and femora concolour yellowish brown to brown. Mandibles, scapi, tibiae and often gaster slightly lighter (Figs 88.1-4). **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Fig. 88.4). Terminal segment of maxillary palpi long with length of sixth segment 0.142-0.176 (mean 0.160). Occipital part of head with 12-24 erected setae. Gena with 0-1 erected setae, underside of head with 1-4 erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.116-0.147, mean 0.134). Below propodeal spiracle 0-3 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with smooth pubescence lacking erected setae or at most with one erected setae. Hind tibiae on external surface in basal parts without or with 1-4 erected setae. Ventral surface of fore femora with 3-6 and mid femora 2-5 erected setae, of hind femora with 1-3 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus dense, mostly covering Clypeus (Fig. 88.4). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view rather low and obtuse, metanotal groove moderately deep (Fig. 88.2).

Comparative remarks. *Lasius kritikos* together with *L. bombycina* and *L. paralienus* form a complex of species characterized by antennal scapi lacking erected setae, hind tibiae with up to 4 erected setae in basal part, numerous erected setae in area below propodeal stigma, and especially by very dense pubescence of clypeus almost entirely covering its surface. Due to their morphological similarity their separation has to be supported with morphometric data. However, *L. kritikos* as an endemic of Crete and is separated geographically from both relatives. *Lasius bombycina* is the largest species of this complex and has the shortest maxillary palpi (length of sixth segment 0.102-0.151, mean 0.135) while *L. kritikos* is smaller but has the longest palpi (terminal segment with length 0.142-0.176, mean 0.160). *L. paralienus* has terminal segment of palpi shorter than in *L. kritikos* (length 0.142-0.176, mean 0. 160)

and differs also in the shortest hair of mesosoma with length of the longest hair 0.075-0.134 (mean 0.134) vs. 0.116-0.147 (mean 0.134) in *L. kritikos*.

Biological notes. *Lasius kritikos* prefers mountain and submountain habitats in altitude from 354 to 1450 m, usually above 800 m. Numerous nests were observed in mountain plateaus, mountain pastures or inside mediterranean forests of small oaks, usually under stones but also in sandy soil.

89. *Lasius lasioides* (Emery, 1869)

(Figs 89.1-4)

Prenolepis lasioides Emery, 1869: 6;
Prenolepis fusculus Emery, 1869: 8;
Lasius fumatus Emery, 1869: 26;
Lasius alienus var. *barbarus* Santschi, 1931: 11.

Distribution in Greece: Greece generally (Seifert 1992: 8); **Aegean Islands** (Borowiec & Salata 2013: 357, Borowiec & Salata 2018 c: 6); **Crete** (Legakis 2011: 27, Borowiec & Salata 2012: 502, Salata & Borowiec 2017: 296-297, Salata et al. 2020 a: 16, Seifert 2020 a: supplementary material; **new data:** Samos, Kokkari, 8 m, 9 VI 2013, 37.76666 N / 26.88333 E; Samos, Klima, 10 m, 4 VI 2013, 37.76666 N / 26.88333 E); **Cyclades** (Seifert 2020 a: supplementary material; **new data:** Naxos, above Eggares, 60 m, 3 VII 2016, 37.116 / 25.4447; Naxos, Mesi Potamia, 150 m, 1 VII 2016, 37.0675 / 25.4444); **Dodecanese** (Borowiec & Salata 2012: 502, Salata & Borowiec, 2016: 198, Seifert 2020 a: supplementary material, Borowiec et al. 2021: 18); **Epirus** (Borowiec & Salata 2018 a: 7, Salata & Borowiec 2019 b: 100, Seifert 2020 a: supplementary material; **new data:** Arta, Athamania-Theodoriana rd., 1155 m, 2 VI 2007, 39.39112 / 21.19797); **Ionian Islands** (Borowiec & Salata 2013: 357, Borowiec & Salata 2014 a: 515, Salata & Borowiec 2017: 296-297, Borowiec & Salata 2018 d: 6, Salata & Borowiec 2019 b: 100-104, 113, Seifert 2020 a: supplementary material, Borowiec & Salata 2021 a: 8; **new data:** Cephalonia, 2 km SW of Poros, 50 m, 18 VI 2021, 38.13659 / 20.75968; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala, 19 m, 17 VI 2021, 38.07683 / 20.79644; Lefkada, Kavalikefta beach, 57 m, 12 VI 2021, 38.75366 / 20.59056; Lefkada, 3.3 km W of Nidri, 492 m, 10 VI 2021, 38.70886 / 20.67459; Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595; Lefkada, Vasiliki beach, 2 m, 12 VI 2021, 38.63156 / 20.59903); **Macedonia** (Borowiec & Salata 2022: 7, **new data:** Halkidiki, Holomontas, n. Arnea, 703 m, 1 IX 2009, 40.46666 N / 23.56666 E; Halkidiki, Kassandra, Siviri, 6 m, 5 IX 2009, 40.03333 N / 23.35 E; Halkidiki, Sithona, Parthenonas, 305 m, 2 IX 2009, 40,1195 N / 23,81297 E; Pieria, Mt. Olympus, Ag. Joannis n. Litohoro, 580 m, 14 V 2019, 40.08377 / 22.48775; Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971); **Peloponnese** (Borowiec & Salata 2013: 357, Borowiec & Salata 2017 b: 211, Salata & Borowiec 2019 b: 114, 115, Seifert 2020 a: supplementary material, Borowiec & Salata 2021 b: 9; **new data:** Arkadia, Langadia, Valtessiniko, 1200 m, 7 VI 2007, 37.7011 / 22.11196); **Sterea Ellas** (Borowiec & Salata 2017 a: 2, Borowiec & Salata 2018 e: 8, Salata & Borowiec 2019 b: 106); **Thessaly** (Borowiec & Salata 2018 b: 229, Seifert 2020 a: supplementary material); **Thrace** (Bračko et al. 2016: 20).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Azerbaijan; Croatia; Cyprus; Egypt; France: mainland; Georgia; Greece; Iran; Israel; Italy: mainland,

Sardinia, Sicily; Malta; Montenegro; Morocco; North Macedonia; Portugal; Serbia; Spain: Baleares, mainland; Tunisia; Turkey.

Description. Moderately large, HL 0.705-0.934 (mean 0.841), HW 0.650-0.936 (mean 0.784), ML 0.78-1.08. Scape moderately elongate, SL 0.704-0.907 (mean 0.802). **Color.** Body, femora and tibiae usually unicolor pale brown except yellowish to pale yellowish-brown to reddish brown tibio-femoral joint region, scape and often also anterior margin of clypeus (Figs 89.1-4). Occasionally mesosoma slightly paler than head and gaster or whole body pale yellowish-brown but body never appears distinctly bicolor. **Structure and setation.** Head oval, slightly longer than wide, with rounded sides, occipital margin of head straight to slightly concave (Fig. 89.4). Occipital part of head with 6-8 erected setae also mesosomal dorsum with only few erected setae, genal setae absent. Below propodeal spiracle 0-3 erected setae. Mandibles usually with 7 dents. Antennal scapi and tibiae with smooth pubescence lacking erected setae. Ventral surface of fore femora with 3-6 and mid femora 1-4 erected setae, of hind femora without setae or 1-3 in basal half of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very smooth, appressed and short. Pubescence of clypeus short and sparse (Fig. 89.4). Frontal and mesosomal pubescence very smooth, appressed and short, all body surface completely smooth, surface moderately shinning, with weak microsculpture. Gaster with very smooth, appressed and short pubescence, surface of gastral tergites distinctly sculptured , First gastral tergite in central part with several erected setae. Propodeum in lateral view with straight anterior and posterior surface, conical and equal in height to mesonotum, metanotal groove deep (Fig. 89.2).

Comparative remarks. Very smooth body, with appressed and short pubescence covering the whole body and appendages, places this species close only to *Lasius brunneus*. Characters of both species largely overlap and cause difficulties in identifying. However, *L. lasioides* is generally smaller and has slimmer head (always slightly longer than wide, also in large workers). While *L. brunneus* is generally larger and has stouter head often wider than long in large workers. In *L. lasioides* head, mesosoma and gaster are usually of the same color or sometimes mesosoma is only indistinctly paler than head and gaster. While *L. brunneus* is usually bicolored, especially large workers, with mesosoma brighter than head and gaster. Also, In *L. lasioides* surface of first gastral tergite is usually uniformly setose on the whole surface while in *L. brunneus* the central part of first gastral is often lacking erected setae or have only few short setae. In Greece, both species are separated ecologically. *L. lasioides* prefers warm, luminous forests, seashores with *Pinus* trees and frygana, it is also common in parks and gardens inside tourist resorts and urban areas. While *L. brunneus* prefers shady mountain forests or in northern Greece, especially wet and shady forests or trees close to water resources, streams and rivers.

Biological notes. *Lasius lasioides* in Greece was observed in the wide range of altitudes from sea level to 1420 m, but most of collecting localities were placed below 700 m. Prefers warm, luminous forest habitats like stream valleys inside deciduous forests, luminous pine forests, seashores with pine trees and frygana. It is common also in parks and gardens inside tourist resorts and urban areas. Rare in pastures or roadsides with shrubs. Never collected in coniferous forests.

90. *Lasius niger* (Linnaeus, 1758)

(Figs 90.1-4)

Formica nigra Linnaeus, 1758: 580;
Formica nigerrima Christ, 1791: 513;
Formica pallescens Schenck, 1852: 55;
Lasius niger var. *alienoniger* Forel, 1874: 47;
Lasius niger subsp. *emeryi* Ruzsky, 1905: 313;
Lasius niger var. *pinetorum* Ruzsky, 1907: 68;
Acanthomyops niger var. *minimus* Kuznetsov-Ugamsky, 1928: 20;
Lasius transylvanica Röszler, 1943: 44.

Distribution in Greece: Macedonia (Legakis 2011: 27, Borowiec & Salata 2012: 503); **Thrace** (Bračko et al. 2016: 21). It was recorded also from Crete, Epirus, Peloponnese, Sterea Ellas and Thessaly but all records outside Macedonia and Thrace need confirmation and probably concern other members of the *niger-alienus* complex.

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Georgia; Germany; Gibraltar; Greece; Hungary; Ireland; Italy: mainland, Sardinia; Latvia; Lithuania; Luxembourg; Madeira; Moldova; Monaco; Montenegro; Netherlands; North Ireland; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL 0.916-1.118 (mean 0.928), HW 0.853-1.033 (mean 0.938), ML 0.90-1.25. Scape moderately elongate, SL 0.866-1.008 (mean 0.936). **Color.** Body, femora and tibiae concolours dark brown. Mandibles, scapi, tibio-femoral joint region lighter, yellowish brown to brown (Figs 90.1-4). Mesosoma sometimes slightly lighter than head and gaster. **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Fig. 90.4). Terminal segment of maxillary palpi long with length of sixth segment 0.157-0.178 (mean 0.169). Occipital part of head with 18-30 short erected setae. Gena and underside of head with several erected setae. Mesosomal dorsum with several short erected setae (length of the longest seta 0.093-0.137, mean 0.118). Below propodeal spiracle 2-6 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with short pubescence with numerous erected setae on the whole anterior and dorsal surface. Hind tibiae with numerous erected setae on the whole external surface. Ventral surface of fore femora with 15-25 and mid femora 10-15 erected setae, of hind femora with 4-7 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus dense, mostly covering Clypeus (Fig. 90.4). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view moderately high to high, slightly conical, metanotal groove deep (Fig. 90.2).

Comparative remarks. *Lasius niger* is a member of a complex of species with uniformly brown to black body and antennal scapi and tibiae with numerous erect setae. It differs from all relatives in pubescence of clypeus dense, covering a large part of the surface of the clypeus. Only *L. platythorax* is similar but it differs in clypeus with relatively sparse

pubescence not covering the whole surface of the clypeus, and the longest erected setae on its scapus are longer than half of the maximum width of apical part of scape (in *L. niger* usually these setae are shorter). Also, both species differ in habitat preferences: *L. niger* prefers open and sunny habitats while *L. platythorax* is associated with deciduous, often shady forests. Dark forms of *L. emarginatus* and *L. illyricus* are also similar to *L. niger* but differ in sparse pubescence of clypeus.

Biological notes. It reaches southern border of range in northern Greece and has confirmed observations from Macedonia and Thrace. *Lasius niger* prefers open habitats, it is common in urban areas and tourist resorts, on sandy places, pastures, and gardens. Nests in soil or under stones.

91. *Lasius paralienus* Seifert, 1992

(Figs 91.1-4)

Lasius (*Lasius*) *paralienus* Seifert, 1992: 16.

Distribution in Greece: Epirus (Seifert 2020 a: supplementary material).

Distribution in Europe and Mediterranean Basin: Andorra; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; France: Corsica, mainland; Germany; Greece; Hungary; Ireland; Italy: mainland, Sardinia; Montenegro; North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Small to moderately large, HL 0.724-1.081 (mean 0.900), HW 0.640-1.029 (mean 0.839), ML 0.87-1.06. Scape moderately elongate, SL 0.695-1.042 (mean 0.863). **Color.** Body and femora concolours medium to dark brown. Mandibles, scapi and tibiae light yellowish brown (Figs 91.1-4). **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Fig. 91.4). Terminal segment of maxillary palpi long with length of sixth segment 0.142-0.176 (mean 0.160). Occipital part of head with 12-24 erected setae. Gena with up to two erected setae, underside of head with 2-6 erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.075-0.134, mean 0.109). Below propodeal spiracle 3-5 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with smooth pubescence lacking erected setae or at most with 2 erected setae. Hind tibiae on external surface in basal parts without or with 1-3 erected setae. Hind tibiae on external surface in basal parts without or with 1-3 erected setae. Ventral surface of fore femora with 3-5 and mid femora 2-4 erected setae, of hind femora with 2-3 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus dense, mostly covering surface of clypeus. Surface of gastral tergites distinctly sculptured, first gastral tergite in central part with numerous erected setae. Propodeum in lateral view rather low and obtuse, metanotal groove moderately deep.

Comparative remarks. *Lasius paralienus* together with *L. bombycina* and *L. kritikos* form a complex of species characterized by antennal scapi lacking erected setae, hind tibiae with up to 4 erected setae in basal part, numerous erected setae in area below propodeal stigma and especially by very dense pubescence of clypeus almost entirely covering its surface. Due to their morphological similarity their separation has to be supported with morphometric data. *L. kritikos* as a Cretan endemic and is separated geographically. *L. paralienus* is

sympatric with *L. bombycina* in northern Greece but differs in longer terminal (6th) segment of maxillary palps (length 0.142-0.176, mean 0.160 vs 0.102-0.151, mean 0.135 in *L. bombycina*) and shorter hair on pronotum (length of the longest seta 0.075-0.134, mean 0.109 vs 0.108-0.185, mean 0.145 in *bombycina*).

Biological notes. It reaches southern border of range in northern Greece and was confirmed from Epirus. It prefers xerothermic habitats, open grasslands, rarely occurs in moist meadows or in Mediterranean oak forests. Prefers low altitudes from sea level up to 500 m, in more northern areas it is common on xerothermic grasslands between 500 to 950 m.

92. *Lasius platythorax* Seifert, 1991

(Figs 92.1-4)

Lasius (*Lasius*) *platythorax* Seifert, 1991: 73.

Distribution in Greece: Greece generally (Seifert 1992: 29, Legakis 2011: 27); **Macedonia** (Seifert 2020 a: supplementary material; **new data:** Drama, Partheno Dasos, 995 m, 7 X 1999, 41.5056 N / 24.4288 E).

Distribution in Europe and Mediterranean Basin: Andorra; Austria; Azerbaijan; Belarus; Belgium; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Germany; Greece; Hungary; Iran; Ireland; Italy: mainland, Sardinia, Sicily; Montenegro; Netherlands; North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL 0.834-1.141 (mean 1.004), HW 0.776-1.169 (mean 0.976), ML 0.94-1.26. Scape moderately elongate, SL 0.784-0.1.86 (mean 0.955)**. Color.** Body, femora and tibiae concolours dark brown to almost black. Mandibles, scapi, tibio-femoral joint region lighter, yellowish brown to brown (Figs 92.1-4). Mesosoma sometimes slightly lighter than head and gaster. **Structure and setation.** Head from as wide as long to slightly elongated, with convex sides and straight posterior margin (Fig. 92.4). Terminal segment of maxillary palpi moderately long with length of sixth segment 0.138-0.183 (mean 0.118). Occipital part of head with 18-30 long erected setae. Gena and underside of head with several erected setae. Mesosomal dorsum with several long erected setae (length of the longest seta 0.107-0.185, mean 0.157). Below propodeal spiracle 4-8 erected setae. Masticatory border of mandibles with 7-9 teeth. Antennal scapi with short pubescence with numerous erected setae on the whole anterior and dorsal surface. Hind tibiae with numerous erected setae on the whole external surface. Ventral surface of fore femora with 12-22 and mid femora 10-15 erected setae, of hind femora with 4-7 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus sparse, not covering Clypeus (Fig. 92.4). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view moderately high to high, usually distinctly conical, metanotal groove deep (Fig. 92.2).

Comparative remarks. *Lasius platythorax* is a member of complex of species with uniformly brown to black body and antennal scapi and tibiae with numerous erect setae. Only *L. niger* is similar but it differs in pubescence of clypeus denser, covering a large part of the surface of the clypeus (Fig. 90.4), and the longest erected setae on its scapus are usu-

ally shorter than half of maximum width of apical part of scape (in *L. platythorax* setae are longer). Also, both species differ in habitat preferences. *Lasius platythorax* is associated with deciduous, often shady forests while *L. niger* prefers open, sunny habitats. Dark forms of *L. emarginatus* and *L. illyricus* are also similar but differ in longer scapus with SL/HL usually above 1.0 (in *L. platythorax* usually below 0.97); *L. illyricus* differs also in strongly reduced erected setation on antennal scapi and distinctly less numerous erected setae on tibiae. *Lasius platythorax* is very rare in Greece known only from the northern part of the Macedonia province while both congeners are more widespread in Greek mainland and in Ionian Islands.

Biological notes. Forest species, in Greece noted from deciduous forest at an altitude 995 m.

93. *Lasius psammophilus* Seifert, 1992

(Figs 93.1-4)

Lasius (*Lasius*) *psammophilus* Seifert, 1992: 15.

Distribution in Greece: Epirus (Seifert 2020 a: supplementary material); **Macedonia** (Seifert 2020 a: supplementary material); **Thessaly** (**new data:** Larissa, Mt. Olympus, EOCHO ski center, 1720 m, 9 V 2017, 40.03592 / 22,33387; Larissa, Mt. Olympus, Vrisopoules loc. 1, 1550 m, 15 V 2019, 40.03372 / 22,31675; Larissa, Mt. Ossa ski center, 1520 m, 6 V 2017, 39.80844 / 22,68604).

Distribution in Europe and Mediterranean Basin: Austria; Belgium; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; France: mainland; Georgia; Germany; Greece; Hungary; Italy: mainland, Sicily; Netherlands; Poland; Russia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL 0.739-0.1.016 (mean 0.879), HW 0.686-0.928 (mean 0.825), ML 0.93-1.29. Scape moderately elongate, SL 0.725-0.962 (mean 0.821). **Color.** Body light reddish brown to medium brown with reddish tinge, mesosoma usually slightly lighter than gaster and head. Mandibles, scapi and tibiae lighter than mesosoma, yellowish red (Figs 93.1-4). **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Fig. 93.4). Terminal segment of maxillary palpi short with length of sixth segment 0.091-0.134 (mean 0.117). Occipital part of head with 14-24 long erected setae. Gena with up to two erected setae, underside of head with 4-8 long erected setae. Mesosomal dorsum with several short to long erected setae (length of the longest seta 0.091-0.143, mean 0.114). Below propodeal spiracle 1-4 erected setae. Masticatory border of mandibles with 8-9 teeth. Antennal scapi with smooth pubescence lacking erected setae. Hind tibiae on external surface in basal parts without or with 1-4 erected setae. Ventral surface of fore femora with 3-6 and mid femora 2-5 erected setae, of hind femora with 2-3 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus sparse, not covering Clypeus (Fig. 93.4). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view moderately high and slightly angulated, metanotal groove moderately deep (Fig. 93.2).

Comparative remarks. *Lasius psammophilus* with *L. creticus* form a complex of species characterized by antennal scapi lacking erected setae, hind tibiae with up to 4 erected

setae in basal part, numerous erected setae in area below propodeal stigma and especially by short and sparse pubescence of clypeus not covering the clypeus surface. Identificaton of members of this complex is challenging and correct determinaton has to be supported with subtle biometric measurements. *L. psammophilus* is known only from Greek mainland while *L. creticus* is distributed in southern islands from Crete to Dodecanese. Also, *L. creticus* has longer maxillary palpi (length of terminal segment 0.166-0.181 and mean 0.171 vs. 0.0.091-0.134 and mean 0.117 in *L. psammophilus*). *Lasius creticus* differs also in slightly longer hair of mesosoma (length of the longest hair 0.110-0.147 and mean 0.124 vs. 0.091-0.143 and mean 0.114 in *L. psammophilus*).

Biological notes. In Greece, it is a dominant ant species on mountain pastures with shrubs at altitude between 1000 to 1720 m. Nests were found mainly between slate rock slabs or under stones.

94. *Lasius tapinomoides* Salata & Borowiec, 2018

(Figs 94.1-7)

Lasius tapinomoides Salata & Borowiec, 2018 b: 142.

Distribution in Greece: Crete (Salata & Borowiec 2018 b: 142, Salata et al. 2020 a: 23, Seifert 2020 a: 54 and supplementary material).

Distribution in Europe and Mediterranean Basin: Endemic to Crete.

Description. Very small, HL 0.679-0.749 (mean 0.707), HW 0.525-0.637 (mean 0.578), ML 0.726-0.827 (mean 0.791), scape moderately elongate SL 0.625-0.715 (mean 0.668). **Color.** Head, mesosoma, petiole and gaster uniformly colored, brown to dark brown, sometimes mesosoma slightly lighter than head and gaster. Antennae, tibiae and tarsi bright brown to orange (Figs 94.1-4). **Structure and setation.** Head oval, approximately 1.2 times as long as wide, lateral surfaces above eyes convex, occipital margin of head slightly convex (Fig. 94.4). Whole frontal head covered with short, appressed and dense pubescence and sparse, long, thick suberect to erected setae, the distance between setae at least as long as three fourths of their length. Temporal part of head with 15-19 long, erected setae also ventral part of head and mesosomal dorsum with several long, erected setae. Below propodeal spiracle 4-7 erected setae. Surface of antennal scapi covered with thin, dense, appressed setae, on its apical part several suberected setae also occur. Proximal part of exterior surface of hind tibiae with 0-3 erected setae, of mid tibiae with 0-1 erected setae. Ventral surface of femora and anterior surface of fore coxa with 4-6 long erected setae. Clypeus covered with sparse, decumbent to erect pubescence, average distance between setae longer than three fourths of their length (Fig. 94.4). Gaster with dense appressed pubescence and sparse erected setae, surface of gastral tergites distinctly sculptured. Propodeum very low and obtuse in lateral view thus metanotal groove very shallow to nearly absent, as result the dorsal profile of mesosoma approaches a linear condition (Fig. 94.2).

Gyne as in Figs 94.5-7.

Comparative remarks. A very distinct species. Very small body size and shallow metanotal groove is an unique combination of characters within Greek *Lasius*. Due to small number of mandibular teeth (7-8), only few erected setae on hind tibia, sparse clypeal pubescence, and shallow metanotal groove, *L. tapinomoides* appears to be a member of the *L. turcicus* complex. In Greece, occur three other species of this complex: *L. turcicus*,

L. neglectus and *L. precursor*. None of these relatives have metanotal groove as shallow as in *L. tapinomoides*, all three are distinctly larger and none of them have erected setae on external surface of proximal part of hind tibia and suberected setae on antennal scape covering its 1/3 apical part.

Biological notes. Species inhabiting moist, closed canopy forests, which are most often located in stream valleys. Nesting in wet soil, under shallow and small rocks. Nests, most often, located in the vicinity of water sources. Workers were found in the litter or on the rocks surrounding the nest entrance. Colonies appear monogynous. All samples were collected in low altitudes 10-342 m.

95. *Lasius turcicus* complex

Lasius turcicus Santschi, 1921 + *Lasius neglectus* Van Loon, Boomsma & Andrasfalvy, 1990 + *Lasius precursor* Seifert, 2020

(Figs 95.1-8)

Lasius niger st. *turcica* Santschi, 1921 a: 115.
Lasius (*Lasius*) *neglectus* Van Loon, Boomsma & Andrasfalvy, 1990: 350.
Lasius precursor Seifert, 2020 a: 51.

Distribution in Greece (whole complex): **Greece generally** (Seifert 1992: 10); **Aegean Islands** (Borowiec & Salata 2013: 358, Borowiec & Salata 2018: 6, Salata & Borowiec 2019 b: 120; **new data:** Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E; Lesbos, Sykaminia, 305 m, 12 VI 2015, 39.3586 N / 26.2911 E; Samos, 1.2 km SE of Mesokampos, 3 m, 6 X 2019, 37.70603 / 26.97805; Samos, Nachtigallental, 50-100 m, 9 VI 2013, 37.7 N / 26.63333 E); **Crete** (Borowiec & Salata 2012: 505, Borowiec & Salata 2015: 25, Salata & Borowiec 2017: 296, Salata et al. 2020 a: 23); **Cyclades** (Salata & Borowiec 2017: 297, Seifert 2020 a: supplementary material; **new data:** Andros, 1.3 km SW of Kato Fellos, 30 m, IV-XI 2006, 37.89778 / 24.70833; Naxos, above Akrotiri, 46 m, 30 VI 2016, 37.1298 / 25.4481; Naxos, Aliki, 15 m, 4 VII 2016, 36.9799 / 25.388; Naxos, Kinidaros, 410 m, 3 VII 2016, 37.1006 / 25.4833); **Dodecanese** (Legakis 2011: 27, Borowiec & Salata 2012: 505, Salata & Borowiec, 2016: 199, Seifert 2020 a: supplementary material, Borowiec et al. 2021: 19); **Epirus** (Borowiec & Salata 2018 a: 7); **Macedonia** (Borowiec & Salata 2012: 505, Salata & Borowiec 2019 b: 104; **new data:** Pieria, Mt. Olympus, Old Ag. Moni Dionizou vic., 870 m, 12 V 2019, 40.09207 / 22.42658; Pieria, Platamonas Castle hill loc. 1, 12 m, 11 V 2019, 40.00868 / 22.59654); **Peloponnese** (Borowiec & Salata 2013: 358, Borowiec & Salata 2017: 211, Salata & Borowiec 2019 b: 114, 115, Borowiec & Salata 2021 b: 9); **Sterea Ellas** (Legakis 2011: 27, Seifert 2020 a: supplementary material); **Thrace** (Bračko et al. 2016: 20).

neglectus: Aegean Islands; Dodecanese; Sterea Ellas.

precursor: Dodecanese.

turcicus: Aegean Islands; Crete; Dodecanese; Epirus; Macedonia; Peloponnese; Thrace.

Distribution in Europe and Mediterranean Basin:

neglectus: Andorra; Belgium; Bulgaria; France: mainland; Georgia; Germany; Great Britain; Greece; Hungary; Iran; Israel; Italy: mainland; Netherlands; Poland; Portugal; Romania; Spain: Canary Is., mainland; Turkey.

precursor: Greece; Turkey.

turcicus: Austria; Bulgaria; Croatia; Czech Rep.; Georgia; Greece; Iran; Montenegro; Serbia; Slovakia; Slovenia; Syria; Turkey.

Description. Moderately large to large ML 0.83-1.16, *neglectus*: HL 0.653-0.929 (mean 0.826), HW 0.559-0.849 (mean 0.743); *precursor* : HL 0.711-0.912 (mean 0.792), HW 0.635-0.853 (mean 0.714); *turcicus*: HL 0.749-1.050 (mean 0.895), HW 0.646-0.989 (mean 0.822). Scape moderately elongate, *neglectus*: SL 0.644-0.861 (mean 0.776), *precursor*: SL 0.667-0.833 (mean 0.735), *turcicus*: SL 0.702-0.949 (mean 0.835). **Color.** Head and gaster usually reddish brown to pale brown, mesosoma usually yellowish brown, antennae and legs pale yellowish brown (Figs 95.1-8). Some colonies pale colored, mostly pale yellowish brown, other dark colored, mostly brown with slightly paler mesosoma, antennae and legs. Specimens from colonies with very small workers often very dark colored, predominantly brown. **Structure and setation.** Head slightly elongated, with convex sides and straight posterior margin (Figs 95.4, 8). Terminal segment of maxillary palpi long with length of sixth segment: *neglectus* 0.133-0.164 (mean 0.153), *precursor* 0.130-0.165 (mean 0.149), *turcicus* 0.141-0.186 (mean 0.169). Occipital part of head with 14-24 erected setae. Gena with 4-6 erected setae, underside of head with 4-6 erected setae. Mesosomal dorsum with several short erected setae. Length of the longest seta: *neglectus* 0.090-0.134 (mean 0.112), *precursor* 0.080-0.116 (mean 0.098), *turcicus* 0.099-0.131 (mean 0.109). Below propodeal spiracle 3-5 erected setae. Masticatory border of mandibles with 7 teeth. Antennal scapi with smooth pubescence lacking erected setae or at most with one erected setae. Hind tibiae on external surface in basal parts usually without, occasionally with 1-3 erected setae. Ventral surface of fore femora with 4-7 and mid femora 2-5 erected setae, of hind femora with 1-3 setae close to base of femur, anterior surface of fore coxa with several long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus very sparse, not covering Clypeus (Figs 95.4, 8). Surface of gastral tergites distinctly sculptured , first gastral tergite in central part with numerous erected setae. Propodeum in lateral view rather low and obtuse, metanotal groove shallow (Figs 95.2, 6).

Comparative remarks. *Lasius turcicus* complex is characterized by: antennal scapi lacking erected setae, hind tibiae with at most a single erected seta basally, numerous erected setae in area below propodeal stigma, and short and sparse pubescence of clypeus. Also, this complex is well distinguished from other species by the lowest number of denticles (6-7) on masticatory border of mandibles, hind tibiae usually lacking erected setae and rather low and obtuse propodeum.

Biological notes. *Lasius turcicus* prefers shady, moisty and wet habitats in forests close to water. Nests were observed in both deciduous and coniferous forests but also in olive plantations and gardens in tourist resorts and towns. Most localities are from low altitude from sea level to 400 m, the highest point was from Dikti Mts. on Crete at altitude 1750 m. *Lasius neglectus* was observed in luminous oak and pine forests, olive plantations, and parks in tourist resorts and towns. Most localities are from low altitude from sea level to 400 m, the highest point was from Thrace at altitude 930 m but in Asia Minor some populations ascend to 1900 m (Seifert 2020 a). According to Seifert (2020 a) *Lasius precursor* was collected in rural grassland. The altitudinal distribution of 51 samples ranges from 5 to 1116 m with the median at 237 m and 86% of all findings below 400 m.

Subgenus *Austrolasius* Faber, 1967

A key to species of the subgenus *Austrolasius*

1. More hairy species, fore femora and tibiae on lateral surface with numerous suberected to erected setae (Fig. 96.2) ..... ***Lasius carniolicus* Mayr,** p. 207

—. Less hairy species, fore femora and tibiae on lateral surface without or with only a few suberected to erected setae (Fig. 97.2) ..... ***Lasius reginae* Faber**, p. 208

Review of species

96. *Lasius carniolicus* Mayr, 1861

(Figs 96.1-7)

Lasius carniolicus Mayr, 1861: 51;
Lasius (*Chthonolasius*) *carniolicus* var. *kusnezovi* Karavaiev, 1929: 212.

Distribution in Greece: Peloponnese (Legakis 2011: 26).

Distribution in Europe and Mediterranean Basin: Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Estonia; France: mainland; Germany; Greece; Hungary; Italy: mainland, Sardinia; Netherlands; ?North Macedonia; Norway; Poland; Russia; Serbia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Monomorphic, gynes very small, not larger than workers. Moderately large, HL 0.881-0.913, HW 0.865-897, ML 0.96-1.08. Scape moderately elongate, SL 0.714-0.754. **Color.** Whole body including appendages pale yellow (Figs 96.1-4). **Structure and setation.** Head from slightly transverse to slightly longer than wide, sides rounded, occipital margin slightly concave (Fig. 96.3). Eyes small, head length at least 9.5 times the maximum diameter of eye. Whole frontal head covered with short, appressed and moderately dense pubescence, shiny surface well visible. Frontal erected setae short and sparse. Occipital part of head with 16-20 moderately long erected setae. Gena lacking erected setae, underside of head with 8-12 erected setae in upper half of head. Mesosomal dorsum with several long erected setae, length of the longest seta 0.088. Below propodeal spiracle 3-5 erected setae. Masticatory border of mandibles with 6-7 teeth. Antennal scapi with short appressed and in apical 2/3 length of dorsal surface slightly decumbent pubescence, erected setae absent. Lateral surface of femora and tibiae with numerous short, suberect to erected setae. Ventral surface of femora with several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence of mesosoma short and dense, shiny surface well visible, gaster with slightly longer and denser pubescence than mesosoma but microsculptured and shiny surface well visible, first gastral tergite in central part with sparse, short erected setae. Pubescence of clypeus short and sparse, not covering Clypeus (Fig. 96.3). Propodeum in lateral view low and obtuse, metanotal groove moderately deep (Fig. 96.2).

Gyne as in Figs 96.4-6, body small, only slightly larger than in workers. Male as in Fig. 96.7.

Comparative remarks. Both Greek members of the subgenus *Austrolasius* are very similar and difficult to identification without comparative materials. *Lasius carniolicus* is

generally more hairy and setose with higher number of semierect hair and erected setae on both ventral and dorsal sides of head and lateral surface of femora and tibia (usually > 11 semierect hair and erected setae of length 10 μm while in *L. reginae* the number of semierect hair and erected setae is usually < 7). For more detailed morphometric differences see Seifert (2018 p. 127).

Biological notes. No recently confirmed data from Greece. In other countries this species occurs in xerothermous grassland, short-grassy mountain pastures and luminous pine forests. Nests under stones, often with a flat mound of soil material. In mountain in Europe ascending to 1650 m but in Pakistan the highest locality was from an altitude of 2600 m (Seifert 2018).

97. *Lasius reginae* Faber, 1967

(Figs 97.1-4)

Lasius (*Austrolasius*) *reginae* Faber, 1967: 75.

Distribution in Greece: Macedonia (**new data:** Pieria, Mt. Olympus, Litohoro-Prionia rd., 1010 m, 12 V 2019, 40.1078 / 22.46315); **Peloponnese** (Borowiec & Salata 2017: 213).

Distribution in Europe and Mediterranean Basin: Austria; Bulgaria; Czech Republic; Germany; Greece; Hungary; Serbia; Slovakia; Slovenia; Switzerland; Turkey.

Description. Monomorphic, gynes very small, not larger than workers. In most characters very similar to L. carniolicus but slightly smaller and less setose. Moderately large, HL 0.809-0.944, HW 0.794-937, ML 0.89-1.06. Scape moderately elongate, SL 0.651-0.746. **Color.** Whole body including appendages pale yellow (Figs 97.1-4). **Structure and setation.** Head from slightly transverse to slightly longer than wide, sides rounded, occipital margin slightly concave (Fig. 97. 4). Eyes small, head length at least 9.5 times the maximum diameter of eye. Whole frontal head covered with short, appressed and moderately dense pubescence, shiny surface well visible. Frontal erected setae short and sparse. Occipital part of head with 12-18 long erected setae. Gena lacking erected setae, underside of head with 8-12 erected setae in upper half of head. Mesosomal dorsum with several long erected setae, length of the longest seta 0.082. Below propodeal spiracle 3-5 erected setae. Masticatory border of mandibles with 6-7 teeth. Antennal scapi with short appressed and in apical half of dorsal surface slightly decumbent pubescence, erected setae absent. Lateral surface of femora and tibiae without or with only few suberect setae. Ventral surface of femora with few erected setae, anterior surface of fore coxa with few short erected setae. Pubescence of mesosoma short and moderately dense, shiny surface well visible, gaster with slightly longer and denser pubescence than mesosoma but microsculpured and shiny surface well visible, first gastral tergite in central part with sparse, short erected setae. Pubescence of clypeus short and sparse, not covering Clypeus (Fig. 97. 4). Propodeum in lateral view low and obtuse, metanotal groove moderately deep (Fig. 97. 2).

Comparative remarks. See comparative remarks under *Lasius carniolicus*.

Biological notes. Noted from luminous mountain mixed and pine forests from an altitude between 1010 and 1480 m. Nests under stones and directly in soil.

Subgenus *Cautolasius* Wilson, 1955 and genus *Metalasius* Boudinot, Borowiec & Prebus, 2022

A key to species of the subgenus *Cautolasius* and the genus *Metalasius*

1. Eyes small but well visible (Figs 98.2, 99.2). Frontal face of head with erected setae (Fig. 98.1). Hypostoma with carina along lateral margin. Larger species, HW 0.603-0.952 ... . 2.

—. Eyes rudimental (Fig. 100.2). Frontal face of head lacking erected setae (Fig. 100.1). Hypostoma lacking carina along lateral margins. Smaller, HW 0.500-0.524 .... ***M. myrmidon* Mea***, p. 212

2. Eyes very small, head length at least 7.5 times longer than the maximum diameter of eye. Thermophilous species, prefers warm and sunny habitats ..... ***L. myops* Forel**, p. 211

—. Eyes larger, head length 6.0-7.2 times longer than the maximum diameter of eye. Mesophilous species, prefers shady habitats ..... ***L. flavus* (Fabricius)**, p. 209

Review of species

98. *Lasius flavus* (Fabricius, 1782)

(Figs 98.1-6)

Formica flava Fabricius, 1782; 491;
Lasius flavus var. *fuscoides* Ruzsky, 1902 a: 16;
Lasius flavus var. *odoratus* Ruzsky, 1905: 282;
Formicina flava var. *morbosa* Bondroit, 1918: 28;
Lasius (*Chthonolasius*) *umbratus* st. *ibericus* Santschi, 1925: 349;
Lasius umbratus ibericus var. *sancho* Santschi, 1925: 350 unavailable name;
Lasius (*Chthonolasius*) *umbratus* var. *apennina* Menozzi, 1925: 34;
Lasius (*Lasius*) *flavus* var. *olivacea* Karavaiev, 1926: 194.

Distribution in Greece: Epirus (Legakis 1983: 5, 2011: 26; **new data:** Ioanina, Smolikas n. Palioseli, 1630 m, 20 VI 2007, 40.07087 / 20.88944); **Ionian Islands** (Forel 1886: clxvii, Emery, 1901: 57, Legakis 2011: 26, Borowiec & Salata 2014 a: 515; **new data:** Cephalonia, Ainos Mts. loc. 1, 1598 m, 8 VI 2019, 38.1387 / 20.66157; Cephalonia, Ainos Mts. loc. 3, 1330 m, 8 VI 2019, 38.15258 / 20.63944; Cephalonia, Ainos Mts, 1430 m, 15 VI 2021, 38.12251 / 20.68765; Cephalonia, 3.8 km W of Tzanata, 759 m, 14 VI 2021, 38.1355 / 20.70529); **Macedonia** (Forel 1886: clxvii, Legakis 2011: 26, Borowiec & Salata 2012: 500, 2022: 7; **new data:** Drama, Elatia Forest, 1590 m, 10 VIII 1999, 7 X 1999, 41.4926 N / 24.3165 E; Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E; Pieria, Mt. Olympus, Prionia loc. 1, 1065 m, 12 V 2019, 40.08523 / 22.40733; Pieria, Mt. Olympus, Prionia-Mt. Olympus trail loc. 1, 1200 m, 12 V 2019, 40.08122 / 22.400123); **Peloponnese** (Legakis 2011: 26, Borowiec & Salata 2017: 211, Salata & Borowiec 2019 b: 105, Borowiec & Salata 2021 b:

*Based on most recent discoveries this species is considered as a member of newly described ant genus *Metalasius*. For more details see comments in the species account.

8); **Sterea Ellas** (Finzi 1928: 791, Legakis 2011: 26, Borowiec & Salata 2018 e: 8, Salata & Borowiec 2019 b: 120, Borowiec & Salata 2021 b: 8); **Thessaly** (Forel 1886: clxvii, Legakis 2011: 26, Borowiec & Salata 2018 b: 228); **Thrace** (Bračko et al. 2016: 19).

Distribution in Europe and Mediterranean Basin: Albania; Algeria; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Channel Is.; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Sardinia, Sicily; Hungary; Iran; Ireland; Italy: mainland, Sardinia; Latvia; Lithuania; Luxembourg; Moldova; Montenegro; Morocco; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: Baleares, mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Polymorphic, HL 0.674-0.953, HW 0.603-0.952, ML 0.76-1.14. Scape moderately elongate, SL 0.556-0.800. **Color.** Whole body including appendages pale yellow (Figs 98.1-4). **Structure and setation.** Head from slightly longer than wide to as long as wide, sides rounded, occipital margin straight to slightly concave (Fig. 98.4). Eyes small, head length 6.0-7.2 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and dense pubescence and sparse, long, erected setae. Occipital part of head with 6-8 long erected setae. Gena and underside of head lacking erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.143. Below propodeal spiracle no erected setae. Masticatory border of mandibles with 5-6 teeth. Antennal scapi with short appressed and slightly decumbent pubescence, erected setae absent onwhole anterior and dorsal surface. Hind tibiae lacking erected setae on external surface. Ventral surface of fore femora with up to two erected setae, od mid- and hind femora lacking erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus sparse, not covering Clypeus (Fig. 98.4). Surface of gastral tergites with microsculpture but shiny, first gastral tergite in central part with sparse, long erected setae. Propodeum in lateral view moderately high, slightly conical, metanotal groove deep (Fig. 98.2).

Gyne as in Figs 98.5, 6.

Comparative remarks. Eyes small but well visible (Fig. 98.2) and frontal face of head with erected setae (Fig. 98.1) place this species only close to *Lasius myops* which differs from *L. flavus* in smaller body size and smaller eyes (HL at least 7.5 times bigger than the maximum diameter of eye while in *L. flavus* head length is only 6.0-7.2 times bigger than the maximum diameter of eye). In Greece, both species are separated ecologically: *L. flavus* prefers shadowy, wet habitats, and occupies localities placed up to 1720 m a. s. l. while *L. myops* is more thermophilous and prefers luminous and warm oak forests and occasionally pine forests laced between 300-800 m a.s.l.

Biological notes. In Greece, it is one of the least thermophilic species of the genus *Lasius*, it prefers mountain and shady forests. Most records are from coniferous forests (especially fir forests) but it was noted also from mountain deciduous forests, stream valleys in deciduous forests, pastures with mixed forests, roadsides in coniferous forests, mixed forests close to parkings and alpine pastures with shrubs. Nests under stone, rarely in stable soil mound cemented by the dense root turf made of diverse plants. Most records are from 800 to 1720 m a. s. l., only in northern Greece it was noted from 100 to 700 m.

99. *Lasius myops* Forel, 1894

(Figs 99.1-4)

Lasius flavus r. *myops* Forel, 1894 a: 12;
Lasius myops flavoides Forel, 1894 a: 12;
Formicina flava var. *flavomyops* Emery, 1916 a: 241.

Distribution in Greece: Crete (Salata et al. 2020 a: 22); **Macedonia** (Legakis 2011: 27, Borowiec & Salata 2012: 503); **Thessaly** (Borowiec & Salata 2018: 229); **Thrace** (Bračko et al. 2016: 20).

Distribution in Europe and Mediterranean Basin: Algeria; Austria; Azerbaijan; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Italy: mainland, Sicily; Montenegro; Morocco; ?North Macedonia; Portugal; Romania; Serbia; Slovakia; Slovenia; Spain: mainland; Switzerland; Turkey.

Description. Polymorphic, in all characters very similar to *L. flavus* but slightly smaller with smaller eyes, HL 0.683-0.937, HW 0.600-0.881, ML 0.75-1.08. Scape moderately elongate, SL 0.468-0.730. **Color.** Whole body including appendages pale yellow (Figs 99.1-4). **Structure and setation.** Head from slightly longer than wide to as long as wide, sides rounded, occipital margin straight to slightly concave (Fig. 99.4). Eyes very small, head length at least 7.5 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and dense pubescence and sparse, long, erected setae. Occipital part of head with 4-6 long erected setae. Gena and underside of head lacking erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.175. Below propodeal spiracle no erected setae. Masticatory border of mandibles with 5-6 teeth. Antennal scapi with short appressed and slightly decumbent pubescence, erected setae absent onwhole anterior and dorsal surface. Hind tibiae lacking erected setae on external surface. Ventral surface of fore femora with up to two erected setae, od mid- and hind femora lacking erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus sparse, not covering Clypeus (Fig. 99.4). Surface of gastral tergites with microsculpture but shiny, first gastral tergite in central part with sparse, long erected setae. Propodeum in lateral view moderately high, slightly conical, metanotal groove deep (Fig. 99.2).

Comparative remarks. Small but well visible eyes and frontal face of head with erected setae place this species only close to *L. flavus* which differs from *L. myops* in larger body size and larger eyes (HL only 6.0-7.2 times bigger than the maximum diameter of eye while in *L. myops* HL is at least 7.5 times bigger than the maximum diameter of eye). In Greece, both species are separated ecologically: *L. myops* is more thermophilous and prefers luminous and warm oak forests and occasionally pine forests from 300 to 800 m a.s.l. while *L. flavus* prefers shadowy and wet habitats, in the mountains occurs up to 1720 m.

Biological notes. More thermophilous than its sister species *Lasius flavus*. Noted from luminous oak forests, one record comes from pine forest. Nests under stones or on cracked rock walls bonded with clay. All records are from low and mid altitude from 300 to 800 m.

100. *Metalasius myrmidon* (Mei, 1998)

(Figs 100.1-4)

Lasius myrmidon Mei, 1998: 177.

Distribution in Greece: Peloponnese (Borowiec & Salata 2013: 357); **Sterea Ellas** (Mei, 1998: 180, Legakis 2011: 27); **Thessaly** (Borowiec & Salata 2018: 229).

Distribution in Europe and Mediterranean Basin: Endemic to Greece.

Description. Slightly polymorphic, HL 0.571-0.619, HW 0.500-0.524, ML 0.59-0.64. Scape moderately elongate, SL 0.460-0.492. **Color.** Whole body including appendages pale yellow (Figs 100.1-4). **Structure and setation.** Head 1.1-1.2 times longer than wide, almost parallelsided or with slightly rounded sides, occipital margin shallowly concave (Fig. 100.4). Eyes rudimental. Whole frontal head covered with moderately long and moderately dense pubescence, erected setae absent. Occipital part of head lacking erected setae, only with some subdecumbent hair. Gena and underside of head lacking erected setae. Mesosomal and promesosomal dorsum with several long erected setae, length of the longest seta 0.079, propodeum lacking erected setae. Below propodeal spiracle single seta. Masticatory border of mandibles with 5-6 teeth. Antennal scapi with short appressed and slightly decumbent pubescence, erected setae absent butapically with suberect hair. Hind tibiae lacking erected setae on external surface. Ventral surface of femora lacking erected setae, anterior surface of fore coxa with two long erected setae. Pubescence on the whole body and appendages very dense and whitish. Pubescence of clypeus very sparse, not covering Clypeus (Fig. 100.4). Surface of gastral tergites with microsculpture but shiny, first gastral tergite in central part with sparse, long erected setae. Propodeum in lateral view low to moderately high, obtuse, metanotal groove moderately deep (Fig. 100.2).

Comparative remarks and taxonomical note. *Lasius myrmidon* have unique morphological characters and most recent molecular studies revealed that it is not monophyletic with *Lasius* and was transferred to newly established genus *Metalasius* (Boudinot et al. 2021). As the revision of *Lasius* was published recently, we could not implement proposed changes in our monograph and *Metalasius myrmidon* is listed here in its obsolete combination. *Metalasius* differs from *Lasius* in eyes situated in anterior half of head as measured in full-face view (eyes situated in posterior half of head in *Lasius*), reduced metapleural gland orifice with opening directed posteriorly (metapleural gland orifice small to very large and opening laterally as well as posteriorly in *Lasius*), propodeal spiracle situated in lower half of propodeum in profile view (propodeal spiracle situated at or above midheight of propodeum in *Lasius*), antennomere III broader than long (usually longer than broad in *Lasius*), and hypostoma lacking carina along lateral margin (carina present in *Lasius*).

Biological notes. Very rare species noted from oak forests, mixed forest and pine forest. Small nests under stones. All collecting sites were from mid altitude between 540 and 600 m.

Subgenus *Chthonolasius* Ruzsky, 1912

A key to species of the subgenus *Chthonolasius*

1. Whole surface of first gastral tergite with erected setae. Petiolar scale of variable shape .... 2.

—. Dorsal area of first gastral tergite lacking erected setae except row of setae at front and posterior margin of the tergite. Petiolar scale very high with deeply excised upper margin ..... ***L. bicornis*** Förster, p. 215

2. Erected setae on mesosomal dorsum long, GHL 0.058-0.135 mm. Dorsal surface of scape and external side of hind tibiae sometimes with setae ..... 3.

—. Erected setae on mesosomal dorsum very short, GHL 0.037-0.055 mm. Dorsal surface of scape and external side of hind tibiae without setae ..... ***L. mixtus*** **(Nylander)**, p. 219

3. Petiole in caudal view slightly notched, concave, straight or convex dorsal crest and usually only slightly tapering dorsad ..... 4.

—. Petiole in caudal view with a deeply incised dorsal crest and strongly tapering dorsad. Genae usually with 0-3 setae ..... ***L. citrinus*** **Emery**, p. 216

4. Petiole not or slightly narrowing anterad, dorsal crest truncate or with shallow excavation at apex. Hind tibia without or with numerous erected setae ..... 5.

—. Petiole distinctly narrowing anterad, dorsal crest usually clearly convex or with very shallow notch at apex. Hind tibia with numerous erected setae ..... ***L. jensi*** **Seifert**, p. 217

5. Dorsum of first gastral tergite with dense to moderately dense pubescence and frontal face of the tergite with short setae. Surface of first gastral tergite more or less distinctly microsculptured, usually appears slightly dull or shiny ..... 6.

—. Dorsum of first gastral tergite with sparse pubescence and frontal face of the tergite with long setae. Surface of first gastral tergite with diffused microsculpture, appears smooth and shiny ..... ***L. nitidigaster*** **Seifert**, p. 220

6. Erected setae on mesosomal dorsum long, GHL > 0.090 mm. Dorsal surface of scape and external side of hind tibiae with several erected setae ..... 7.

—. Erected setae on mesosomal dorsum short, GHL< 0.090 mm. Dorsal surface of scape and external side of hind tibiae without setae or with only few semierected setae .... ***L. sabularum*** **(Bondroit)**, p. 221

7. Small to moderate species, CW up to 1.044 mm. Second segment of antennal funicle moderately elongate, at most 1.5 times as long as wide. Pubescence of gaster moderately dense, the average distance between setae on first gastral tergite less than 35 μm. Hind tibia and antennal scape not to strongly flattened ..... 8.

—. Large species, CW up to 1.270 mm. Second segment of antennal funicle elongate, approximately 1.6 times as long as wide. Pubescence of gaster sparse, the average distance between setae on first gastral tergite is 35 μm. Hind tibia and antennal scape strongly flattened ..... ***L. viehmeyeri*** **Emery**, p. 223

8. Hind tibia moderately wide and not strongly flattened, HTmax/CS distinctly less than 0.1449. Antennal scape moderately flattened. Appressed pubescence on gastral tergites denser ..... 9.

—. Hind tibia strongly widened and flattened, HTmax/CS up to 0.1449. Antennal scape strongly flattened. Appressed pubescence on gastral tergites sparser. Hind tibia with numerous standing setae ..... ***L. meridionalis*** **(Bondroit)**, p. 218

9. External margin of hind tibia usually with less than 10 erected setae, sometimes lacking erected setae. Antennal scapus with only few semierected and erected setae, sometimes lacking erected setae. Here two species distinguishable only for characters of queen caste ..... ***L. balcanicus* Seifert & *L. distinguendus* (Emery)**, p. 214

—. External margin of hind tibia usually with more than 10 erected setae. Antennal scapus with numerous semierect and erected setae ..... ***L.umbratus* (Nylander)**, p. 222

Review of species

101. *Lasius balcanicus* Seifert, 1988 + *Lasius distinguendus* (Emery, 1916)
(Figs 101.1-7)

Formicina umbrata subsp. *distinguenda* Emery, 1916 b: 64;
Formicina umbrata var. *nuda* Bondroit, 1917 b: 176;
Formicina distinguenda var. *hybrida* Bondroit, 1918: 33 (= *Formicina umbrata* ssp. *distinguenda* var. *hybrida* Emery, 1916 b: 66 unavailable name);
Lasius umbratus ssp. *distinguendus* var. *cereomicans* Stärcke, 1937: 49 unavailable name;
Lasius (*Chthonolasius*) *balcanicus* Seifert, 1988: 152.

Note: Only workers of species belonging to the *balcanicus-distinguendus* complex were collected in Greece. Because both species are distinguishable only based on morphological differences in gynes, we provide only characteristics of the complex.

Distribution in Greece: Macedonia (Legakis 2011: 26, Borowiec & Salata 2012: 499); **Peloponnese** (Borowiec & Salata 2017: 210 - as *Lasius balcanicus* or *L. distinguendus*); **Sterea Ellas** (Borowiec & Salata 2018 e: 8); **Thessaly** (**new data:** Larissa, Mt. Olympus, Mt. Olympus, 6.2 km NE of Karya, 935 m, 13 V 2019, 40.00703 / 22.46108); **Thrace** (Legakis 2011: 26).

Distribution in Europe and Mediterranean Basin: Andorra; Armenia; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; France: mainland; Georgia; Germany; Greece; Hungary; Italy: mainland; Moldova; Montenegro; Netherlands; ?North Macedonia; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Switzerland; Turkey; Ukraine.

Description. *Lasius balcanicus* and *L. distinguendus* differ only in gyne caste, for differences see comparative characters. Monomorphic, small to moderately large, HL 1.032-1.175, HW 1.008-1.151, ML 1.17-1.37. Scape moderately elongate, SL 0.825-0.992. **Color.** Whole body including appendages pale yellow (Figs 101.1-4). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 101.4). Eyes very small, head length 7.1-8.7 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence, and sparse, short to moderately long, erected setae, surface well visible, microsculptured but shiny. Occipital part of head with 24-28 long erected setae. Gena and underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.159. Below propodeal spiracle 5-8 short erected setae. Antennal scapi mod-

erately flattened, anterior surface with short appressed and slightly decumbent pubescence and in apical 2/3 length with suberect hair and 0-3 short erected setae, posterior surface with 0-6 erected setae. Hind tibiae moderately broad and flattened, with (0)2-6 (8) suberect to erected setae on external surface. Ventral surface of femora and tibiae with several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages moderately dense and whitish. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 101.4). Surface of gastral tergites distinctly sculptured but shiny, first gastral tergite on the whole surface with dense, moderately long erected setae. Petiolar scale slightly broadened in the middle, slightly narrowed anterad, upper margin with shallow median emargination. Propodeum in lateral view high, slightly conical or with obtuse top, metanotal groove deep (Fig. 101.2).

Gyne as in Figs 101.5-7.

Comparative remarks. Both species belong to the group of species with long erected setae on mesosoma, petiolar scale slightly broadened medially, slightly narrowed anterad with shallowly emarginate upper margin, and antennal scapus and hind tibiae usually with few suberected to erected setae. The most similar to members of this complex is *L. sabularum* but it differs in distinctly shorter erected setae. Also, less setose specimens of *Lasius umbratus* can be confused with species of the *balcanicus-distinguendus* complex but they differ in antennal scapus and hind tibia always with erected setae (on external margin of hind tibia usually with more than 10 setae).

Gynes of *L. balcanicus* and *L. distinguendus* can be distinguished based on the following characters:

1. Erected setae on anterior part of dorsal plane of first gastral tergite very long: GHL 0.137-0.176. Scape long SL/HW 0.804-0.962 ..... ***L. balcanicus* Seifert**

—. Erected setae on anterior part of dorsal plane of first gastral tergite very long: GHL 0.080-0.092. Scape short SL/HW 0.732-0.787 ..... ***L. distinguendus* (Emery)**

Biological notes. Noted from coniferous, pine and fir forests, and sunny locations in deciduous forests in mountains. In Greece, nests under stones, in other countries also in soil. Collecting sites recorded from mid and high altitude between 668 and 1480 m.

102. *Lasius bicornis* Förster, 1850

(Figs 102.1-3)

Lasius bicornis Förster, 1850 a: 177.

Distribution in Greece: Macedonia (Legakis 2011: 26); **Peloponnese** (Legakis 2011: 26); **Sterea Ellas** (Stärcke 1937: 56, Legakis 1984: 87, 2011: 26).

Distribution in Europe and Mediterranean Basin: Algeria; Armenia; Austria; Belgium; Bulgaria; Croatia; Czech Rep.; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Italy: mainland, Sardinia; Luxembourg; Netherlands; Poland; Romania; Russia; Serbia; Slovakia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Monomorphic, large, HL 1.127-1.186, HW 1.127-1.306, ML 1.30-1.35. Scape moderately elongate, SL 0.968. **Color.** Whole body including appendages pale

yellow (Figs 102.1-3). **Structure and setation.** Head from as long as wide to longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 102.3). Eyes very small, head length at least 6.9 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and sparse, in anterior part of frons short in posterior part long, erected setae, surface well visible, with diffused microsculpture, rather micropunctate, shiny. Occipital part of head with 6-10 long erected setae. Gena lacking erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.182. Below propodeal spiracle no erected setae. Antennal scapi distinctly flattened, on anterior face with only short appressed pubescence, on posterior surface with appressed and slightly decumbent pubescence, lacking suberect hair or erected setae. Hind tibiae moderately broad and slightly flattened, covered with only smooth appressed pubescence, lacking erected hair. Ventral surface of fore femora with 6-8 long erected setae, of mid femora with 2-3 setae, and on hind femora without or with a single erected seta, anterior surface of fore coxa with few moderately long erected setae. Pubescence on the whole body moderately dense and whitish. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 102.3). Surface of gastral tergites with microsculpture but shiny, first gastral tergite only on anterior slope and close posterior margin with erected setae, central part lacking erected setae, subsequent tergites with sparse erected setae. Petiolar scale strongly narrowed from base to apex, upper margin with very deep median emargination, apex appears bidentate. Propodeum in lateral view high, slightly conical, metanotal groove deep (Fig. 102.2).

Comparative remarks. A very distinct species, it differs from all congeners in central part of the first gastral tergite lacking erected setae, and narrow and high petiolar scale with extremely deep apical emargination.

Biological notes. No confirmed or recent records from Greece. In European countries it was noted inside or at margins of dry to humid deciduous forests, also in grasslands with single old trees and in parks of towns. Nets always near or in deciduous trees, partly in soil, leaf litter or under moss.

103. *Lasius citrinus* Emery, 1922

(Figs 103.1-4)

Formica affinis Schenck, 1852: 62 not Leach 1825: 290;
Lasius bicornis var. *citrina* Emery, 1922: 12.

Distribution in Greece: Dodecanese (Forel 1889: 256 (as *Lasius umbratus* r. *affinis*); **Epirus** (**new data:** Thesprotia, Ag. Kyriaki vic., 870 m, 20 VI 2007, 39.48867 / 20.53374; Zagori, Pindus Mts., 4 V 2017); **Macedonia** (Borowiec & Salata 2012: 499; **new data:** Kastoria, Nea Kotili, 1325 m, 17 VI 2007, 40.351 / 21.032; Kastoria, Pefkofito vic., 1270 m, 17 VI 2007, 40.34877 / 20.93888); **Peloponnese** (Stärcke 1937: 56); **Thessaly** (Legakis 2011: 26; **new data:** Larissa, Mt. Olympus, 4.6 km E of Karya, 830 m, 13 V 2019, 39.99709 / 22.44375).

Distribution in Europe and Mediterranean Basin: Algeria; Armenia; Austria; Belgium; Bulgaria; Croatia; Czech Rep.; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Italy: mainland, Sardinia; Luxembourg; Netherlands; Poland; Romania; Russia; Serbia; Slovakia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Monomorphic, large, HL 0.992-1.286, HW 0.952-1.246, ML 1.24-1.56. Scape moderately elongate, SL 0.857-1.079. **Color.** Whole body including appendages pale yellow (Figs 103.1-4). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 103.4). Eyes small, head length at least 6.2 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and sparse, moderately long to long, erected setae, surface well visible, microsculptured but shiny. Occipital part of head with 8-12 long erected setae. Gena with 0-3 erected setae, underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.143. Below propodeal spiracle4-8 short erected setae. Antennal scapi slightly flattened, anterior surface with short appressed and slightly decumbent pubescence and in apical half with suberect hair, posterior surface in apical half with suberect hair. Hind tibiae not flattened, HTmax/CS less than 0.1445, lacking suberect or erected setae on external surface. Ventral surface of femora with 6-8 erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on head and mesosoma and appendages moderately dense and whitish, , on gaster dense, partly covering surface of tergites. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 103.4). Surface of gastral tergites distinctly sculptured , shiny, first gastral tergite on the whole surface with dense, long erected setae. Petiolar scale distinctly narrowed to the apex, upper margin with very deep median emargination. Propodeum in lateral view moderately high, broadly obtuse, metanotal groove deep (Fig. 103.2).

Comparative remarks. *Lasius citrinus* differs from congeners in very deeply emarginate petiolar scale and scapus and hind tibiae lacking erected setae.

Biological notes. Recorded from mountain deciduous forest and old quarry close to coniferous forest. In Greece, nests were found under stones, in other countries noted also from dead logs and the root zone of living and dead old trees. Collecting sites noted from mid and high altitude between 567 and 1325 m.

104. *Lasius jensi* Seifert, 1982

(Figs 104.1-7)

Lasius (*Chthonolasius*) *jensi* Seifert, 1982: 85.

Distribution in Greece: Macedonia (Borowiec & Salata 2012: 501; **new data:** Kastoria, Kotili vic., 1560 m, 16 VI 2008, 40.34087 / 20.99719; Pieria, Mt. Olympus, Old Ag. Moni Dionizou vic., 870 m, 12 V 2019, 40.09207 / 22.42658); **Peloponnese** (Borowiec & Salata 2021 b: 8); **Thessaly** (Borowiec & Salata 2018: 228); **Thrace** (Bračko et al. 2016: 20.

Distribution in Europe and Mediterranean Basin: Armenia; Austria; Belgium; Bulgaria; Czech Rep.; Germany; Greece; Hungary; Montenegro; Netherlands; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Switzerland.

Description. Monomorphic, small to moderately large, HL 0.929-1.095, HW 0.873-1.048, ML 1.11-1.32. Scape moderately elongate, SL 0.817-0.952. **Color.** Whole body including appendages pale yellow (Figs 104.1-4). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 104.4). Eyes small, head length at least 7.2 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and dense, long, erected setae, surface well visible, microsculptured but shiny. Occipital part of head with

24-32 long erected setae. Gena and underside of head with numerous and long erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.159. Below propodeal spiracle 6-10 short erected setae. Antennal scapi distinctly flattened, with short appressed and decumbent pubescence and in apical 2/3 length, on both anterior and posterior surface, with erect hair. Hind tibiae moderately broad and moderately flattened, with 18-40 suberect to erected setae on external surface. Ventral surface of femora and tibiae with several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages dense and whitish. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 104.4). Surface of gastral tergites with microsculpture but distinctly shiny, first gastral tergite on the whole surface with dense, moderately long erected setae. Petiolar scale narrowed apically, upper margin bluntly pointed to narrowly rounded, occasionally with narrowly truncate apex. Propodeum in lateral view high, slightly conical with slightly obtuse top, metanotal groove deep (Fig. 104.2).

Gyne as in Figs 104.5-7.

Comparative remarks. *Lasius jensi* differs from congeners in narrow and narrowed apically petiolar scale with bluntly pointed to narrowly rounded upper margin lacking apical emargination (sometimes upper margin with very small and shallow emargination). Also, it is one of the most setose members of the subgenus *Chthonolasius* with numerous erect setae on both anterior and posterior surfaces of scapus and external and lateral margins of hind tibia.

Biological notes. Recorded from mountains, luminous deciduous and mixed forests, mountain pastures at side of coniferous forest and from rocky alpine pastures. Prefers sunny and warm sites. In Greece, nests under stones, in other countries also simply in soil. Collecting sites noted from mid and high altitude between 594 and 1520 m.

105. *Lasius meridionalis* (Bondroit, 1920)

(Figs 105.1-7)

Formicina meridionalis Bondroit, 1920: 143.

Distribution in Greece: Macedonia (Legakis 2011: 27).

Distribution in Europe and Mediterranean Basin: Austria; Belgium; Britain; Bulgaria; Czech Rep.; Denmark; Finland; France: mainland; Germany; Greece; Hungary; Italy: mainland; Netherlands; Norway; Poland; Portugal; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Monomorphic, small to moderately large, HL 0.841-0.952, HW 0.825-0.921, ML 0.96-1.08. Scape moderately elongate, SL 0.714-0.833. **Color.** Whole body including appendages pale yellow (Figs 105.1-4). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 105.4). Eyes very small, head length at least 6.6 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and sparse, long, erected setae, surface well visible, microsculptured but shiny. Occipital part of head with 12-18 long erected setae. Gena and underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.135. Below propodeal spiracle1-2 short erected setae. Antennal scapi distinctly flattened, with short appressed and slightly decumbent pubescence and in apical 2/3 length, with suberect hair. Hind tibiae broad and flattened, HTmax/CS up to 0.1449, with 5-40 suberect to erected setae on

external surface. Ventral surface of femora with several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages moderately dense and whitish. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 105.4). Surface of gastral tergites with microsculpture but shiny, first gastral tergite on the whole surface with dense, moderately long erected setae. Petiolar scale nearly parallelsided, upper margin with shallow median emargination. Propodeum in lateral view high, slightly conical, metanotal groove deep (Fig. 105.2).

Comparative remarks. *Lasius meridionalis* belong to the complex of species with scapus and hind tibiae with suberected to erected setae and differs from its relatives in strongly widened and flattened hind tibiae with HTmax/CS up to 0.1449 and sparser appressed pubescence on gastral tergites.

Biological notes. No confirmed or recent data from Greece. In other countries it was noted from sandy xerothermous grassland and grassy parts of open sandy heaths, more rarely in limestone grassland and xerothermous patches on rock. In Greece, most likely is occurs in mountains and inhabits open habitats.

106. *Lasius mixtus* (Nylander, 1846)

(Figs 106.1-7)

Formica mixta Nylander, 1846 b: 1050.

Distribution in Greece: Epirus (Borowiec & Salata 2018 a: 7); **Ionian Islands** (Emery, 1901: 57, Legakis 2011: 27); **Peloponnese** (Borowiec & Salata 2017: 211).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Channel Is.; Croatia; Czech Rep.; France: Corsica; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Ireland; Italy: mainland; Latvia; Lithuania; Luxembourg; Moldova; Netherlands; North Ireland; North Macedonia; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Monomorphic, large, HL 0.968-1.127, HW 0.897-1.040, ML 1.14-1.29. Scape moderately elongate, SL 0.794-0.905. **Color.** Whole body including appendages pale yellow (Figs 106.1-4). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 106.4). Eyes very small, head length at least 6.1 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and sparse, short, erected setae, surface visible, distinctly microsculptured but shiny. Occipital part of head with 8-14 short erected setae. Gena and underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.063. Below propodeal spiracle 5-8 short erected setae. Antennal scapi not flattened, anterior surface with short appressed and slightly decumbent pubescence lacking erected setae, at most with some subdecumbent pubescence, posterior surface also at most with decumbent pubescence but lacking erected setae. Hind tibiae moderately broad and flattened, usually lacking erected setae on external surface or at most with 1-3 short erected setae. Ventral surface of femora and tibiae with few erected setae, anterior surface of fore coxa with few short erected setae. Pubescence on appendages, head and mesosoma dense and whitish, , on gaster distinctly denser than on mesosoma and partly covering surface. Pubescence of clypeus sparse, not covering clypeus

surface (Fig. 106.4). Surface of gastral tergites distinctly sculptured but shiny, first gastral tergite on the whole surface with dense, short erected setae hardly visible in profile. Petiolar scale slightly broadened in the middle, slightly narrowed anterad, upper margin with shallow median emargination or truncate. Propodeum in lateral view high, slightly conical or with obtuse top, metanotal groove deep (Fig. 106.2).

Gyne as in Figs 106.5-7.

Comparative remarks. *Lasius mixtus* has the shortest setae on mesosomal dorsum and gastral tergites (GHL 0.037-0.055) and the longest setae on mesosoma < 0.064. It belongs to the species complex characterized by dorsal surface of scape and external side of hind tibiae lacking erected setae and differs from *L. citrinus* and *L. sabularum* in absence of erected setae on scapus and hint tibiae, shallow emargination of apical margin of petiolar scale, and short erected setae on gaster.

Biological notes. Recorded from roadsides in coniferous forests and sunny places inside coniferous forests. In Greece, nests under stones but in other countries nests were also found in soil. Collecting sites noted from mid and high altitude between 920 and 1470 m.

107. *Lasius nitidigaster* Seifert, 1996

(Figs 107.1-4)

Lasius nitidigaster Seifert, 1996: 185, 1997 b: 201-205.

Distribution in Greece: Thessaly (Borowiec & Salata 2012: 504, Borowiec & Salata 2018: 229; **new data:** Larissa, Mt. Olympus, 3.9 km E of Karya, 790 m, 13 V 2019, 39.99133 / 22.44169).

Distribution in Europe and Mediterranean Basin: Bulgaria; Croatia; Czech Rep.; Georgia; Greece; Hungary; Montenegro; Serbia; Slovakia; Slovenia; Turkey.

Description. Monomorphic, moderately large, HL 1.000-1.270, HW 0.984-1.246, ML 1.19-1.62. Scape elongate, SL 0.873-1.159. **Color.** Whole body including appendages pale yellow (Figs 107.1-4). **Structure and setation.** Head as long as wide to slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 107.4). Eyes very small, head length at least 7.2 times the maximum diameter of eye. Whole frontal head covered with short, appressed and moderately dense pubescence and sparse, moderately long, erected setae, surface well visible, with diffused microsculpture, shiny. Occipital part of head with 18-24 long erected setae. Gena and underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.151. Below propodeal spiracle 2-3 short erected setae. Antennal scapi slightly flattened, on anterior surface with short decumbent pubescence and in apical 2/3 length with suberect hair and few erect setae. Hind tibiae moderately broad and only slightly flattened, with partly decumbent pubescence and 4-12 suberect to erected setae on external surface. Ventral surface of femora with few to several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages short and sparse and whitish, which is smooth and shiny. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 107.4). Surface of gastral tergites with diffused microsculpture, appears smooth and shiny, first gastral tergite on the whole surface with dense and long erected setae. Petiolar scale nearly parallelsided, upper margin with shallow median emargination or occasionally with rounded or truncate upper margin. Propodeum in lateral view moderately high to high, slightly conical with obtuse top, metanotal groove deep (Fig. 107.2).

Comparative remarks. *Lasius nitidigaster* differs from congeners in smooth and shiny gaster with diffused microsculpture and very dilute pubescence, long and dense body hairs, and long scapus.

Biological notes. Recorded from mountain pastures with limestone rocks and pastures close to coniferous forest. In Greece, nests under stones but in other countries also simply in soil. Collecting sites noted from mid and high altitude between 790 and 1000 m.

108. *Lasius sabularum* (Bondroit, 1918)

(Figs 108.1-7)

Formicina umbrata var. *sabularum* Bondroit, 1918: 30.

Distribution in Greece: Not recorded from Greece but its occurrence in Bulgaria suggests its possible presence in northern Greece.

Distribution in Europe and Mediterranean Basin: Austria; Belgium; Britain; Bulgaria; Czech Rep.; France: mainland; Germany; Netherlands; Poland; Romania; Slovakia; Slovenia; Spain: mainland; Switzerland.

Description. Monomorphic, large, HL 1.095-1.90, HW 1.063-1.190, ML 1.33-1.43. Scape elongate, SL 0.929-1.008. **Color.** Whole body including appendages pale yellow (Figs 108.1-4). **Structure and setation.** Head from as long as wide to slightly longer than wide, sides rounded, occipital margin slightly concave (Fig. 108.4). Eyes very small, head length at least 6.0 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and sparse, moderately long, erected setae, surface well visible, microsculptured but shiny. Occipital part of head with 14-18 long erected setae. Gena and underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.087. Below propodeal spiracle 5-8 short erected setae. Antennal scapi moderately flattened, anterior surface with short appressed and slightly decumbent pubescence lacking erected setae, at most with some subdecumbent pubescence, posterior surface lacking erected setae, sometimes with 1-2 suberect setae. Hind tibiae moderately broad and flattened, usually lacking suberect or erected setae on external surface, sometimes with 1-3 erected setae. Ventral surface of femora and tibiae with erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on appendages, head and mesosoma moderately dense and whitish, on gaster distinctly denser than on mesosoma but not covering surface. Pubescence of clypeus sparse, not covering clypeus surface (Fig. 108.4). Surface of gastral tergites distinctly sculptured but shiny, first gastral tergite on the whole surface with dense, moderately long erected setae. Petiolar scale slightly broadened in the middle, slightly narrowed anterad, upper margin with shallow median emargination. Propodeum in lateral view high, slightly conical, metanotal groove deep (Fig. 108.2).

Gyne as in Figs 108.5-7.

Comparative remarks. Short erected setae on mesosoma and usually lack of erected setae on antennal scapus and external margin of hind tibia place this species only close to *Lasius mixtus*. *L.mixtus* differs from *L. sabularum* in short and sparse setation of mesosoma (length of the longest seta <0.064) and short erected setae on gastral tergites.

Biological notes. No data from Greece. In other countries it was noted from woodland margins with open habitats, old orchards, meadows, semidry grassland with few bushes and trees. Nests under large stones or in rotten tree trunks.

109. *Lasius umbratus* (Nylander, 1846)

(Figs 109.1-4)

Formica umbrata Nylander, 1846 b: 1048;
Lasius umbratus var. *mixtoumbratus* Forel, 1874: 48;
Lasius umbratus var. *exactus* Ruzsky, 1902 c: 15;
Lasius umbratus var. *affinoumbratus* Donisthorpe, 1914: 40;
Formicina belgarum Bondroit, 1918: 31;
Lasius umbratus var. *hirtiscapus* Stärcke, 1937: 43;
Chthonolasius affinis var. *nyaradi* Röszler, 1943: 47.

Distribution in Greece: Cyclades (Forel 1889: 256, Legakis 2011: 27); **Dodecanese** (Legakis 2011: 27).

Distribution in Europe and Mediterranean Basin: Albania; Armenia; Austria; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Ireland; Italy: mainland, Sardinia; Latvia; Lithuania; Luxembourg; North Macedonia; Moldova; Montenegro; Netherlands; North Ireland; Norway; Poland; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Monomorphic, Moderately large to large, HL 0.857-1.159, HW 0.809-1.111, ML 0.97-1.35. Scape moderately elongate, SL 0.738-0.984. **Color.** Whole body including appendages pale yellow (Figs 109.1-4). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin straight to slightly concave (Fig. 109.4). Eyes very small, head length at least 6.6 times the maximum diameter of eye. Whole frontal head covered with moderately long, appressed and dense pubescence and sparse, moderately long, erected setae, surface partly invisible, microsculptured but shiny. Occipital part of head with 14-20 long erected setae. Gena and underside of head with numerous erected setae. Mesosomal dorsum with several long erected setae, length of the longest seta 0.135. Below propodeal spiracle 6-10 erected setae. Antennal scapi not flattened, with short decumbent and subdecumbent pubescence with several suberect hair and erected setae. Hind tibiae moderately broad, not flattened, with 10-30 suberect to erected setae on external surface. Ventral surface of femora and tibiae with several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages moderately dense to dense and whitish, on head and mesosoma not on gaster. Pubescence of clypeus sparse, not covering Clypeus (Fig. 109.4). Surface of gastral tergites with microsculpture but shiny, first gastral tergite on the whole surface with dense, moderately long erected setae. Petiolar scale slightly broadened in the middle, slightly narrowed anterad, occasionally parallelsided, upper margin usually with shallow median emargination. Propodeum in lateral view high, slightly conical, usually with obtuse top, metanotal groove deep (Fig. 109.2).

Comparative remarks. *Lasius umbratus* belongs to the species complex characterized by setose antennal scapus and external margin of hind tibia, and slightly broadened medially and slightly narrowed anterad petiolar scale with shallowly emarginate upper margin. *L. umbratus* is similar to the *balcanicus-distinguendus* complex but both species differ from *L. umbratus* in distinctly less setose antennal scapi and tibia. Small specimens of *L. umbratus* are similar to *L. meridionalis* but have distinctly narrower and not flattened hind tibiae.

Biological notes. No recent or confirmed data from Greece. In other countries it was noted from woodland and open habitats of diverse structure but it avoid extremely dry and very wet habitats. Nests in soil, under stones, in rotten logs and hollow tree stems. In southern Alps ascending to 1700 m.

110. *Lasius viehmeyeri* Emery, 1922

(Figs 110.1-5)

Lasius umbratus var. *viehmeyeri* Emery, 1922: 13*;*
Lasius viehmeyeri var. *dalmatica* Stärcke, 1937: 53.

Distribution in Greece: Peloponnese (Emery 1922: 14 - as *Lasius umbratus* var. *viehmeyeri*, Stärcke 1937: 56, Seifert 1990: 3, Legakis 2011: 28).

Distribution in Europe and Mediterranean Basin: Greece; Croatia; Romania; Serbia.

Description. No specimen available to study, description based on Boer (2003) paper. Monomorphic, very large, HW 1.270. **Color.** Whole body including appendages pale yellow (Figs 110.1, 2). **Structure and setation.** Head slightly longer than wide, sides rounded, occipital margin slightly concave. Whole frontal head covered with moderately long, appressed and moderately dense pubescence and sparse, moderately long, erected setae, surface well visible, microsculptured but shiny. Occipital part of head with at least 14 long erected setae. Gena and underside of head with numerous erected setae. Antennal scapi distinctly flattened, with short appressed and slightly decumbent pubescence and in apical 2/3 length, with numerous suberect and erected hair. Hind tibiae broad and slightly flattened, with at least 20 suberect to erected setae on external surface. Ventral surface of femora and tibiae with several erected setae, anterior surface of fore coxa with few long erected setae. Pubescence on the whole body and appendages moderately dense and whitish. Pubescence of clypeus sparse, not covering surface of clypeus. Surface of gastral tergites with microsculpture but shiny, first gastral tergite on the whole surface with sparse, long erected setae, length of the longest seta 0.143. Petiolar scale nearly parallelsided, upper margin with shallow median emargination. Propodeum in lateral view high, conical, metanotal groove deep (Fig. 110.2).

Gyne as in Figs 110.3-5.

Comparative remarks. *Lasius viehmeyeri* belongs to complex of species with numerous erected setae on antennal scapus and external margin of hind tibia. It differs from relatives in large body size with HW 1.270. Only the largest workers of *L. citrinus* have HW close to 1.250 but they differ in scapus and hind tibiae lacking erected setae.

Biological notes. No detailed data from Greece. A single queen was collected in forest at an altitude 800-1000 m.

Subgenus *Dendrolasius* Ruzsky, 1912

In Greece only one species.

111. *Lasius fuliginosus* (Latreille, 1798)

(Figs 111.1-8)

Formica fuliginosa Latreille, 1798: 36.

Distribution in Greece: Macedonia (Legakis 2011: 26, Borowiec & Salata 2012: 501; **new data:** Drama, Mt. Falakro, 1300 m, 6 VII 1996, 41.2939 N / 24.0948 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E); **Thrace** (Bračko et al. 2016: 20).

Distribution in Europe and Mediterranean Basin: Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Czech Rep.; Denmark; Estonia; Finland; France: mainland; Georgia; Germany; Greece; Hungary; Ireland; Italy: mainland, Sicily; Latvia; Lithuania; Luxembourg; North Macedonia; Moldova; Montenegro; Netherlands; Norway; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Very large, HL 1.333-1.571 (mean 1.448), HW 1.302-1.540 (mean 1.418), ML 1.33-1.54. Scape moderately elongate, SL 1.167-1.333 (mean 1.243). **Color.** Body, femora, tibiae concolours dark brown to black (Figs 111.1-4). Mandibles reddish, antennae yellowish brown, tarsi yellowish. **Structure and setation.** Head as wide as long or slightly elongated, with convex sides and deeply concave posterior margin, appears heart-shaped, clypeus without median keel (Fig. 111.4). Maxillary palpi short, not extending to the half-length of ventral side of head. Setation of head short and sparse, occipital part of head with 8-14 short erected setae. Gena lacking erected setae, underside of head with 8-26 short erected setae. Mesosomal dorsum with several short erected setae, length of the longest seta 0.095. Below propodeal spiracle no erected setae. Masticatory border of mandibles with 7-8 teeth. Antennal scapi with smooth pubescence, on ventral space decumbent, erected setae absent. Hind tibiae with slightly decumbent pubescence, on external surface lacking erected setae. Ventral surface of femora lacking erected setae, anterior surface of fore coxa with few short erected setae. Pubescence on head and mesosoma short and sparse, whitish, surface microreticulate but appears smooth and shiny. Pubescence of clypeus short and sparse, hardly visible, Clypeus smooth and shiny (Fig. 111.4). Pubescence of gastral tergites slightly shorter and denser than on mesosoma, surface with microsculpture but shiny, first gastral tergite in central part with sparse, short erected setae. Propodeum in lateral view low and rounded, metanotal groove deep (Fig. 111.2).

Gyne as in Figs 111.5-7, male as in Fig. 111.8.

Comparative remarks. A very distinct species. Its deep dark brown to black body, short and sparse vestiture, shiny body surface and deeply emarginate occipital part of head distinguishes it from all members of the genus *Lasius*.

Biological notes. In Greece rare, inhabits mountain deciduous forests, occasionally noted also from coniferous forests. Prefers shady and humid habitats. Arboricolous, nests in living trees, preferably growing near streams or water intakes. Absent in high mountains, collecting sites were noted from low to mid altitude between 100 to 1200 m.

Genus *Lepisiota* Förster, 1850

Useful identification keys, revisions and taxonomic papers: no recent studies focused on the Eastern Mediterranean.

Diagnosis. Monomorphic; mandibles with 5-6 teeth, tooth 3 smaller than tooth 4; palp formula 6:4; antennae 11-segmented; antennal scape very long, without projected setae; antennal sockets close to the posterior clypeal margin; eyes moderately large, placed in or slightly behind the midlength of head; mesothorax strongly constricted immediately behind the pronotum; mesosoma dorsally without or with few setae; propodeum bidentate; first gastral tergite without stout projected setae except row of setae close to the posterior margin; metapleural gland present; propodeal spiracle circular to subcircular; no tibial pectinate spurs

on meso- and metatibia; petiole in form of scale bidentate apically; acidopore with a seta-fringed nozzle.

In Greece at least four named species and four morphospecies of unclear status.

A key to species of the genus *Lepisiota*

1. Body predominantly black, at most mesonotal constriction reddish, sometimes also posterior half of mesonotal dorsum and base of petiolar scale yellowish brown (Figs 116.1, 2, 117.1, 2, 118.1, 2). Gynes body completely brown to black (Figs 116.5, 6, 118.5,6).....2.

—. Mesosoma partly to completely red, often head partly to completely reddish, if only mesonotum partly reddish brown then pronotum with more than two erected setae (Figs 112.1, 2, 113.1, 2, 114.1, 2, 115.1, 2, 119.1, 2). Gynes body partly yellowish to red (Figs 113, 56, 114.5, 6, 13, 14, 115.7, 8) ..... 4.

2. Body completely black or mesonotal constriction partly reddish brown (Figs 118.1, 2) .... ***L. nigra* (Dalla Torre)**, p. 238

—. Body black, mesonotal constriction distinctly reddish (Figs 116.1, 2, 117.1, 2) ..... 3.

3. Head, mesosoma and gaster with diffused microreticulation, surface shiny (Figs 116.1, 2). Pronotum in fresh specimens usually with a pair of erected setae (in mature specimens sometimes without setae). Widespread in Greece ..... ***L. melas* (Emery)**, p. 234

—. Head and gaster with diffused microreticulation, surface shiny, mesosoma strongly microsculptured, surface indistinctly dull (Figs 117.1, 2). Pronotum in fresh specimens without or at most with a single erected seta. Karpathos Island …..... ..... ***L.* cf. *melas*_KARPATHOS**, p. 236

4. Head and mesosoma uniformly yellowish red (Figs 112.1, 2, 113.1, 2) ..... 5.

—. Head usually completely dark, distinctly darker than mesosoma, sometimes only occipital part of head slightly obscure, if head completely red then pronotum with numerous erected setae (Figs 114.1, 2, 9, 10, 115.1, 2, 119.1, 2) ..... 6.

5. Head, mesosoma and petiolar scale red, gaster black, sometimes occipital part of head slightly obscure (Figs 112.1, 2). Petiolar scale high, strongly narrowed apically with deep apical emargination ..... ***L.* cf. *caucasica*_MACEDONIA**, p. 226

—. Head, mesosoma and gaster yellowish red (Figs 113.1, 2). Petiolar scale low, moderately narrowed apically with shallow apical emargination .... ***L.* cf. *caucasica*_KARYOFYLLAS**, p. 227

6. Pronotum usually with more than 4 erected setae, meso- and metanotum and first gastral tergite often with a pair or more of erected setae (Figs 115.5, 6, 119.1, 2) ..... 7.

—. Pronotum with 0- 3, occasionally 4 erected setae, meso- and metanotum and first gastral tergite lacking erected setae (Figs 114.1, 2, 9, 10) ..... ***L. frauenfeldi* (Mayr)**, p. 229

7. Mesosoma mostly reddish; meso- and metanotum, first gastral tergite and petiolar scale often with a pair or more of erected setae (Figs 119.1, 2). Microsculpture of head and mesosoma less visible, surface appears distinctly shiny ..... ***L. syriaca* (André)**, p. 239

—. Mesosoma mostly brown, only metanotal constriction reddish and posterior part of pronotum and mesonotum reddish brown, occasionally sides of pronotum and propodeum reddish laterally and brown dorsally; meso- and metanotum, first gastral tergite and petiolar scale lacking erected setae, occasionally in the largest workers propodeum with a pair of short erected setae (Figs 115.1, 2, 5, 6). Microsculpture of head and mesosoma more visible, surface appears less shiny ..... ***L.* cf. *frauenfeldi*_AEGEAN**, p. 232

Review of species

112. *Lepisiota* cf. *caucasica*_MACEDONIA

(Figs 112.1-4)

Distribution in Greece: **Macedonia** (Borowiec & Salata 2012: 506 – as *Lepisiota caucasica*).

Distribution in Europe and Mediterranean Basin: Greece; Turkey.

Description. Moderately large, HL: 0.595-0.698 (mean 0.655); HW: 0.465-0.544 (mean 0.522); SL: 0.905-1.000 (mean 0.941); EL: 0.146-0.178 (mean 0.166); ML: 1.02-1.14; MW: 0.33-0.43. **Color.** Head, mesosoma and petiolar scale completely yellowish red or red, in some specimens occipital part of head slightly infuscate; gaster black, antennae and legs completely yellowish red (Figs 112.1-4). **Head.** 1.2- 1.3 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 112.4). Clypeus with convex anterior and straight posterior margin, arched medially, without or with obtuse median keel, on the whole surface with diffused microreticulation but shiny, with short and sparse appressed hairs and a row of 5 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.114. Head with diffused microreticulation, shiny, with a pair of erected setae in interantennal, interocular and ocellar area**,** sometimes with additional 1-2 erected setae in occipital corners, no erected setae on gena and ventral side of head. Scape long, 1.69-1.95 times longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.7 times as long as wide and 1.5 times longer than second segment, the second funicular segment 1,9 times as long as wide, and distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 112.3). Eyes big, short oval, 0.25 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.5-3.0 times as long as wide, dorsally with diffused microreticulation, laterally with more distinct microreticulation, surface shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle. Whole mesosomal surface unpubescent, pronotum with 4-6 erected

setae, mesonotum lacking erected setae and propodeum without or with a pair of erected setae (Fig. 112.2). **Waist and gaster.** Petiolar scale elongate, thin in lateral view and narrow in anterior view, widened at the middle then distinctly narrowed anterad, apex deeply emarginate, anterolateral corners form acute denticle, without or with a single erected seta. Gaster shorter than mesosoma, first tergite with indistinctly diffused microreticulation, sometimes appears completely smooth, subsequent tergites basally distinctly microreticulated tending to form transverse cells, surface shiny, covered with short and sparse appressed pubescence, distance between hairs much larger than their length. First tergite with up to 4 erected setae centrally and a row of long, erected setae close to posterior margin (Fig. 112.2). **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora with a single erected seta basally, of mid and hind femora lacking erected setae.

Comparative remarks. Completely or almost completely yellowish red head, mesosoma and petiolar scale place this species close only to *L.* cf. *caucasica*_KARYOFYLLAS. But *L.* cf. *caucasica*_KARYOFYLLAS differs in completely yellowish red gaster while in *L.* cf. *caucasica* gaster is black.

Biological notes. Biology of this morphospecies is little known, in Greece was collected on stone wall in mountain village at the altitude 305 m. In Aegean Turkey it was collected in luminous pine forest at an altitude 1020 m, and in open areas within ancient ruins at altitudes 6 m and 692 m.

Note. Legakis (2011) noted *Lepisiota caucasica* from Aegean Islands, Ionian Islands, Macedonia, Peloponnese and Sterea Ellas but due to taxonomic and nomenclatorial chaos in *Lepisiota* these records are doubtful. *Lepisiota caucasica* Santschi, 1917 was described from Armenia and its status remains uncertain. Lack of recent revision of this genus and a high number of valid infraspecific taxa described within the *L. frauenfeldi* complex do not allow to state whether the populations from Greece and Aegean Turkey are the true *L. caucasica* or if they represent another, yet undescribed species.

113. *Lepisiota* cf. *caucasica*_KAROFYLLAS

(Figs 112.1-7)

Distribution in Greece: **Dodecanese** (Borowiec et al. 2021: 19).

Distribution in Europe and Mediterranean Basin: Greece.

Description. Moderately large, HL: 0.659; HW: 0.510); SL: 0.906; EL: 0.175; ML: 1.03; MW: 0.38. **Color.** Head, mesosoma, petiolar scale and gaster completely yellowish red, antennae and legs completely yellow (Figs 112.1-7). **Head.** Approximately 1.3 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 113.4). Clypeus with convex anterior and straight posterior margin, arched medially, without median keel, on the whole surface with diffused microreticulation but shiny, with short and sparse appressed hairs and a row of 4 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.130. Head with diffused microreticulation, strongly shiny, with a pair of erected setae in frons, without setae in frontal and occipital areas but this may be an artifact as the only studied worker's specimen was very worn. Scape elongate, 1.78 times longer than width of head, in basal 3-4 length thin then distinctly widened

and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 3.3 times as long as wide and 1.24 times longer than second segment, the second funicular segment 2.8 times as long as wide, and only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 113.3). Eyes big, short oval, 0.27 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.7 times as long as wide, dorsally and laterally with diffused microreticulation, surface strongly shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with short, spiniform denticle. Whole mesosomal surface unpubescent, pronotum with a pair of erected setae, mesonotum and propodeum lacking erected setae (Fig. 113.2). **Waist and gaster.** Petiolar scale short, thin in lateral view and narrow in anterior view, widened at the middle then narrowed anterad, apex very shallowly emarginate, anterolateral corners form obtuse denticles, lacking erected seta. Gaster shorter than mesosoma, first tergite in anterior half practically without microreticulation, posteriorly with strongly diffused microreticulation, surface strongly shiny, subsequent tergites distinctly microreticulated but surface strongly shiny, gastral tergites covered with short and sparse appressed pubescence, distance between hairs much larger than their length, erected setae absent onlywith a row of long, erected setae close to posterior margin (Fig. 113.2). **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora with a single erected seta basally, of mid and hind femora lacking erected setae.

Gyne. Whole body reddish brown, antennae and legs yellow. Mesosoma narrow, area between mesonotal sutures narrow, length of mesosoma from anterior margin of pronotum to posterior margin of propodeum/distance between mesonotal sutures at base 3.03 (Figs 113.5-7).

Comparative remarks. *Lepisiota* cf. *caucasica*_KAROFYLLAS is the only Greek member of the genus with completely yellowish red body. *Lepisiota* cf. *caucasica*_MACEDONIA appears similar due to completely pale head, mesosoma and petiolar scale but differs in black gaster. Also, *L.* cf. *caucasica*_KAROFYLLAS is the only Greek species with reddish brown body of gynes. In other species, gynes are bicoloured (composition of red mixed with brown and black) or uniformly black.

Biological notes. Biology unknown, the only nest was observed under stone near the seashore at an altitude 1 m. Karofyllas is a very small island of Dodecanese placed close to Kasos and Karpathos islands, characterized by very dry and rocky habitats without trees.

114. *Lepisiota frauenfeldi* (Mayr, 1855) complex

(Figs 114.1-14)

Hypoclinea frauenfeldi Mayr, 1855: 378;
Acantholepis frauenfeldi var. *pubescens* Forel, 1892 c: 41;
Acantholepis frauenfeldi var. *integra* Forel, 1894 b: 411;
Acantholepis frauenfeldi var. *kantarensis* Forel, 1911 a: 351;
Acantholepis frauenfeldi var. *barbara* Santschi, 1917: 44;

Acantholepis frauenfeldi st. *integra* var. *minima* Santschi, 1917: 44 unavailable name;
Acantholepis frauenfeldi st. *saharensis* Santschi, 1917: 44;
Acantholepis frauenfeldi var. *variabilis* Santschi, 1917: 43;
Acantholepis frauenfeldi var. *libanica* Santschi, 1921 a: 115;
Acantholepis frauenfeldi subsp. *ferganica* Kuznetsov-Ugamsky, 1929 a: 490;
Acantholepis frauenfeldi subsp. *surchanica* Kuznetsov-Ugamsky, 1929 a: 491;
Acantholepis frauenfeldi var. *azerbeidzhanica* Karavaiev, 1932: 250;
Acantholepis frauenfeldi var. *marocana* Santschi, 1936: 206;
Acantholepis frauenfeldi var. *truncata* Finzi, 1940: 162;
Acantholepis frauenfeldi subsp. *velox* Baroni Urbani, 1968: 480;
Acantholepis frauenfeldi subsp. *kassansai* Tarbinsky, 1976: 132.

Note: In Greece, *Lepisiota frauenfeldi* (Mayr) forms two morphotypes which are partly sympatric. Workers of these morphotypes are very similar but these two forms can be easily separated based on morphology of gynes. Taxonomic status of these morphotypes is unclear and needs molecular study. Perhaps they represent two distinct species but due to the general infraspecific variability of various populations we provisionally treat these morphotypes as belonging to one variable taxon. With great probability most of infraspecific taxa described within *L. frauenfeldi* complex and noted above as synonymies represent distinct species.

Distribution in Greece (whole complex): **Aegean Islands** (Finzi 1928: 791 - as *Acantholepis frauenfeldi*, Collingwood 1993: 195, Legakis 2011: 24, Salata & Borowiec 2017: 295-299, Borowiec & Salata 2018 c: 6; **new data:** Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E; Lesbos, Argennos, 548 m, 12 VI 2015, 39.35494 N / 26.2661 E; Lesbos, Eftalou, 60 m, 2 VIII 2009, 39.37833 N / 26.21833 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, Kalloni salines, 3 m, 10 VI 2015, 39.21687 N / 26.26662 E; Lesbos, 3 km N of Kalloni, 191 m, 9 VI 2015, 39.26158 N / 26.2073 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, n. Mantamados, 150 m, 30 VII 2009, 39.3 N / 26.35 E; Lesbos, 1.7 km NW of Megali Limni, 381 m, 10 VI 2015, 39.11343 N / 26.30738 E; Lesbos, Piges Pesa, 113 m, 10 VI 2015, 39.12736 N / 26.26342 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E); **Crete** (Forel 1886: clxvii - as *Acantholepis frauenfeldi*, Emery 1894: 11 - as *Acantholepis freuenfeldi*, Legakis 2011: 24, Borowiec & Salata 2012: 507 - as *Lepisiota melas*); **Crete** (Salata et al. 2020 a: 27); **Cyclades** (Collingwood 1993: 195, Legakis 2011: 24); **Dodecanese** (Collingwood 1993: 195, Legakis 2011: 24, Borowiec et al. 2021: 19); **Epirus** (Borowiec & Salata 2018 a: 7); **Ionian Islands** (Roger 1859: 243 - as *Formica* (*Hypoclinea*) *frauenfeldi*, Emery 1898: 125 - as *Acantholepis frauenfeldi*, Emery, 1901: 57 (as *Acantholepis frauenfeldi*, Emery 1914: 158, Collingwood 1993: 195, Legakis 2011: 24, Borowiec & Salata 2014 a: 515, Salata & Borowiec 2017: 295-299, Borowiec & Salata 2018 d: 6, Salata & Borowiec 2019 b: 100-104, 113, 114, Borowiec & Salata 2021 a: 8; **new data:** Cephalonia, Kapandriti vic. loc. 2, 160 m, 9 VI 2019, 38.11361 / 20.73201; Cephalonia, Katapodata, 100 m, 10 VI 2019, 38.23337 / 20.64594; Cephalonia, 1.5 km NE of Koulourata, 273 m, 10 VI 2019, 38.20667 / 20.67715; Cephalonia, Lourdata, 4 m, 14 VI 2021, 38.11421 / 20.62931; Cephalonia, 1.7 km NW of Pastra, 335 m, 9 VI 2019, 38.1084 / 20.74085; Cephalonia, 2 km SW of Poros, 50 m, 18 VI 2021, 38.13659 / 20.75968; Cephalonia, 2.4 km W of Poros, 56 m,

18 VI 2021, 38.13924 / 20.75005; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala, 19 m, 17 VI 2021, 38.07683 / 20.79644; Lefkada, 1.2 km W of Kalavros, 330 m, 2 IX 2016, 38,80662 N / 20,66471 E; Lefkada, Kavalikefta beach, 57 m, 12 VI 2021, 38.75366 / 20.59056; Lefkada, Lefkada town, 4 m, 11 VI 2021, 38.82645 / 20.71254, Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595; Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747; Lefkada, Vasiliki beach, 2 m, 12 VI 2021, 38.63156 / 20.59903); **Macedonia** (Borowiec & Salata 2012: 506 and 507 - as *Lepisiota melas* and *Lepisiota* cf. *melas* sp. 1, Salata & Borowiec 2019 b: 104, Borowiec & Salata 2022: 8 as *Lepisiota frauenfeldi* morp. 1 and morph. 2; **new data:** Drama, 12 km S of Livadero, 500 m, 9 X 1999, 41.2351 N / 24.1936 E; Halkidiki, Kassandra, Kassandrino-Polihrono rd., 100 m, 29 VIII 2009, 40 N / 23.43333 E; Halkidiki, Metamorfosi-Metangisi rd., 81 m, 27 VIII 2009, 40,24536 N / 23.61279 E); **Peloponnese** (Forel 1886: clxvii - as *Acantholepis frauenfeldi*, Collingwood 1963: 116, Legakis 2011: 24, Borowiec & Salata 2015: 53, Salata & Borowiec 2017: 295-299, Borowiec & Salata 2017 b: 213, Salata & Borowiec 2019 b: 105, 114, 115, Borowiec & Salata 2021 b: 9); **Sterea Ellas** (Forel 1886: clxvii - as *Acantholepis frauenfeldi*, Finzi 1928: 791 - as *Acantholepis frauenfeldi*, Finzi 1939: 157 - as *Acantholepis frauenfeldi*, Legakis 1984: 86 - as *Acantholepis frauenfeldi*, 2011: 24, Borowiec & Salata 2017 a: 1-2, Salata & Borowiec 2017: 295-299, Borowiec & Salata 2018 e: 8, Salata & Borowiec 2019 b: 107; **new data:** Aetolia-Acarnania, Nafpaktos, Nafpaktos Castle, 125 m, 9 VI 2021, 38.39595 / 21.82464; Attica, Athens, 110 m,10 VII 2016, 37.97222 N / 23.72527 E; Attika, Pireus beach, 5 m,10 VII 2016, 37.92083 N / 23.69777 E); **Thessaly** (Finzi 1939: 157 - as *Acantholepis frauenfeldi*, Legakis 2011: 24, Borowiec & Salata 2012: 507 - as *Lepisiota melas*, Borowiec & Salata 2018 b: 229; **new data:** Ossa Mts., Kokkino Nero, 10 m, 7 VIII 2009, 39.833 N / 22.792 E; Ossa Mts., Kokkino Nero, 35 m, 1 VIII 2009, 39.836 N / 22.788 E); **Thrace** (Finzi 1939: 157 - as *Acantholepis frauenfeldi*, Bračko et al. 2016: 21).

Distribution in Europe and Mediterranean Basin (whole complex): Albania; Algeria; Armenia; Azerbaijan; Bulgaria; Croatia; Cyprus; Georgia; Greece; Israel; Italy: mainland, Sicily; Lebanon; Libya; Malta; Morocco; North Macedonia; Portugal; Saudi Arabia; Serbia; Spain: Baleares, mainland; Syria; Tunisia; Turkey - C Asia.

Description. Morphotype 1: Moderately large, HL: 0.587-0.698 (mean 0.638); HW: 0.452-0.527 (mean 0.492); SL: 0.762-0.876 (mean 0.841); EL: 0.151-0.190 (mean 0.169); ML: 0.88-1.06; MW: 0.35-0.42. **Color.** Head yellowish brown to dark brown, gena sometimes paler than rest of head surface, mesosoma usually completely yellowish red or red only in the darkest form pronotum dorsally with brown obscure spot and occasionally also anterior part of mesonotal dorsum obscure, petiolar scale uniformly yellowish to reddish or often pale basally and obscure apically; antennae and legs from completely yellowish red to scapi with obscure broadened apical part, in dark forms coxa, femora and tibiae brown with yellowish knee and apex of tibia, often fore tibiae completely yellow and mid and hind tibiae indistinctly infuscated, gaster always dark colored, brown to black (Figs 114.1-4). **Head.** 1.2- 1.4 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 114.4). Clypeus with convex anterior and straight posterior margin, arched medially, without or with obtuse median keel, on the whole surface with diffused microreticulation and shiny, with short and sparse appressed hairs and a row of 5 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.119. Head with

diffused microreticulation, shiny, with a pair of erected setae in interantennal, interocular and ocellar area, sometimes with additional 2 erected setae in frontal surface but always without setae in occipital corners, no erected setae on gena and ventral side of head. Scape long, 1.65-1.84 times longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 3.3 times as long as wide and 1.7 times longer than second segment, the second funicular segment 1,9 times as long as wide, and only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 114.3). Eyes big, short oval, 0.26 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.5-2.7 times as long as wide, dorsally distinctly microreticulated, laterally with more distinct microreticulation, surface shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle (Fig. 114.2). Whole mesosomal surface with short and sparse pubescence, often appears unpubescent, pronotum usually with up to two erected setae, occasionally in the largest workers with 3-4 erected setae, mesonotum and propodeum lacking erected setae. **Waist and gaster.** Petiolar scale elongate, thin in lateral view and narrow in anterior view, widened at the middle then distinctly narrowed anterad, apex deeply emarginate, anterolateral corners form acute denticle, without a single erected seta. Gaster shorter than mesosoma, first tergite with indistinctly diffused microreticulation, sometimes appears completely smooth, strongly shiny, subsequent tergites basally distinctly microreticulated tending to form transverse cells, surface shiny, covered with short and sparse appressed pubescence, distance between hairs much larger than their length. First tergite lacking erected setae except a row of long, erected setae close to posterior margin. **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora with a single erected seta basally, of mid and hind femora lacking erected setae.

Gynes distinctly darker than in morphotype 2. Head completely dark brown, mesosoma mostly brown, especially scutum predominantly brown with yellow to yellowish brown spots of diffused borders basally and centrally, pronotum and mesopleuron mostly brown, only scutellum and anepisternum mostly and propodeum partly yellowish, metanotum with obscure spot centrally and mesopleurum with distinct obscure spot on ventral side. Legs and antennae yellow, usually femora and tibiae partly infuscate, occasionally only fore femora infuscate (Figs 114.5-7). Petiolar scale obtusely angulate on sides with shallow to moderately deep apical emargination and obtuse apical denticles.

Morphotype 2: Moderately large, HL: 0.579-0.698 (mean 0.626); HW: 0.444-0.567 (mean 0.493); SL: 0.790-0.937 (mean 0.856); EL: 0.152-0.190 (mean 0.169); ML: 0.89-1.08; MW: 0.32-0.43. Generally paler than morphotype 1, head yellowish brown often with yellow gena, mesosoma and petiolar scale completely yellowish to reddish, antennae and legs completely yellowish red, in the darkest form petiolar scale, coxa and femora indistinctly infuscated; gaster brown to black, (Figs 114.9-12). Other morphological characters as in morphotype 1.

Gynes distinctly paler than in morphotype 1. Head brown with yellowish brown gena, mesosoma mostly yellow, only pronotum partly brown, scutum in anterior half with large

brown spot divided along middle by yellow line, metanotum with obscure spot centrally and mesopleurum with distinct obscure spot on ventral side. Legs and antennae completely yellow (Figs 114.8, 13-14). Petiolar scale more angulate on sides than in morphotype 1 with very deep, triangular apical emargination and acute apical denticles.

Comparative remarks. *Lepisiota frauenfeldi* and *L. syriaca* are the only Greek species with at least partly brown head and mostly to completely red mesosoma. *Lepisiota syriaca* differs in pronotum with several erected setae, and meso- and metanotum with at least a pair of erected setae. While in *L. frauenfeldi* pronotum is with 0-3 erected setae and meso- and metanotum are lacking erected setae.

Biological notes. Thermophilous species, noted from luminous deciduous and pine forests, shady valley in mixed forests, roadsides in burned forests, open oak woodland, olive plantations, roadsides along olive plantation, shrubs growing along roadsides, dry pastures with shrubs and rocks, fryganas, gorges with oak forests, shores of an artificial lake overgrown by plane trees, agricultural area, hotel gardens and grasslands in tourist resorts. Polygynous, nests under stones. Most records are from low and mid altitude, from sea level to 400 m, the highest locality in continental Greece was from Monastiriaki, Sterea Ellas at an altidude 1090 m, from islands was placed in Rouvas Forest in Crete at an altitude 1310 m.

115. *Lepisiota* cf. *frauenfeldi*_AEGEAN

(Figs 115.1-9)

Distribution in Greece: **Aegean Islands** (Borowiec & Salata 2018 c: 6 – as *Lepisiota frauenfeldi*; **new data:** Chios, Kerameia, 8 m, 15 V 2013, 38.2987 N / 26.1373 E; Samos, Kokkari, 8 m, 8 VI 2013, 37.76666 N / 26.88333 E; Samos, Pythagorio, 20 m, 5 VI 2013, 36.68333 N / 26.93333 E); **Dodecanese:** (Borowiec & Salata 2012: 509 – as *Lepisiota syriaca* sp. 1; Salata et al. 2019 a: 16 – as *Lepisiota syriaca*, specimens from Rhodes and Telendos, Borowiec et al. 2021: 19).

Distribution in Europe and Mediterranean Basin: Greece; Turkey.

Description. Moderately large, HL: 0.643-0.738 (mean 0.691); HW: 0.500-0.619 (mean 0.556); SL: 0.844-1.024 (mean 0.950); EL: 0.175-0.206 (mean 0.188); ML: 1.03-1.23; MW: 0.39-0.49. **Color.** Head from yellowish brown to brown, gena sometimes paler than rest of head surface; mesosoma usually mostly brown with mesonotal constriction and dorsal part of mesonotum in posterior half yellowish to reddish, in the palest forms pronotum mostly yellowish red with dark brown spot on top, mesonotum completely yellowish red, propodeum yellowish red basally and brown dorsally and petiolar scale with yellowish red basal half and brown apical half; in the darkest form whole mesosoma brown to dark brown with reddish brown mesonotal constriction, gaster in all forms brown to black. Generally in Aegean Islands (Samos, Chios) predominate forms with more expanded yellowish red parts of mesosoma and in eastern Dodecanese predominate dark forms; antennae uniformly yellowish, often scapus with obscure broadened apical part and apical antennomeres slightly infuscate; coxa and femora dark brown, trochanters and knee sometimes yellowish to yellowish brown, tibiae usually brown with yellowish brown apex, sometimes completely brown, or fore tibiae yellowish to yellowish brown and mid and hind tibiae brown, tarsi yellow (Figs 115.1-6). **Head.** 1.2-1.3 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex

(Fig. 115.4). Clypeus with convex anterior and straight posterior margin, arched medially, without or with obtuse median keel, on the whole surface with diffused microreticulation, and with very sparse and moderately long appressed hairs and a row of 4-5 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.167. Head distinctly microreticulate, appears indistinctly shiny, with a pair of erected setae in interantennal, interocular and ocellar area, sometimes in large workers with additional pair of setae in frontal area, and single seta in occipital corners. Scape long, 1.63-1.84 times longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 3.3 times as long as wide and 1.7 times longer than second segment, the second funicular segment 2.1 times as long as wide, and distinctly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 115.3). Eyes big, short oval, 0.27 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.5-2.7 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle (Fig. 115.2). Whole mesosomal surface covered with short and sparse appressed pubescence, pronotum with 2-7 erected setae, mesonotum and propodeum lacking erected setae only in the largest workers propodeum sometimes with 2 short erected setae. **Waist and gaster.** Petiolar scale thick in lateral view and narrow in anterior view, widened at the middle, apex deeply emarginate, anterolateral corners form acute denticle, erected setae absent. Gaster slightly shorter than mesosoma, first tergite distinctly microreticulated, subsequent tergites basally with distinct transverse striation, posteriorly with microreticulation but microsculpture tend to form transverse cells, surface shiny, covered with short and sparse appressed pubescence, distance between hairs mostly larger than their length. No erected setae on surface of tergites except transverse row of long, erected setae close to posterior margin. **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora with a single erected seta basally, in large workers sometimes present one to two short erected setae centrally, mid and hind femora lacking erected setae.

Gynes dark colored. Head dark brown to black, mesosoma mostly dark brown to black, only scutellum anteriorly with yellow to yellowish brown spots of diffused borders basally and stures of msonotal sclerites yellwish brown, metanotum with yellowish spot centrally. Scapus yellowish basally and apically with brown 2/3 of distal part, funicle mostly yellowish, apex of distal segments indistinctly infuscate. Coxa and femora mostly brown to black, only trochanters and knee yellowish, tibiae yellowish brown, tarsi reddish yellow, partly brown infuscate. Petiolar scale sharply angulate on sides with deep apical emargination and sharp apical denticles (Figs 115.7-8).

Comparative remarks. *Lepisiota* cf. *frauenfeldi*_AEGEAN appears intermediate between *L. syriaca* and *L. melas*. Its bicolored mesosoma and mostly dark with reddish spots mesonotal constriction resemble *L. melas*. However, *L. melas* differs in less setose pronotum with at most 2 erected setae (usually 3 or more in *L.* cf. *frauenfeldi*_AEGEAN) and more

shiny body. *Lepisiota syriaca* appears very similar to *L.* cf. *frauenfeldi*_AEGEAN due to numerous setae on pronotum but differs in mesosoma predominantly reddish (mostly brown in *L.* cf. *frauenfeldi*_AEGEAN) and propodeum and petiolar scale often with erected setae (lacking erected setae in *L.* cf. *frauenfeldi*_AEGEAN).

Biological notes. Thermophilous species, noted from luminous deciduous and pine forests, olive plantations, shrubs growing along roadsides, dry pastures with shrubs and rocks, fryganas, gorges with oak forests, ruderal area in tourist resorts, occasionally in stream valley with deciduous forest. Polygynous, nests under stones. Most records are from low and mid altitude, from sea level to 500 m, the highest locality was from Samos, Pandroso at an altitude 770 m.

Note. Status of this taxon is unclear due to the large number of described valid infraspecifc taxa within the *L. frauenfeldi* complex. Probably most of these taxa represent good species but without a comprehensive revision of the whole complex it is impossible to determine whether this Aegean morphospecies is new to science or is conspecific with one of the already described infrasubspecific taxa. Mophologically, it looks very similar to *Lepisiota frauenfeldi* ssp. *variabilis* Santschi, 1917 described from Tunisia.

116. *Lepisiota melas* (Emery, 1915)

(Figs 116.1-7)

Acantholepis frauenfeldi var. *melas* Emery, 1915: 3.

Distribution in Greece: Aegean Islands (Collingwood 1993: 195, Legakis 2011: 24); **Crete** (Legakis 2011: 24, Borowiec & Salata 2012: 506 - as *Lepisiota frauenfeldi*, Salata & Borowiec 2017: 296-298, 304, Salata et al. 2020 a: 27); **Cyclades** (Finzi 1939: 158 - as *Acantholepis frauenfeldi* var. *melas*, Legakis 2011: 24, Salata & Borowiec 2017: 296-298, 304; **new data:** Naxos, Amiki Bay, 6 m, 30 VI 2016, 37.1328 / 25.4338; Naxos, Demeter Temple vic., 110 m, 2 VII 2016, 37.027 / 25.4288; Naxos, Kouros of Milonas, 200 m, 3 VII 2016, 37.1328 / 25.4338; Naxos, Lionas, 20 m, 4 VII 2016, 37.137 / 25.5855; Naxos, Plaka, 6 m, 2 VII 2016, 37.0532 / 25.3673); **Dodecanese** (Emery, 1915: 3 - as *Aphaenogaster frauenfeldi* var. *melas*, Menozzi 1936: 298, Legakis 2011: 24, Borowiec & Salata 2012: 506 - as *Lepisiota frauenfeldi*, Salata & Borowiec 2015 a: 69, Salata & Borowiec, 2016: 198-199, Salata & Borowiec 2017: 296-298, 304, Borowiec et al. 2021: 19); **Ionian Islands** (Collingwood 1993: 195, Legakis 2011: 24, Borowiec & Salata 2014 a: 516, Salata & Borowiec 2017: 296-298, 304, Borowiec & Salata 2018 d: 6, Salata & Borowiec 2019 b: 100-104, 114, Borowiec & Salata 2021 a: 8; **new data:** Cephalonia, 1.9 km NE of Sami, 138 m, 14 VI 2021, 38.26483 / 20.66705; Cephalonia, Skala, 19 m, 17 VI 2021, 38.07683 / 20.79644; Cephalonia, Skala vic. loc. 1, 40 m, 6 VI 2019, 38.08178 / 20.79275); **Macedonia** (Petrov & Legakis 1996: 31 as *Acantholepis melas*, Legakis 2011: 24; **new data:** Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E); **Peloponnese** (Finzi 1939: 158 - as *Acantholepis frauenfeldi* var. *melas*, Legakis 2011: 24, Borowiec & Salata 2017: 213, Salata & Borowiec 2019 b: 115); **Sterea Ellas** (Finzi 1939: 158 - as *Acantholepis frauenfeldi* var. *melas*, Legakis 2011: 24); **Thrace** (Legakis 2011: 24).

Distribution in Europe and Mediterranean Basin: Greece; Serbia; Turkey.

Description. Moderately large, HL: 0.663-0.746 (mean 0.690); HW: 0,508-0.565 (mean 0.537); SL: 0.889-0.968 (mean 0.927); EL: 0.171-0.192 (mean 0.179); ML: 1.05-1.11;

MW: 0.38-0.43. **Color.** Head, mesosoma, petiolar scale and gaster dark brown to black, only mesonotal constriction completely or mostly red, occasionally also posterior part of pronotum and posterior part of pedicel of petiolar scale partly reddish brown; antennae yellowish, sometimes broadened apical part of scapus slightly infuscate, coxa and femora dark brown, trochanters and knee sometimes yellowish to yellowish brown, tibiae usually brown with yellowish brown apex, sometimes completely brown, or fore tibiae yellowish to yellowish brown and mid and hind tibiae brown, tarsi yellow (Figs 116.1-4). **Head.** Approximately 1.3 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 116.4). Clypeus with convex anterior and straight posterior margin, arched medially, without or with obtuse median keel, on the whole surface with diffused microreticulation, and with very sparse and moderately long appressed hairs and a row of 4-6 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.120. Head distinct microreticulate, populations from eastern Aegean Islands, Crete and Ionian Islands less reticulate than populations from Cyclades and western Dodecanese islands, appears indistinctly shiny, with a pair of erected setae in interantennal, interocular and ocellar area, sometimes with additional pair of setae in frontal area, no erected setae in occipital part of head, gena and ventral side of head also lacking erected setae. Scape long, 1.69-1.77 times longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.9 times as long as wide and 1.5 times longer than second segment, the second funicular segment 2.1 times as long as wide, and slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 116.3). Eyes big, short oval, 0.26 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.6-2.8 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle (Fig. 116.2). Whole mesosomal surface covered with short and sparse appressed pubescence, sometimes appears unhaired, pronotum with up to two erected setae, mesonotum and propodeum lacking erected setae. **Waist and gaster.** Petiolar scale thick in lateral view and narrow in anterior view, widened at the middle, apex deeply emarginate, anterolateral corners form acute denticle, erected setae absent. Gaster slightly longer than mesosoma, first tergite with indistinctly diffused microreticulation, sometimes appears completely smooth, subsequent tergites basally with distinct transverse striation, posteriorly with microreticulation, surface shiny, covered with short and sparse appressed pubescence, distance between hairs mostly larger than their length. No erected setae on surface of tergites except transverse row of long, erected setae close to posterior margin. **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora without or with a single erected seta basally, of mid and hind femora lacking erected setae.

Gynes dark colored, body almost completely black, only are close to wings base yellowish. Scapus yellowish basally and apically with brown 2/3 of distal part or mostly brown, funicle mostly yellowish, apex of distal segments indistinctly infuscate. Coxa and femora

mostly brown to black, only trochanters and knee yellowish, tibiae yellowish brown, tarsi reddish yellow, partly brown infuscate. Petiolar scale obtusely angulate on sides with moderately deep apical emargination and moderately sharp apical denticles (Figs 116.5-7).

Comparative remarks. *Lepisiota melas* differs from all Greek members of this genus in dark brown to black, indistinctly shiny body and reddish mesonotal constriction. Similarly shiny body has *L. nigra* but it differs from *L. melas* in completely black body.

Biological notes. Thermophilous species, noted from luminous deciduous forests, roadsides in burned forests, shrubs in cypress forests, open oak woodland on an archeological site, olive plantations with limestone rocks, roadsides along olive plantation, shrubs growing along roadsides, pastures with frygana, fryganas, frygana on sea coast, deep canyon with oak forests, limestones quarry, agricultural area, and hotel gardens in tourist resorts. Polygynous, nests under stones. Most records are from low and mid altitude, from sea level to 400 m, the highest locality was placed in Mt. Pandokrator, Corfu at an altitude 766 m.

117. *Lepisiota* cf. *melas*_KARPATHOS

(Figs 117.1-4)

Distribution in Greece: **Dodecanese** (Borowiec et al. 2021: 20).

Distribution in Europe and Mediterranean Basin: Greece.

Description. Moderately large, HL: 0.619-0.683 (mean 0.652); HW: 0.478-0.550 (mean 0.517); SL: 0.794-0.905 (mean 0.927); EL: 0.163-0.187 (mean 0.173); ML: 0.94-1.05; MW: 0.36-0.41. **Color.** Head, mesosoma, petiolar scale and gaster dark brown to brownish black but never black, only mesonotal constriction completely or mostly yellowish red, often also posterior part of mesonotal dorsum and basal part of petiolar scale yellowish to yellowish brown; antennae yellowish to yellowish brown, broadened apical part of scapus indistinctly infuscated, coxa and femora dark brown, trochanters and knee sometimes yellowish to yellowish brown, tibiae usually brown with yellow to yellowish brown apex, sometimes completely brown, or fore tibiae yellowish to yellowish brown and mid and hind tibiae brown, tarsi yellow (Figs 117.1-4). **Head.** 1.23-1.29 times as long as wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 117.4). Clypeus with convex anterior and straight posterior margin, arched medially, without median keel, on the whole surface with diffused microreticulation, with sparse and short appressed hairs and a row of 4 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.114. Head distinct microreticulate but appears indistinctly shiny, with a pair of erected setae in interantennal, interocular and ocellar area, no erected setae in occipital part of head, gena and ventral side of head lacking erected setae. Scape long, 1.63-1.72 times longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.5 times as long as wide and 1.4 times longer than second segment, the second funicular segment twice as long as wide, and approximately as long as third segment, the rest of funicular segments clearly longer than broad (Fig. 117.4). Eyes big, short oval, 0.27 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal

view distinctly constricted in the middle, 2.4-2.7 times as long as wide, dorsally and laterally very distinct microreticulation, surface indistinctly dull. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle (Fig. 117.2). Whole mesosomal surface covered with short and sparse appressed pubescence, pronotum usually without or at most with a single erected seta, mesonotum and propodeum lacking erected setae. **Waist and gaster.** Petiolar scale low and thick in lateral view and broad in anterior view, widened at the middle, apex deeply emarginate, anterolateral corners form acute denticle, erected setae absent. Gaster slightly shorter than mesosoma, first tergite with indistinctly diffused microreticulation in posterior half of the tergite tending to form transverse cells, subsequent tergites with distinct transverse microreticulation or striation, surface of gaster appears shiny, covered with short and sparse appressed pubescence, distance between hairs mostly larger than their length. No erected setae on surface of tergites except transverse row of long, erected setae close to posterior margin. **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora without or with a single erected seta basally, of mid and hind femora lacking erected setae.

Gyne unknown.

Comparative remarks. *Lepisiota* cf. *melas*_KARPATHOS belongs to the group of species with predominantly dark body: brown to black with at least mesonotal constriction and base of petiolar scale paler colored. *L. nigra* differs in body uniformly black and shiny mesosoma. *L. melas* is very similar due to pale colored mesonotal constriction but differs in more shiny body and longer antennal scapi, 1.69-1.77 (mean 726) times longer than width of head while in *L.* cf. *melas*_KARPATHOS antennal scapi are 1.63-1.72 (mean 1.669) times longer than width of head.

Biological notes. Thermophilous species, noted from ruderal areas inside tourist resorts and open xerothermic habitats. All records are from low and mid altitude, between 26 to 720 m.

Note. With great probability this is an undescribed species, perhaps endemic to the Karpathos island but without comprehensive revision of all Mediterranean taxa of the genus *Lepisiota* its status remains unclear.

118. *Lepisiota nigra* (Dalla Torre, 1893)

(Figs 118.1-7)

Acantholepis frauenfeldi var. *nigra* Dalla Torre, 1893: 171.
Acantholepis frauenfeldi var. *splendens* Karavaiev, 1912: 586.

Distribution in Greece: Aegean Islands (Finzi 1939: 158 - as *Acantholepis frauenfeldi* var. *nigra*, Collingwood 1993: 195); **Crete** (Borowiec & Salata 2012: 508, Borowiec & Salata 2015: 21, 25, Salata & Borowiec 2017: 296, Salata et al. 2020 a: 27); **Cyclades** (Finzi 1928: 791 - as *Acantholepis frauenfeldi* var. *splendens*, Finzi 1939: 158 - as *Acantholepis frauenfeldi* var. *nigra*, Collingwood 1993: 195); **Dodecanese** (Collingwood 1993: 195, Salata & Borowiec 2015 a: 68-69, Borowiec et al. 2021: 20); **Ionian Islands** (Emery, 1901: 57 - as *Acantholepis frauenfeldi* var. *nigra*, Emery 1914: 158 - as *Acantholepis frauenfeldi* var. *nigra*, Borowiec & Salata 2014 a: 516, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 8, Borowiec et al. 2021: in print); **Peloponnese** (Borowiec & Salata 2017:

213, Salata & Borowiec 2019 b: 115); **Sterea Ellas** (Finzi 1939: 158 - as *Acantholepis frauenfeldi* var. *nigra*; **new data:** Attica, Athens National Garden, 90 m,10 VII 2016, 37.97138 N / 23.7175 E; Attica, Antikythira, Potamos-Pateriana, 33 m, 11 IX 2001, 35.8796 N / 23.2897 E).

Distribution in Europe and Mediterranean Basin: Bosnia and Herzegovina; Bulgaria; Croatia; Greece; Israel; Italy; Montenegro; Serbia; Spain.

Description. Moderately large, HL: 0.595-0.929 (mean 0.693); HW: 0,484-0.603 (mean 0.523); SL: 0.817-1.087 (mean 0.929); EL: 0.154-0.191 (mean 0.172); ML: 0.97-1.19; MW: 0.35-0.48. **Color.** Head, mesosoma, petiolar scale and gaster dark brown to black, occasionally mesonotal constriction partly reddish brown; antennae yellowish, sometimes broadened apical part of scapus slightly infuscate, coxa and femora dark brown, trochanters and knee yellowish to yellowish brown, tibiae usually brown with yellowish brown apex, sometimes completely brown, or fore tibiae yellowish to yellowish brown and mid and hind tibiae brown, tarsi yellow (Figs 118.1-4). **Head.** 1.2- 1.5 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 118.4). Clypeus with convex anterior and straight posterior margin, arched medially, without or with obtuse median keel, on the whole surface with diffused microreticulation, with sparse and long appressed hairs and a row of 6-8 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.119. Head microreticulate, appears shiny, with a pair of erected setae in interantennal, interocular and ocellar area, no erected setae in occipital part of head, gena and ventral side of head also lacking erected setae. Scape very long, 1.69-1.82 times longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.9 times as long as wide and 1.5 times longer than second segment, the second funicular segment 2.1 times as long as wide, and slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 118.3). Eyes big, short oval, 0.25 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.5-2.8 times as long as wide, dorsally and laterally distinctly microreticulated, surface shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle (Fig. 118.2). Whole mesosomal surface covered with short and sparse appressed pubescence, sometimes appears unhaired, pronotum with 0-6 erected setae, mesonotum and propodeum lacking erected setae. **Waist and gaster.** Petiolar scale thick in lateral view and narrow in anterior view, widened at the middle, apex deeply emarginate, anterolateral corners form acute denticle, erected setae absent. Gaster slightly longer than mesosoma, first tergite with indistinctly diffused microreticulation, subsequent tergites basally with distinct transverse striation, posteriorly with microreticulation, surface shiny, covered with short and sparse appressed pubescence, distance between hairs mostly larger than their length. No erected setae on surface of tergites except transverse row of long, erected setae close to posterior margin. **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora with single erected seta basally, of mid and hind femora lacking erected setae.

Gynes dark colored, body almost completely black. Scapus dark brown to black wiyh yellowish brown apex, funicle mostly yellowish, apex of distal segments more or less infuscate, sometimes apical 2-3 segments completely brown. Coxa and femora mostly brown to black, tibiae yellowish brown to completely brown, tarsi reddish yellow, partly brown infuscate. Petiolar scale sharply angulate on sides with deep apical emargination and moderately sharp to sharp apical denticles (Figs 118.5-7).

Comparative remarks. *Lepisiota nigra* differs from all Greek members of this genus in completely black and shiny body. Similarly shiny body has *L. melas* but it differs in red mesonotal constriction.

Biological notes. Thermophilous species, noted from luminous deciduous forests, olive plantations with limestone rocks, fryganas, roadsides with rocks and frygana, pastures in alpine zone, seashore with frygana and pine trees, mountain plateau with sparse vegetation, rocky coastline, and abandoned gardens. Polygynous, nests under stones. Most records are from low and mid altitude, from sea level to 500 m, the highest locality was placed in Dikti Mts., Crete at an altitude 1450 m.

119. *Lepisiota syriaca* (André, 1881)

(Figs 119.1-4)

Acantholepis frauenfeldi var. *syriaca* André, 1881: 61.

Distribution in Greece: Crete (Legakis 2011: 25, Borowiec & Salata 2012: 506 - as *Lepisiota dolabellae*, Salata et al. 2019 a: 16); **Dodecanese** (Salata et al. 2019: 16 – only specimens from Leros, Borowiec et al. 2021: 20); **Sterea Ellas** (Salata et al. 2019 a: 16).

Distribution in Europe and Mediterranean Basin: Armenia; Azerbaijan; Egypt; Greece; Israel; Lebanon; Syria; Turkey.

Description. Moderately large, HL: 0.643-0.754 (mean 0.701); HW: 0.500-0.633 (mean 0.561); SL: 0.889-1.078 (mean 0.962); EL: 0.160-0.209 (mean 0.183); ML: 1.02-1.301; MW: 0.38-0.49. **Color.** Head from bicolor, mostly reddish with obscure brown occipital part to completely dark brown, mesosoma from completely red to mostly dark brown with reddish constricted part of mesonotum and adjacent parts of pronotum and mesonotum, petiolar scale from uniformly reddish to mostly dark brown with reddish base, gaster from brown to black; antennae in pale forms completely yellowish to reddish, in dark forms scapus with reddish brown basal half and brown distal half, in the darkest form whole scapus brown, funicle always yellowish to reddish; coxa in the palest form reddish, fore legs reddish, mid and hind femora and tibiae indistinctly infuscated and tarsi yellowish; in dark forms coxa, femora and tibiae dark brown to almost black with yellowish knee and apex of tibia, tarsi always yellow to reddish (Figs 119.1-4). **Head.** 1.2-1.3 times longer than wide, in front of eyes slightly convex and narrowed to mandibles, behind eyes relatively regular ly rounded, occipital margin convex (Fig. 119.4). Clypeus with convex anterior and straight posterior margin, arched medially, with smooth, obtuse median keel, on the whole surface with diffused microreticulation, with sparse and long appressed hairs and a row of 4-5 long setae close to anterior margin and a pair of long, erected setae close to posterior margin, the longest anterior seta with length 0.130. Head distinct microreticulate, appears indistinctly shiny, with a pair of erected setae in interantennal and interocular area and 2-4 erected setae in occipital part of head, gena and ventral side of head also lacking erected setae. Scape long, 1.53-1.79 times

longer than width of head, in basal 3-4 length thin then distinctly widened and again constricted before apex, reaching strongly beyond the occipital margin of head, surface microreticulate but shiny, with short and sparse appressed pubescence, erected setae absent. Funicular segments elongate, thin, first segment 2.9 times as long as wide and 1.5 times longer than second segment, the second funicular segment 2.1 times as long as wide, and slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 119.3). Eyes big, short oval, 0.26 length of head. Mandibles long, without longitudinal sculpture, shiny, with large apical dent and 4 smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.5-2.8 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly shiny. In lateral view pronotum convex, metanotum strongly constricted in front of spiracles, propodeum laterally tuberculate, apex of tubercle with spiniform denticle (Fig. 119.2). Whole mesosomal surface covered with short and sparse appressed pubescence, pronotum with 3-10 erected setae, mesonotum with up to two and propodeum with 0-4 erected setae. **Waist and gaster.** Petiolar scale thick in lateral view and narrow in anterior view, widened at the middle, apex deeply emarginate, anterolateral corners form acute denticle, with 0-1 erected setae. Gaster slightly longer than mesosoma, first tergite with microreticulation, subsequent tergites microreticulate, close to apex microreticulation tends to form transverse cells, surface shiny, covered with short and sparse appressed pubescence, distance between hairs mostly larger than their length. Usually no erected setae on surface of tergites except transverse row of long, erected setae close to posterior margin but in some specimens first gastral tergite in the middle with 1-2 short to long erected setae. **Legs.** Fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically. Ventral surface of fore femora without or with a single erected seta basally, of mid and hind femora lacking erected setae.

Gyne unknown.

Comparative remarks. *Lepisiota syriaca* is similar only to specimens of *L. frauenfeldi* with uniformly reddish mesosoma and mostly to completely reddish head. *L. frauenfeldi* differs in pronotum with only 0-3 erected setae and meso- and metanotum lacking erected setae while *L. syriaca* has pronotum with several erected setae and meso- and metanotum with at least a pair of erected setae.

Biological notes. Invasive species, noted only from ruderal sites, grass areas, roadsides and dry riverbeds in tourist resorts and towns. Nests under stones. All records are from low altitude between 14 and 100 m.

Genus *Nylanderia* Emery, 1906

Useful identification keys, revisions and taxonomic papers: LaPolla et al. 2011.

Diagnosis. Monomorphic; mandibles with 5-6 teeth, tooth 3 smaller than tooth 4; palp formula 6:4; antennae 12-segmented; antennal scape long, with projected setae; antennal sockets close to the posterior clypeal margin; eyes large, placed slightly in front of the midlength of head; mesothorax not constricted immediately behind the pronotum; mesonotum with stout setae present arranged in distinct pairs; propodeum lacking projected setae; gaster with stout projected setae; metapleural gland present; propodeum unarmed; propodeal spiracle circular; tibial spurs on meso- and metatibia simple; petiole in form of unarmed scale; acidopore with a seta-fringed nozzle.

In Greece two invasive species.

A key to species of the genus *Nylanderia*

1. Number of erected setae on frontal surface of antennal scapus usually fewer than 10. Gaster tergites with erected macrosetae and a layer of adherent pubescence (Fig. 120.1) ..... ***N. jaegerskioeldi* (Mayr)**, p. 241

─. Number of erected setae on frontal surface of antennal scapus usually more than 10. Gaster tergites with erected macrosetae without a layer of adherent pubescence (Fig. 121.1) .... ***N. vividula* (Nylander)**, p. 243

Review of species

120. *Nylanderia jaegerskioeldi* (Mayr, 1904)

(Figs 120.1-8)

Prenolepis jaegerskioeldi Mayr, 1904: 8;
Prenolepis traegaordhi Forel, 1904 c: 14;
Prenolepis (*Nylanderia*) *jaegerskioeldi* var. *borcardi* Santschi, 1908: 533;
Prenolepis (*Nylanderia*) *weissi* Santschi, 1911 a: 210;
Prenolepis (*Nylanderia*) *jaegerskioeldi* var. *zelotypa* Santschi, 1915: 264;
Paratrechina weissi nimba Bernard, 1953: 258.

Distribution in Greece: Crete (Salata et al. 2019 a: 15, Salata et al. 2020 a: 24); **Dodecanese** (Forel 1889: 256 - as *Prenolepis vividula*, Collingwood 1993: 195, Borowiec & Salata 2012: 525, Salata et al. 2019 a: 15, Borowiec et al. 2021: 23); **Ionian Islands** (Borowiec & Salata 2014 a: 516, Borowiec & Salata 2018 d: 7, Salata et al. 2019 a: 15; **new data:** Cephalonia, Lourdata, 4 m, 14 VI 2021, 38.11421 / 20.62931; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, Skala, 19 m, 17 VI 2021, 38.07683 / 20.79644; Lefkada, 3.3 km W of Nidri, 492 m, 10 VI 2021, 38.70886 / 20.67459); **Peloponnese** (Borowiec & Salata 2013: 359, Salata & Borowiec 2017: 299, Borowiec & Salata 2017: 216, Salata et al. 2019 a: 15, Salata & Borowiec 2019 b: 114); **Sterea Ellas** (Borowiec & Salata 2018 e: 9, Salata et al. 2019 a: 15).

Distribution in Europe and Mediterranean Basin: Cyprus; Egypt; Greece: Dodecanese, mainland; Israel; Libya; Oman; Saudi Arabia; Spain: Baleares, Canary Is., mainland; Turkey; United Arab Emirates; Yemen - Afrotropical.

Description. Moderately large, HL: 0.590-0.794 (mean 0.674); HW: 0.495-0.738 (mean 0.597); SL: 0.619-0.846 (mean 0.717); EL: 0.127-0.177 (mean 0.151); ML: 0.70-1.03; MW: 0.35-0.54. **Color.** Body from yellow to brown, head and gaster usually darker than mesosoma, sometimes gaster dark brown to almost black, scapus, mandibles, and legs yellow, only in the darkest specimens femora slightly infuscate (Figs 120.1-4). **Head.** Slightly longer than wide, sides softly rounded, occipital margin in the middle shallowly concave (Fig. 120.4). Clypeus smooth and shiny, transverse, its anterior margin rounded, posterior margin concave in the middle, clypeal surface with moderately dense and long appressed pubescence not covering clypeus surface white hairs and several brown to black, long erected

setae, the longest with length 0.160. Whole head with diffused microreticulation but appears shiny, with moderately long and dense appressed white pubescence and several long to long, yellowish brown, semierect to erected setae, gena with long erected setae. Ventral sides of head with sparse, long, white erected setae. Scape moderately long, 1.15-1.29 times longer than width of head, thin, surpass occipital margin of head by first 3-4 funicular segments, only slightly widened from base to apex, its surface microreticulate but shiny, anterior edge usually with 6-10, occasionally to 14 long semierect to erect setae, the longest setae longer than width of scape in the middle. Funicular segments elongate, thin, the second funicular segment 1.3 times as long as wide, distinctly shorter than first and third segments, the rest of funicular segments clearly longer than broad (Fig. 120.3). Eyes big, only slightly longer than wide, 0.22 length of head. Mandibles moderately elongate, only at base with diffused striation then without elongate sculpture. **Mesosoma.** Moderately elongate, softly constricted in the middle, 1.8-2.0 times as long as wide, surface smooth and shiny or with very diffused microreticulation. In lateral view promesonotum regularly convex, metanotal groove shallow, propodeum regularly convex (Fig. 120.2). The whole surface of promesonotum with long and moderately dense appressed pubescence not covering the surface, pronotum with 8-10 short yellow erected setae and 4-6 very long brown erected setae, the longest with length 0.175, mesonotum with several short, yellowish, and 4-6 long, dark erected setae, propodeum without setae. **Waist and gaster.** Petiole small, in form of thick scale with rounded apex, without setae in anterolateral corners. Gaster longer than mesosoma, surface of tergites with diffused microreticulation but appears shiny, with moderately long and dense appressed pubescence covering gaster surface, each tergite with numerous long, yellowish to brown erected setae. **Legs.** Moderately elongate, surface of femora and tibiae with several semierect black setae.

Gyne as in Figs 120.5-7, male as in Fig. 120.8.

Comparative remarks. *Nylanderia jaegerskioeldi* is similar to its congener *N. vividula* and the best distinguishing characters is pubescence and setation of gaster tergites. *Nylanderia jaegerskioeldi* has gaster tergites covered with erected macrosetae and a layer of adherent pubescence while *N. vividula* has gaster tergites covered only with erected setae and a layer of adherent pubescence is absent. Generally, *N. jaegerskioeldi* has less setose antennal scapi, usually with < 10 erected setae while *N. vividula* has usually > 10 erected setae. However, the scape setosity is fragile and setae often break off in dry-stored specimens. Thus, a series of specimens from a single site to are needed to accurately assess mean number of setae on scape.

Biological notes. Invasive species, in Greece recorded mainly from grassy areas in tourist resorts and cities. Occasionally noted also from olive plantations and dry valley inside village. Nests in soil and under stones. Most records are from low altitude from sea coast to 155 m. Only one record comes from grass area inside a Savvas Monastery, Karpathos at an altitude 863 m.

121. *Nylanderia vividula* (Nylander, 1846)

(Figs 121.1-6)

Formica vividula Nylander, 1846 a: 900;
Formica picea Buckley, 1866: 163;
Prenolepis guatemalensis r. *antillana* Forel, 1893: 340;

Prenolepis kincaidi Wheeler, 1906: 350;
Prenolepis vividula subsp. *docilis* Forel, 1908 b: 402;
Prenolepis (Nylanderia) vividula var. *mjobergi* Forel, 1908 a: 64;
Paratrechina (Nylanderia) vividula var. *australis* Santschi, 1929 b: 313.

Distribution in Greece: Dodecanese (Forel 1888: 256, Salata et al. 2019 a: 15). The only known record of this species comes from 1888 (ca. 15 years before description of *N. jaegerskioeldi*). Therefore, this record can be considered as uncertain and needs verification. Moreover, authors observed only *N. jaegerskioeldi* in Rhodes, which could support a thesis of incorrect determination of specimens noted by Forel.

Distribution in Europe and Mediterranean Basin: Britain; Croatia; Egypt; Greece; Iran; Ireland; Israel; Russia; Serbia; Spain: Baleares, mainland; Sweden; Turkey; Ukraine; United Arab Emirates; Yemen - subcosmopolitan.

Description (partly after Kallal & LaPolla 2012: 38). large, HL: 0.56-0.66; HW: 0.47-0.65; SL: 0.62-0.74; EL: 0.13-0.19; ML: 0.63-0.98; MW: 0.34-0.50. **Color.** Body usually brown with yellowish brown scapus, mandibles, and leg joints; mesocoxae and metacoxae sometimes lighter (Figs 121.1-3). **Head.** Slightly longer than wide, sides softly rounded, occipital margin in the middle straight to shallowly concave (Fig. 121.3). Clypeus smooth and shiny, transverse, its anterior margin rounded, posterior margin concave in the middle, clypeal surface with sparse but long appressed to semierect white pubescence and 6-8 brown to black, long erected setae. Head smooth and shiny, with sparse, short, appressed white pubescence and several short to long, dark erected setae, gena with moderately long, dark erected setae. Ventral sides of head with sparse, moderately long, white erected setae. Scape moderately long, approximately 1.3 times longer than width of head, thin, surpass occipital margin of head by first 3-4 funicular segments, only slightly widened from base to apex, its surface microreticulate but shiny, anterior edge usually with more than 10 long semierect to erect setae, the longest setae longer than width of scape in the middle. Funicular segments elongate, thin, the second funicular segment 1.3 times as long as wide, slightly shorter than third segment and distinctly shorter than the first segment, the rest of funicular segments clearly longer than broad. Eyes big, only slightly longer than wide, 0.23 length of head. Mandibles moderately elongate, only at base with diffused striation then without elongate sculpture. **Mesosoma.** Moderately elongate, softly constricted in the middle, 1.9 times as long as wide, surface smooth and shiny. In lateral view promesonotum regularly convex, metanotal groove shallow, propodeum regularly convex (Fig. 121.2). The whole surface of promesonotum with short and sparse appressed pubescence, pronotum with 2-6, mesonotum with 4-8 long, dark erected setae, propodeum without setae. **Waist and gaster.** Petiole small, in form of thick scale with rounded apex, without or with single short setae in anterolateral corners. Gaster longer than mesosoma, surface of tergites smooth and shiny, without appressed pubescence, with numerous long, brown to black erected setae. **Legs.** Moderately elongate, surface of femora and tibiae with several semierect black setae.

Gyne as in Figs 121.4-6.

Comparative remarks. See remarks under *Nylanderia jaegerskioeldi*.

Biological notes. Invasive species, no biological data from Greece. In other countries nests in open habitats such as roadsides, fields, pasture edges, suburban lawns, prairie remnants, in and near agricultural fields, phryganas. Occasionally collected in sparse and lu-

minous coniferus forests such as pine foreststs. In general, this species appears to thrive in somewhat disturbed habitats. Nests are typically in soil, leaf litter, acorns, and under rocks or other objects on the ground. In northern countries, it is recorded from closed facilities such as greenhouses, botanical and zoological gardens.

Genus *Paratrechina* Motschoulsky, 1863

Useful identification keys, revisions and taxonomic papers: Wetterer 2008, LaPolla & Fisher 2014.

Diagnosis. Monomorphic; mandibles with 5 teeth, tooth 3 smaller than tooth 4; palp formula 6:4; antennae 12-segmented; antennal scape very long, without or with few projected setae; antennal sockets very close to the posterior clypeal margin; eyes large, placed in midlength of head; mesothorax not strongly constricted immediately behind the pronotum; mesonotum with stout setae present arranged in distinct pairs; propodeum lacking projected setae; gaster with stout projected setae; metapleural gland present; propodeum unarmed; propodeal spiracle circular; tibial spurs on meso- and metatibia simple; petiole in form of unarmed scale; acidopore with a seta-fringed nozzle.

In Greece only one invasive species.

122. *Paratrechina longicornis* (Latreille, 1802)

(Figs 122.1-4)

Formica longicornis Latreille, 1802: 113 a;
Formica vagans Jerdon, 1851: 124;
Formica gracilescens Nylander, 1856: 73;
Paratrechina currens Motschoulsky, 1863: 14;
Prenolepis longicornis var. *hagemanni* Forel, 1901: 65.

Distribution in Greece: Greece generally (Kugler 1988: 259); **Dodecanese** (Borowiec et al. 2021: 23).

Distribution in Europe and Mediterranean Basin: Algeria; Azores; Cyprus; Egypt; France: mainland; Israel; Malta; Oman; Saudi Arabia; Spain: Baleares, Canary Is., mainland; Turkey; United Arab Emirates; Yemen - cosmopolitan.

Description. Large, HL: 0.627-0.714 (mean 0.676); HW: 0,444-0.524 (mean 0.483); SL: 1.063-1.222 (mean 1.138); EL: 0.178-0.222 (mean 0.197); ML: 0.93-1.06; MW: 0.34-0.40. **Color.** Body uniformly yellowish brown to dark brown, mandibles, antennae, and legs yellow, only in the darkest forms legs slightly infuscate (Figs 122.1-4). **Head.** Approximately 1.4 times longer than wide, sides almost parallel, occipital margin softly convex (Fig. 122.4). Clypeus with diffused microreticulation, appears almost smooth and shiny, transverse, its anterior margin almost straight with shallow median emargination, posterior margin concave in the middle, clypeal surface with sparse and short appressed white pubescence, a row of long yellow setae at anterior margin and mixed short and long erected setae, the longest with length 0.152. Whole head with diffused microreticulation but appears shiny, with rudiments of sparse and short white appressed hairs and numerous very long, yellowish white, semierect to erected setae, the shortest on gena, the longest in interocular and occipital area, the longest with length 0.183. Ventral sides of head with several, long, white erected setae

grouping mostly on sides of gular area. Scape very long, 2.31-2.41 times longer than width of head, only slightly widened from base to apex, its surface microreticulate but shiny with very short and sparse appressed pubescence, erected setae absent or at most in apical third of frontal edge with single, short erect seta. Funicular segments elongate, thin, the second funicular segment approximately 2.2 times as long as wide, slightly shorter than first and distinctly shorter than third segment, the rest of funicular segments very long, clearly longer than broad (Fig. 122.3). Eyes big, distinctly longer than wide, 0.29 length of head. Mandibles elongate, without longitudinal sculpture. **Mesosoma.** Strongly elongate, softly constricted in the middle, 2.4-2.8 times as long as wide, surface without appressed pubescence, with diffused microreticulation, appears slightly opaque. In lateral view promesonotum almost linear, metanotal groove very shallow, propodeum elongate, softly convex (Fig. 122.2). The whole surface of promesonotum with numerous, very long, white or yellowish white erected setae, as long as the longest setae on head, propodeum without setae. **Waist and gaster.** Petiole small, in form of thick scale with rounded apex, without setae in anterolateral corners. Gaster shorter than mesosoma, surface of tergites distinctly microreticulated, without appressed pubescence, appears slightly opaque, each tergite with numerous very long, white to yellowish erected setae, the longest with length 0.190. Legs thin and elongate, femora distinctly longer than gaster. **Legs.** Elongate, surface of femora and tibiae with several semierect white setae.

Comparative remarks. A very distinct species. Its slim, elongate body, very elongate antennae and legs, and whole body covered by long and strong setae is unique combination of characters. Only members of the genus *Nylanderia* are as strongly setose as *Paratrechina* but differ in stouter body, antennae and legs. Members of both genera differ also in structure of mandibles, *Paratrechina* has mandible with longitudinal striation and 5 teeth while in members of *Nylanderia* mandible is unsculptured, with 6-7 teeth.

Biological notes. Invasive thermophilous species, noted from tourist resorts. Inhabits ruderal areas, grasslands and parks. Nests in cavities in plants and trees, rotten wood, and in soil. Workers are omnivorous, feeding on live and dead insects, seeds, honeydew, fruits, plant exudates, and many household foods. All records are from low altitude from sea level to 155 m.

Genus *Plagiolepis* Mayr, 1861

Useful identification keys, revisions and taxonomic papers: Radchenko 1996 a, Salata et al. 2018 a, Seifert 2020 b.

Diagnosis. Monomorphic, very small, ML below 0.65; mandibles with 5 teeth, tooth 3 smaller than tooth 4; palp formula 6:4; antennae 11-segmented; antennal scape short, without projected setae; antennal sockets close to the posterior clypeal margin; eyes large, placed in front of the midlength of head; mesothorax not constricted in its anterior half; metapleural gland present; propodeum unarmed; propodeal spiracle circular; no tibial spurs on meso- and metatibiae; petiole in form of unarmed scale with a shorter anterior face and longer posterior face; acidopore with a seta-fringed nozzle.

In Greece three species with worker caste and social parasites without worker caste.

A key to species of the genus *Plagiolepis*:

1. Social parasites. worker caste absent ..... 2.

─. Not parasitic species, worker caste present. ..... 3.

2. Gynes wingless, very small, only slightly larger than workers of the host species (Figs 126.1, 2) ..... ***P. xene* Stärcke**, p. 252

—. Gynes brachypteric, distinctly larger than workers but distinctly smaller than gynes of the host species (Fig. 127.1, 2) ..... ***P.* sp. brachypterous**, p. 253

3. Fourth funiculus segment only slightly longer than third segment, third segment distinctly longer than second segment ..... 4.

—. Fourth funiculus segment distinctly longer than second and third segment, third segment as long as to only slightly longer than second segment ..... ***P. pygmaea* (Latreille)**, p. 250

4. Gaster with dense appressed pubescence, the distance between hair shorter than 1/3 of their length (Figs 124.1, 2) ..... ***P. perperamus* Salata, Borowiec & Radchenko**, p. 248

—. Gaster with sparse appressed pubescence, the distance between hair even or longer than half of their length (Figs 123.1, 2) ..... ***P. pallescens* Forel**, p. 246

Review of species

123. *Plagiolepis pallescens* Forel, 1889

(Figs 123.1-6)

Plagiolepis pygmaea var. pallescens Forel, 1889: 265;
Plagiolepis maura var. *taurica* Santschi, 1920: 171;
Plagiolepis maura var. *ancyrensis* Santschi, 1920: 171;
Plagiolepis vindobonensis Lomnicki, 1925 b: 77.

Distribution in Greece: Aegean Islands (Finzi 1939: 157, Legakis 2011: 25 - as *Plagiolepis ancyrensis*, *Plagiolepis taurica* and *Plagiolepis vindobonensis*, Salata & Borowiec 2017: 295-296, Borowiec & Salata 2018 b: 7 – as *Plagiolepis taurica*; **new data:** Lesbos, Argennos, 548 m, 12 VI 2015, 39.35494 N / 26.2661 E; Lesbos, Eftalou, 60 m, 2 VIII 2009, 39.37833 N / 26.21833 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, 3 km N of Kalloni, 191 m, 9 VI 2015, 39.26158 N / 26.2073 E; Lesbos, 1.7 km NW of Megali Limni, 381 m, 10 VI 2015, 39.11343 N / 26.30738 E; Lesbos, Piges Pesa, 113 m, 10 VI 2015, 39.12736 N / 26.26342 E; Lesbos, Sykaminia, 305 m, 12 VI 2015, 39.3586 N / 26.2911 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E); **Crete** (Legakis 2011: 25 - as *Plagiolepis ancyrensis*, *Plagiolepis taurica* and *Plagiolepis vindobonensis*, Salata et al. 2020 a: 29); **Cyclades** (Finzi 1939: 157; **new data:** Christiani, 55 m, 4 VIII 2006, 36.2515 / 25.2032); **Dodecanese** (Forel, 1889: 265, Borowiec & Salata 2012: 529, Salata & Borowiec 2015 a: 69, Salata & Borowiec, 2016: 198-199, Borowiec et al. 2021: 24); **Ionian Islands** (Collingwood 1993: 195 - as *Plagiolepis vindobonensis*, Legakis 2011: 25 - as *Plagiolepis ancyrensis*, *Plagiolepis taurica* and *Plagiolepis vindobonensis*, Salata & Borowiec 2019 b: 114; **new data:** Lefkada, Dragano, 374 m, 11 VI 2021, 38.6805 / 20.57827; Lefkada, Nikiana, 24 m, 11 VI 2021, 38.766171, 20.71766); **Macedonia** (Stärcke 1936: 278 - as *Plagiolepis vindobonensis*, Legakis 2011: 25 - as *Plagiolepis ancyrensis*, *Plagiolepis taurica* and *Plagiolepis vindobonensis*, Borowiec & Salata 2012: 529, Salata & Borowiec 2019 b: 104-105, Borowiec & Salata 2022: 9; **new data:** Pieria, 2 km W of

Panteleimonas, 305 m, 15 V 2019, 39.98563 / 22.59513); **Peloponnese** (Finzi 1939: 157, Borowiec & Salata 2013: 364, Borowiec & Salata 2021 b: 10); **Sterea Ellas** (Finzi 1939: 157, Borowiec & Salata 2018 e: 9, Borowiec & Salata 2021 b: 10); **Thessaly** (Borowiec & Salata 2018 b: 234 – as *Plagiolepis taurica*; **new data:** Ossa Mts., Kokkino Nero-Karitsa rd., 251 m, 29 VII 2009, 39.836 N / 22.788 E); **Thrace**: Bračko et al. 2016: 26).

Distribution in Europe and Mediterranean Basin: Albania; Armenia; Austria; Azerbaijan; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czech Rep.; France: Corsica; Germany; Greece; Hungary; Iran; Italy: mainland, Sardinia; Libya; Montenegro; North Macedonia; Romania; Russia; Serbia; Slovakia; Slovenia; Switzerland; Turkey; Ukraine.

Description. HL: 0.427-0.575 (mean 0.473); HW: 0.369-0.542 (mean 0.430); SL: 0.382-0.508 (mean 0.442); ML: 0.47-0.63. **Color.** Whole body from bright yellow (Figs 123.5, 6) to brown, head and mesosoma usually sligtly paler than gaster (Figs 123.1-4). In dark specimens legs, scapus and up to four first segments of funiculus brighter, from orange to bright yellow. **Head.** Longer than wide, oval or trapezoidal, its sides always convex, occipital margin nearly straight or concave (Fig. 123.4). Clypeus shiny, its posterior edge convex, setosity sparse and long, setae from adjacent to subdecumbent. Head smooth and shiny, bearing short, sparse and adjacent setae. Scape reaches beyond the occipital margin, widening upward from ¾ of its length, its surface shiny, with feeble, sparse microreticulation, dense, adjacent microsetae covers its whole surface. The second funicular segment square or slightly rectangular, the third segment elongate, equal or only slightly shorter than the fourth one, the rest of funicular segments clearly longer than broad (Fig. 123.3). Eyes big, oval, 1.4 times as long as wide. **Mesosoma.** Elongate, 1.9 times as long as wide. In lateral view dorsal surface of promesonotum slightly convex, metanotal groove shallow, propodeum with convex dorsal and straight or slightly concave posterior sides (Fig. 123.2). The whole mesosoma smooth and shiny, bearing sparse, short and adjacent micropilosity (Figs 123.1, 2). **Waist and gaster.** Petiolar scale thin and short, its anterior and posterior sides slightly convex, apex concave, its surface smooth and shiny. Gaster longer than mesosoma, shiny, with sparsely microreticulate, bearing sparse, appressed hairs, the distance between hairs is equal to full or half of the length of setae, additionally thick, long hairs occur on posterior margins of all tergites (Figs 123.1, 2). **Legs.** Short, surface with appressed pubescence.

Comparative remarks. *Plagiolepis pallescens* belongs to not parasitic species. It has sparse gaster pubescence like in *P. pygmaea* but it differs in fourth funiculus segment distinctly longer than second and third segment, and third segment only slightly longer than second segment. While in *P. pallescens* fourth funiculus segment is only slightly longer than third segment, and third segment is distinctly longer than second segment. *P. perperamus* shares with *P. pallescens* the funiculus characters but it differs in gaster with denser appressed pubescence with the distance between hair shorter than 1/3 of their length. While in *P. pallescens* gaster is covered with sparse appressed pubescence with the distance between hair even or longer than half of their length.

Biological notes. Thermophilous species. Very abundant, found in a wide range of habitats. Noted from various types of luminous deciduous and coniferous forests, stream valleys and roadsides with plane trees, olive plantations, mountain pastures with clumps of low oaks or shrubs, rocky alpine pastures, ruderal areas and gardens in tourist resorts. Nests under

stone, in rock crevices or simply in soil. Polygynous and polydomous. Most records are from low and mid altitude, from sea level to 600 m. The highest localities come from continental Greece, Sothern slope of Mt. Olympus, Thessaly at an altitude 1430 m, and island Greece from Dikti Mts., Crete at an altitude 1450 m.

124. *Plagiolepis perperamus* Salata, Borowiec & Radchenko, 2018

(Figs 124.1-7)

Plagiolepis pallescens sensu Radchenko, 1996 a: 184 not Forel, 1889: 265.
Plagiolepis perperamus Salata, Borowiec & Radchenko, 2018 a: 816.

Distribution in Greece (in all records before 2018 named as *Plagiolepis pallescens* sensu Radchenko)**: Aegean Islands** (Legakis 2011: 25, Salata & Borowiec 2019 b: 120; **new data:** Lesbos, n. Ahladeri, 9 m, 10 VI 2015, 39.15958 N / 26.29292 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, 1.7 km NW of Megali Limni, 381 m, 10 VI 2015, 39.11343 N / 26.30738 E; Lesbos, Anaxos Skoutarou, 4 m, 7 VI 2015, 39.31839 N / 26.14776 E; Lesbos, Kalloni salines, 3 m, 10 VI 2015, 39.21687 N / 26.26662 E); **Crete** (Legakis 2011: 25, Borowiec & Salata 2012: 528, Borowiec & Salata 2015: 25, Salata & Borowiec 2017: 297-299, Salata et al. 2020 a: 29); **Cyclades** (Collingwood 1993: 195, Legakis 2011: 25; **new data:** Naxos, Amiki Bay, 6 m, 30 VI 2016, 37.1328 / 25.4338); **Dodecanese** (Collingwood 1993: 195, Legakis 2011: 25, Salata & Borowiec 2015 a: 68-69, Borowiec et al. 2021: 24); **Epirus** (Borowiec & Salata 2018 a: 8); **Ionian Islands** (Borowiec & Salata 2013: 364, Salata & Borowiec 2017: 297-299, Borowiec & Salata 2018 d: 7, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 9; **new data:** Lefkada, Lefkada town, 4 m, 11 VI 2021, 38.82645 / 20.71254, Lefkada, Vasiliki beach, 2 m, 12 VI 2021, 38.63156 / 20.59903); **Macedonia** (Legakis 2011: 25, Borowiec & Salata 2012: 528; **new data:** Pieria, Paralia Panteleimonas, 3 m, 11 V 2019, 40.01657 / 22.58971); **Peloponnese** (Legakis 2011: 25, Borowiec & Salata 2017: 218, Borowiec & Salata 2021 b: 10); **Sterea Ellas** (Legakis 2011: 25, Borowiec & Salata 2012: 528, Borowiec & Salata 2018 e: 9, Borowiec & Salata 2021 b: 10); **Thessaly** (Legakis 2011: 25); **Thrace** (Bračko et al. 2016: 24).

Distribution in Europe and Mediterranean Basin: Azerbaijan; Greece; Iran; Turkey.

Description. HL: 0.463-0.541 (mean 0.502); HW: 0.402-0.525 (mean 0.468); SL: 0.407-0.508 (mean 0.459); ML: 0.49-0.62. **Color.** Whole body brown to dark brown. Legs, scapus and up to four first segments of funiculus brighter, from brown to ochre (Figs 124.1-4). Head longer than wide, oval or trapezoidal, its sides always convex, occipital margin nearly straight or concave (Fig. 124.4). Clypeus shiny, its posterior edge convex, setosity sparse and long, setae subdecumbent. Head smooth and shiny, bearing short, sparse and adjacent setae. Scape reaches beyond the occipital margin, widening upward from ¾ of its length, its surface shiny, with feeble, moderate microreticulation, dense, adjacent microsetae covers its whole surface. The second funicular segment square or slightly rectangular, the third segment elongate, equal or only slightly shorter than the fourth one, the rest of funicular segments clearly longer than broad (Fig. 124.3). Eyes big, oval, 1.3 times as long as wide. Mesosoma. Elongate, 1.7 times as long as wide. In lateral view dorsal surface of promesonotum slightly convex, metanotal groove shallow, propodeum with convex dorsal and straight or slightly concave posterior sides (Fig. 124.2). The whole mesosoma smooth and shiny, bearing sparse, short and adjacent micropilosity (Figs 124.1, 2). **Waist and gaster.** Petiolar

scale thin and short, its anterior and posterior sides slightly convex, apex concave, its surface smooth and shiny. Gaster longer than mesosoma, shiny, sparsely microreticulate, bearing dense, appressed hairs, the distance between hairs shorter than 1/3 their length, additionally thick, long hairs occur on posterior margins of all tergites (Figs 124.1, 2). **Legs.** Short, surface with appressed pubescence.

Gyne as in Figs 124.5-7.

Comparative remarks. *Plagiolepis perperamus* belongs to not parasitic species. It differs from its relatives in dense appressed pubescence of gastral tergites with the distance between hair shorter than 1/3 of their length. In both relatives (*P. pygmaea* and *P. pallescens*) appressed pubescence is sparser with the distance between hair approximately even or longer than half of their length. *Plagiolepis pygmaea* differs also in structure of antennae with fourth funiculus segment distinctly longer than second and third segment, and third segment only slightly longer than second segment. While in *P. perperamus* fourth funiculus segment is only slightly longer than third segment and third segment is distinctly longer than second segment.

Biological notes. Thermophilous species. Less abundant than *Plagiolepis pygmaea* or *P. pallescens* and preferring open habitats. Noted from luminous deciduous and coniferous forests, mountain pass, rocky coastline, seashore with frygana and pine trees, stream valley with sparse plane trees, roadsides, sands near marshes, and ruderal areas in tourist resorts and towns. Polygynous and polydomous. Most records are from low altitude, from sea level to 600 m. The highest locality comes from Mt. Timfirstos, Sterea Ellas at an altitude 1112 m.

Note. Seifert (2020 b), in his revision of *Plagiolepis schmitzi* group, synonymized *P. perperamus* with *P. atlantis* Santschi, 1920 based on subtle morphometric analysis. However, the author ignored observed differences revealed based on ecological niche modelling and the large geographical disjunction separating North African populations hitherto named as *P. atlantis* and Balkan populations described as *P. perperamus.* In his analysis, populations from Greece form a distinct cluster separated from African populations but this separation was not considered as strong. We do not rule out the possibility that *P. perperamus* may be a junior synonym of *P. atlantis*. However, in our opinion such taxonomic decision has to be supported with more roboust and comprehensive data. As long as genetic studies do not confirm the conspecificity of the populations from the North-West Africa and the Balkans, we treat the Balkans population as *P. perperamus*.

125. *Plagiolepis pygmaea* (Latreille, 1798)

(Figs 125.1-7)

Formica pygmaea Latreille, 1798: 45;
Micromyrma dufourii Perris, 1878: 382;
Plagiolepis pygmaea var. *minu* Forel, 1911 a: 350;
Plagiolepis pygmaea var. *obscuriscapus* Santschi, 1923 a: 137.

Distribution in Greece: Aegean Islands (Collingwood 1993: 195, Legakis 2011: 25, Borowiec & Salata 2018 c: 7); **Crete** (Forel 1886: clxvii, Forel 1889: 256, Emery 1894: 11, Legakis 2011: 25, Borowiec & Salata 2012: 529, Borowiec & Salata 2015: 25, Salata & Borowiec 2017: 296-299); **Cyclades** (Forel 1886: clxvii, Forel 1889: 256, Legakis 2011: 25, Salata et al. 2020 a: 29; **new data:** Naxos, Aliki, 15 m, 4 VII 2016, 36.9799 / 25.388;

Naxos, Kouros, 68 m, 30 VI 2016, 37.1788 / 25.4932; Naxos, Kouros of Milonas, 200 m, 3 VII 2016, 37.0847 / 25.4501); **Dodecanese** (Forel 1889: 256, Emery 1915: 1, Legakis 2011: 25); **Epirus** (Legakis 1983: 5, 2011: 25, Borowiec & Salata 2018 a: 9, Salata & Borowiec 2019 b: 100-104); **Ionian Islands** (Emery 1914: 158, Stärcke 1936: 278, Collingwood 1993: 195, Legakis 2011: 25, Borowiec & Salata 2014 a: 516, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2018 d: 7, Salata & Borowiec 2019 b: 100-101, 113, 114, Borowiec & Salata 2021 a: 10; **new data:** Cephalonia, 2 km SW of Poros, 50 m, 18 VI 2021, 38.13659 / 20.75968; Cephalonia, 2.8 km SW of Poros, 62 m, 18 VI 2021, 38.13222 / 20.75406; Cephalonia, Poros forest loc. 2, 118 m, 18 VI 2021, 38.18413 / 20.74856; Cephalonia, 1.9 km NE of Sami, 138 m, 14 VI 2021, 38.26483 / 20.66705; Cephalonia, 2.4 km NE of Sami, 32 m, 14 VI 2021, 38.26884 / 20.66621; Cephalonia 2.8 km NE of Valsamata, 560 m, 11 VI 2019, 38.19844 / 20.59694; Lefkada, 2.5 km S of Egklouvi, 1010 m, 2 IX 2016, 38,70876 N / 20,63711, Lefkada, Platistoma (Litrovio), 495 m, 13 VI 2021, 38.74364 / 20.66595; Lefkada, Sivros, 228 m, 12 VI 2021, 38.67013 / 20.64747); **Macedonia** (Legakis 2011: 25, Borowiec & Salata 2012: 529, Salata & Borowiec 2019 b: 104-105, Borowiec & Salata 2022: 9; **new data:** Halkidiki, Kassandra, Agia Paraskevi, 213 m, 26 VIII 2009, 39.95 N / 23.6 E; Halkidiki, Kassandra, Cap Paliouri, 38 m, 31 VIII 2009, 39.91666 N / 23.7 E; Halkidiki, Kassandra, Elani, 281 m, 28 VIII 2009, 40.05 N / 23.35 E; Halkidiki, Kassandra, Livadakia, 6 m, 26 VIII 2009, 39.96666 N / 23.55 E; Halkidiki, Kassandra, Loutra, 10 m, 26 VIII 2009, 39.91666 N / 23.58333 E; Halkidiki, n. Metamorfosi, 117 m, 2 IX 2009, 40,23333 N / 23.6 ES; Halkidiki, Sithona, Parthenonas, 305 m, 2 IX 2009, 40,1195 N / 23,81297 E; Pieria, Mt. Olympus, Litohoro vic., 470 m, 14 V 2019, 40.09677 / 22.49301; Pieria, Mt. Olympus, 1.6 km SW of Litohoro, 575 m, 14 V 2019, 40.08929 / 22.48804; Pieria, 2 km W of Panteleimonas, 305 m, 15 V 2019, 39.98563 / 22.59513; Pieria, P. Poroi, 510 m, 17 V 2019, 39.96797 / 22.58846); **Peloponnese** (Forel 1886: clxvii, Legakis 2011: 25, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2017 b: 218, Salata & Borowiec 2019 b: 105, 114, 115, 120, Borowiec & Salata 2021 b: 11); **Sterea Ellas** (Forel 1886: clxvii, Forel 1889: 256, Legakis 2011: 25, Borowiec & Salata 2017 a: 2, Salata & Borowiec 2017: 296-299, Borowiec & Salata 2018 e: 9, Salata & Borowiec 2019 b: 106, 121, Borowiec & Salata 2021 b: 11); **Thessaly** (Legakis 2011: 25, Borowiec & Salata 2012: 529, Borowiec & Salata 2018 b: 234, Salata & Borowiec 2019 b: 107, 121; **new data:** Larissa, Mt. Olympus, 3.9 km E of Karya, 790 m, 13 V 2019, 39.99133 / 22.44169; Larissa, Kryovrysi, 985 m, 16 V 2019, 39.98888 / 22.32645); Larissa, Mt. Olympus, Vrisopoules loc. 2, 1430 m, 15 V 2019, 40.02795 / 22.30612); **Thrace** (Bračko et al. 2016: 26).

Distribution in Europe and Mediterranean Basin: Andorra; Armenia; Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Egypt; France: Corsica, mainland; Georgia; Germany; Gibraltar; Greece; Hungary; Iran; Israel; Italy: mainland, Sardinia, Sicily; Luxembourg; Malta; Montenegro; Netherlands; North Macedonia; Portugal; Romania; Serbia; Slovakia; Slovenia; Spain: Baleares, Canary Is., mainland; Switzerland; Turkey; Ukraine; Yemen.

Description. HL: 0.389-0.452 (mean 0.425); HW: 0.341-0.413 (mean 0.380); SL: 0.349-0.389 (mean 0.374); ML: 0.39-0.52. **Color.** Whole body from bright yellow to dark brown. In dark specimens legs, scapus and up to four first segments of funiculus brighter, from orange to yellowish brown (Figs 125.1-4). **Head.** Longer than wide, oval or trapezoidal, its sides always convex, occipital margin nearly straight or concave (Fig. 125.4). Clypeus

shiny, its posterior edge convex, setosity sparse and long, setae from adjacent to subdecumbent. Head smooth and shiny, bearing short, sparse and adjacent setae. Scape reaches beyond the occipital margin, widening upward from ¾ of its length, its surface shiny, with feeble, sparse microreticulation, dense, adjacent microsetae covers its whole surface. The second funicular segment square or slightly rectangular, the third segment also square, as long as to only slightly longer than second segment, distinctly shorter than the fourth segment, the rest of funicular segments clearly longer than broad (Fig. 125.3). Eyes big, oval, 1.3 times as long as wide. Mesosoma. Elongate, 1.8 times as long as wide. In lateral view dorsal surface of promesonotum slightly convex, metanotal groove shallow, propodeum with convex dorsal and straight or slightly concave posterior sides (Fig. 125.2). The whole mesosoma smooth and shiny, bearing sparse, short and adjacent micropilosity (Figs 125.1, 2). **Waist and gaster. Petiolar s**cale thin and short, its anterior and posterior sides slightly convex, apex concave, its surface smooth and shiny. Gaster longer than mesosoma, shiny, sparsely microreticulate, bearing sparse, appressed hairs, the distance between hairs is 1/3-3/4 of the length of setae, additionally thick, long hairs occur on posterior margins of all tergites (Figs 125.1, 2). **Legs.** Short, surface with appressed pubescence.

Gyne as in Figs 125.5-7.

Comparative remarks. *Plagiolepis pygmaea* belongs to not parasitic species. It differs from its relatives in structure of antennae with fourth funiculus segment distinctly longer than second and third segment, and third segment only slightly longer than second segment. In both relatives fourth funiculus segment is only slightly longer than third segment and third segment is distinctly longer than second segment. *Plagiolepis perperamus* differs also in gaster with dense appressed pubescence with the distance between hair shorter than 1/3 of their length while in *P. pygmaea* gaster is covered with sparse appressed pubescence with the distance between hair approximately even or longer than half of their length.

Biological notes. Thermophilous species. Very abundant, found in a wide range of habitats. Noted from luminous pine forests, various types of deciduous forests, stream valleys with plane trees, olive plantations, mountain pastures with clumps of low oaks, area near a small lake in a moist, shaded valley of a small creek, mountain plateau, small gorge with mediterranean shrubs, seashore with frygana and pine trees, roadsides, ruderal areas and gardens in tourist resorts. Nests under stone, in rock crevices, under the moss on the rocks or between the rock rubble. Polygynous and polydomous. Most records are from low and mid altitude, from sea level to 800 m. The highest localities come from continental Greece, Taygetos Mts., Peloponnese at an altitude 1480 m, and island Greece from Lefka Ori Mts., Crete at an altitude 1800 m.

126. *Plagiolepis xene* Stärcke, 1936

(Figs 126.1-3)

Plagiolepis xene Stärcke, 1936: 279.

Distribution in Greece: Aegean Islands (Borowiec & Salata 2013: 364); **Epirus** (Borowiec & Salata 2018 a: 9); **Ionian Islands** (Borowiec & Salata 2013: 364, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 10); **Macedonia** (Legakis 2011: 25, Borowiec & Salata 2022: 9).

Distribution in Europe and Mediterranean Basin: Andorra; Croatia; Czech Rep.; France: mainland; Germany; Greece; Hungary; Italy: mainland, Sardinia, Sicily; Montenegro; North Macedonia; Serbia; Slovakia; Spain: Baleares, mainland; Switzerland; Turkey; Ukraine.

Description. Wingless gyne only. HL: 0.359-0.373 (mean 0.366); HW: 0.333-0.349 (mean 0.341); SL: 0.310-0.317 (mean 0.314); ML: 0.48-0.50. **Color.** Whole body from bright yellow to yellowish brown, mesosoma often slightly brighter than head and gaster (Figs 126.1-3). **Head.** Longer than wide, oval or trapezoidal, its sides always convex, occipital margin nearly straight or concave (Fig. 126.3). Clypeus shiny, its posterior edge convex, setosity sparse and long, setae from adjacent to subdecumbent. Head smooth and shiny, bearing short, sparse and adjacent setae. Scape reaches beyond the occipital margin, widening upward from ¾ of its length, its surface shiny, with feeble, sparse microreticulation, dense, adjacent microsetae covers its whole surface. The second funicular segment square, the third segment slightly wider than long, not longer than the second segment, fourth segment square only slightly longer than the third segment, the rest of funicular segments slightly to clearly longer than broad (Fig. 126.3). Eyes big, oval, 1.3 times as long as wide. Mesosoma. Elongate, 1.7 times as long as wide. In lateral view scutum and scutellum flat, no metanotal groove only metanotal suture, propodeum softly convex in profile (Fig. 126.2). The whole mesosoma smooth and shiny, bearing sparse, short and appressed micropilosity and anteriorly and on sides with few long, erected setae. **Waist and gaster. Petiolar s**cale thin, short and broad, apex slightly concave, its surface smooth and shiny. Gaster slightly longer than mesosoma, shiny, bearing sparse, appressed hairs, the distance between hairs mostly longer than the length of setae, additionally very long setae occur on posterior margins of all tergites (Figs 126.1, 2). **Legs.** Short, surface with appressed pubescence.

Comparative remarks. This social parasite is known only from sexual forms and has no worker caste. In Greece, this is the only known described parasitic species of the genus *Plagiolepis* as the status of *P.* sp. "brachypterous" remains unclear. However, Deguldre et al. (2020), based on molecular study, suggest an occurrence of second and undescribed parasitic species in this country (Samos Island).

Biological notes. Social parasite lacking worker caste. Collected in nests of *Plagiolepis pygmaea* in coniferous and deciduous forests. Polygynous with a maximum of 100 queens per nest. Males not more abundant than gynes. Nests were placed at an altitude 311 and 770 m.

127. *Plagiolepis* sp. brachypterous gynes

(Figs 127.1-3)

Distribution in Greece: Aegean Islands (**new data:** Samos, Nightingale Vall., 09.05.2013, 26°49'E / 37°47'N).

Distribution in Europe and Mediterranean Basin: Cyprus (our unpublished data); Greece.

Description. Winged gynes only. HL: 0.587-0.595 (mean 0.592); HW: 0.548-0.563 (mean 0.557); SL: 0.524-0.559 (mean 0.549); ML: 0.84-0.91; fore wing length: 0.183-0.198 (mean 0.189). **Color.** Whole body brown to dark brown, appendages lighter, legs yellowish, antennae yellowish brown (Figs 127.1-3). **Head.** Longer than wide, oval, its sides always

convex, occipital margin nearly straight or concave (Fig. 127.3). Clypeus shiny, its posterior edge convex, setosity sparse and long, setae mostly subdecumbent. Head with diffused microreticulation, bearing short, sparse appressed to decumbent pubescence and in ocellar area two moderately long, erect setae. Scape reaches beyond the occipital margin, widening upward from ¾ of its length, its surface microreticulate, with moderately dense appressed to decumbent pubescence. The second funicular segment thin, only slightly longer than wide, the third segment elongate, distinctly longer than the second segment, fourth segment only slightly longer than the third segment, the rest of funicular segments clearly longer than broad (Fig. 127.3). Eyes big, oval, 1.4 times as long as wide. Mandibles with large apical denticle and four small additional denticles. Mesosoma. Elongate, 1.7 times as long as wide. In lateral view scutum and scutellum flat, no metanotal groove only metanotal suture, propodeum softly convex in profile. The whole mesosoma distinctly microreticulate but appears indistinctly shiny, bearing sparse, short and appressed pubescence and anteriorly 3-4 long, erected setae. **Waist and gaster. Petiolar s**cale thin, short and broad, apex slightly concave, its surface smooth and shiny. Gaster more than 1.6 times longer than mesosoma, microreticulate, bearing dense appressed pubescence partly covering surface of tergite, additionally very long setae occur on posterior margins of all tergites. **Legs.** Short, surface with appressed pubescence.

Comparative remarks. If this taxon proves to be a good species then it differs from *P. xene*, the only hitherto known Greek parasitic *Plagiolepis* species, in presence of brachypteric gynes that are distinctly larger than workers but distinctly smaller than gynes of the host species. Gynes of *P. xene* are wingless and very small (usually similar in size to workers of the host species).

Biological notes. Probably social parasite, all alate gynes were collected in nests of *Plagiolepis pallescens* Forel. However, it cannot be ruled out that this brachypteric form arose as a result of parasitization of gynes of *P. pallescens*. However, the gaster section of brachyperous gynes did not show any nematode or microsporidia infection.

Genus *Polyergus* Latreille, 1804

Diagnosis. Social parasite, obligatory slave-makers with *Formica*-like morphology, large; mandibles sickle-shaped, without denticles; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape elongate, longer than width of head, without projected setae; antennal sockets close to the posterior clypeal margin; eyes large, elongate oval, placed behind the midlength of head; ocelli present; mesothorax constricted in its anterior half; metapleural gland present; propodeum unarmed; propodeal spiracle elongate oval; petiole in form of unarmed scale; acidopore with a seta-fringed nozzle.

In Greece only one species.

128. *Polyergus rufescens* (Latreille, 1804)

(Figs 128.1-5)

Formica rufescens Latreille, 1798: 44;
Formica testacea Fabricius, 1804: 400;
Polyergus rufescens subsp. *tianschanicus* Kuznetsov-Ugamsky, 1927 a: 41.

Distribution in Greece: Macedonia (Legakis 2011: 36).

Distribution in Europe and Mediterranean Basin: Albania; Austria; Armenia; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Denmark; France: Corsica, mainland; Georgia; Germany; Greece; Hungary; Italy: mainland; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Poland; Portugal; Romania; Russia; Serbia; Slovakia; Slovenia; Spain: mainland; Sweden; Switzerland; Turkey; Ukraine.

Description. Large, HL: 1.413-1.740 (mean 1.577); HW: 1.214-1.508 (mean 1.387); SL: 1.024-1.325 (mean 1.195); ML: 2.20-2,54; MW: 0.92-1.07. **Color.** Whole body from to reddish brown, sometimes body brown and appendages reddish brown, often sides of mesosoma darker, reddish brown to brown and mesosomal dorsum paler, reddish (Figs 128.1-4). **Head.** Slightly longer than wide, sides from almost parallel to slightly convex, occipital margin on sides rounded, in the middle straight (Fig. 128.4). Clypeus microreticulate from slightly dull to slightly shiny, trapezoidal, its anterior margin straight with 10-12 very long setae and 2-4 short setae, central part with 6-8 long erected setae with short and sparse appressed hairs. Head strongly microreticulate, indistinctly dull, erected setae absent, gular area also lacking erected setae. Ventral sides of head close to lateral margin with 1-4 long erected setae. Frontal head without or with short, hardly visible appressed hairs, occipital and lateral surface with short, fine appressed hairs. Scape short, not reaching beyond the occipital margin, widening upward from 2/3 of its length, its surface microreticulate but shiny, with very short, moderately dense appressed hairs. Funicular segments elongate, the second funicular segment 2.4 times as long as wide, only slightly shorter than first segment and distinctly longer than the third segment, the rest of funicular segments clearly longer than broad (Fig. 128.3). Eyes big, oval, 1.3 times as long as wide. Mandibles long and sickle-shaped, masticatory margin only minutely serrate without denticles. **Mesosoma.** Elongate, 2.4 times as long as wide, strongly microreticulate, indistinctly dull. In lateral view promesonotum regularly convex, metanotal groove deep, propodeum strongly convex with rounded top, pronotum with 0-6 long erected setae, mesonotum without setae, propodeum with up to two erected setae. The whole surface of mesosoma bearing short and sparse appressed pubescence (Fig. 128.2). **Waist and gaster.** Petiolar scale thick with rounded top, its surface microreticulate with sparse, short, appressed pubescence, on sides with 1-3 long erected setae. Gaster shorter than mesosoma, distinctly microreticulated, from dull to indistinctly shiny, bearing short, dense, appressed pubescence but not covering surface, first tergite in front area with group of 8-12 thick, long erected setae and in front of posterior margin with row of long setae, second tergite across the middle and close to posterior margin with a row of long setae.

Male as in Fig. 128.5.

Comparative remarks. A very distinct species, similar to species of the genus *Formica* but differs from all the genera of Greek Formicinae in modified mandibles, long and sickle-shaped, with masticatory margin only minutely serrate without denticles.

Biological notes. No recent or confirmed data from Greece. In neighboring countries it was noted from dry and semi-dry grasslands also in urban zones, from low and mid altitude up to 1500 m. Obligatory slave-makers of the species of the subgenus *Serviformica*. Structure and materials of nests depend on the particular host species but nests are in dimensions larger than the average size of host nests.

Genus *Prenolepis* Mayr, 1861

Diagnosis. Monomorphic, moderately large, ML below 1.2 mm; mandibles with 6-7 teeth; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape elongate, distinctly longer than width of head, with at most suberect but without projected setae; antennal sockets close to the posterior clypeal margin; eyes large, circular, placed slightly behind the midlength of head; ocelli absent; mesothorax strongly constricted in the middle; metapleural gland present; propodeum unarmed; propodeal spiracle circular; simple tibial spurs on meso- and metatibiae; petiole in form of unarmed scale; acidopore with a seta-fringed nozzle.

In Greece only one species.

129. *Prenolepis nitens* (Mayr, 1853)

(Figs 129.1-4)

Tapinoma nitens Mayr, 1853 a: 144;
Tapinoma polita Smith, 1855: 112;
Formica crepusculascens Roger, 1859: 238;
Prenolepis imparis subsp. *nitens* var. *liburnica* Röszler, 1942 b: 58.

Distribution in Greece: Aegean Islands (Legakis 2011: 26, Salata & Borowiec 2017: 295-299, Borowiec & Salata 2018 c: 7; **new data:** Lesbos, Argennos, 548 m, 12 VI 2015, 39.35494 N / 26.2661 E; Lesbos, Ipsilometopo, 485 m, 11 VI 2015, 39.32012 N / 26.24461 E; Lesbos, Ligona Valley, 229 m, 11 VI 2015, 39.32734 N / 26.21009 E; Lesbos, 1.7 km NW of Megali Limni, 381 m, 10 VI 2015, 39.11343 N / 26.30738 E; Lesbos, rd. Sykaminia-Vigla, 395 m, 12 VI 2015, 39.35468 N / 26.30483 E; Samos Platanos, 502 m, 7 X 2019, 37.73842 / 26.74563); **Epirus** (Legakis 1983: 5, 2011: 26, Borowiec & Salata 2018 a: 9); **Ionian Islands** (Legakis 2011: 26, Salata & Borowiec 2017: 295-299, Borowiec & Salata 2018 d: 7, Salata & Borowiec 2019 b: 100-104, Borowiec & Salata 2021 a: 10; **new data:** Lefkada, Asprogerakata, 430 m, 2 IX 2016, 38.46828 / 20.39191); **Macedonia** (Legakis 2011: 26, Borowiec & Salata 2012: 531, Salata & Borowiec 2019 b: 104-105, Borowiec & Salata 2022: 9; **new data:** Drama, 12 km S of Livadero, 500 m, 9 X 1999, 41.2351 N / 24,1936 E; Kavalas, Nestos river n. Komnina, 100 m, 10 X 1999, 41.169 N / 24.6966 E; Pieria, Mt. Olympus, Ag. Joannis n. Litohoro, 580 m, 14 V 2019, 40.08377 / 22.48775; Pieria, Mt. Olympus, Litohoro vic., 470 m, 14 V 2019, 40.09677 / 22.49301; Pieria, 2 km W of Panteleimonas, 305 m, 15 V 2019, 39.98563 / 22.59513; Pieria, P. Poroi, 510 m, 17 V 2019, 39.96797 / 22.58846); **Peloponnese** (Legakis 2011: 26, Borowiec & Salata 2021 b: 11); **Sterea Ellas** (Forel 1886: clxvii, Legakis 2011: 26); **Thessaly** (Legakis 2011: 26, Borowiec & Salata 2018 b: 234, Salata & Borowiec 2019 b: 107; **new data:** Larissa, Mt. Olympus, Mt. Olympus, 6.2 km NE of Karya, 935 m, 13 V 2019, 40.00703 / 22.46108); **Thrace** (Bračko et al. 2016: 26.

Distribution in Europe and Mediterranean Basin: Albania; Bosnia and Herzegovina; Britain; Bulgaria; Croatia; Georgia; Greece; Hungary; Italy: mainland; Montenegro; North Macedonia; Romania; Serbia; Slovakia; Slovenia; Turkey.

Description. Moderately large, HL: 0.698-0.825 (mean 0.777); HW: 0,609-0.778 (mean 0.721); SL: 0.825-1.000 (mean 0.930); EL: 0.188-0.230 (mean 0.214); ML: 0.93-1.09; MW: 0.33-0.51. **Color.** Body from yellowish brown to brown, mesosoma usually slightly lighter than head and gaster, frontal head darker than sides and ventral surface, antennae

and legs yellow; in the darkest specimens gaster dark brown, distinctly darker than mesosoma and head (Figs 129.1-4). **Head.** Slightly longer than wide, sides rounded, occipital margin in the middle straight to shallowly concave (Fig. 129.3). Clypeus smooth and shiny, trapezoidal, its anterior margin straight with a row of long setae, posterior margin concave in the middle, whole clypeal surface sparse and short appressed hairs and 6-8 long erected setae the longest with length 0.206. Head with hardly visible diffused microreticulation, smooth and shiny, with very sparse, short decumbent setae and numerous long erected setae, the longest with length 0.246, gular area with short to moderately long subdecumbent and decumbent setae. Ventral sides of head sparse, moderately long decumbent setae. Frontal head without or with short, hardly visible appressed hairs, occipital and lateral surface with short, fine appressed hairs. Scape very long, approximately 1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, only slightly widened from 2/3 of its length, its surface microreticulate but shiny, with long and dense subdecumbent and semierect hairs. Funicular segments elongate, thin, the second funicular segment 1.5 times as long as wide, as long as or only slightly shorter than third segment and distinctly shorter than the first segment, the rest of funicular segments clearly longer than broad (Fig. 129.3). Eyes big, only slightly longer than wide, 0.28 length of head. Mandibles short, only at base with diffused striation then microrerticulate but shiny with large apical dent and six smaller denticles on masticatory margin. **Mesosoma.** Elongate, distinctly constricted in the middle, 2.3 times as long as wide, dorsally with diffused microreticulation, laterally partly completely smooth, shiny on the whole surface. In lateral view promesonotum regularly convex, metanotal groove deep, propodeum regularly convex, pronotum with 0-6 long erected setae, mesonotum without setae, propodeum with up to two erected setae. The whole surface of promesonotum with short and sparse appressed pubescence and long erected setae the longest with length 0.206, propodeum with a pair of long erected setae (Figs 129.1, 2). **Waist and gaster.** Petiole with long stem partly hidden under anterior part of the first tergite, scale short with truncate to shallowly emarginate apical margin, without or with single short setae in anterolateral corners. Gaster longer than mesosoma, first tergite distinctly microreticulated, subsequent tergites with transverse microstriation, surface shiny with short and sparse appressed pubescence and long erected setae the longest with length 0.238.

Gyne not studied.

Comparative remarks. A very distinct species, it differs from other Formicinae members in propodeal spiracle round to oval, antennal insertions placed close to clypeal margin, distinctly constricted mesosoma between mesonotum and propodeum, and lack of ocelli in workers.

Biological notes. Most its records come from deciduous forests. It was also noted from mixed forests close to streams, shady valleys in mixed forests, stream valleys with plane trees, old olive plantations, roadsides with shrubs, and shrubs around olive plantations. Less frequently observed in coniferous forests, alpine zone with limestone rocks and pastures, rest area in village with stone walls, pastures inside mixed forest and gardens. Prefers shady and damp places. Nests under stones. Some of the workers stock up on honeydew in their gaster. The gaster of such individuals is strongly swollen (Fig. 129.4). Such individuals usually stay in the nests, often form clusters attached to the bottom wall of the stones beneath which their nest is located. Most records are from low and mid altitude from sea level to 800 m, the highest locality was from Langadia, Peloponnese from an altitude 1200 m.

Genus *Proformica* Ruzsky, 1902

Useful identification keys, revisions and taxonomic papers: Dlussky 1969, Lebas & Galkowski, 2019 a, Lebas & Galkowski 2019 b.

Diagnosis. Polymorphic, moderately large, major workers with ML up to 2 mm; mandibles with 5 teeth; palp formula 6:4; antennae 12-segmented, no antennal club; antennal scape short, not or slightly longer than width of head, without or with only 1-3projecting setae; antennal sockets close to the posterior clypeal margin; eyes large, elongate oval, placed behind the midlength of head; ocelli present; mesothorax moderately constricted in its anterior half; metapleural gland present; propodeum unarmed; propodeal spiracle elongate oval; fore tibia with broad, apical pectinate spur, mid and hind tibia with two simple spurs apically; petiole in form of unarmed scale; acidopore with a seta-fringed nozzle.

In Greece at least four species.

A key to species of the genus *Proformica*

(mostly based on minor workers which are more frequently collected)

1. At least pronotum and central part of first gastral tergite with erected setae, appressed pubescence on gastral tergites short and sparse but well visible (Figs 130.2, 131.2, 132.2). If mesosoma and first gastral tergite lacking erected setae then frons without striation or with narrow patch of diffused striation centrally (Figs 130.4, 131.4, 132.4) ..... 2.

—. Mesosoma and central part of first gastral tergite lacking erected setae or at most with 1-2 short erected setae, appressed pubescence on gastral tergites short and sparse, hardly visible (Figs 133.2, 3). Frons centrally with wide patch of striae (Fig. 133.5) .... ***P. striaticeps* (Forel)**, p. 265

2. Promesonotum in minor workers with at most 3-8 erected setae, occipital part of head lacking erected setae or at most with a single seta (Figs 131.2, 132.2) ..... 3.

—. Promesonotum in minor workers usually with more than 4 (often more than 10) erected setae, also occipital part of head with few erected setae (Fig. 130.2) .... ***P. chelmosensis* Lebas & Galkowski**, p. 258

3. Appressed pubescence sparser, erect setation of mesosoma less evident, promesonotum in minor workers with up to two erected setae, occasionally pronotum with 3-4 setae. Microreticulation on gastral tergites less evident. Lowlands and mountains of central and southern Greece up to 1758 m ..... ***P. oculatissima* (Forel)**, p. 262

—. Appressed pubescence denser, erect setation of mesosoma in minor workers more evident, promesonotum always with 1-6 erected setae. Microreticulation on gastral tergites more evident. Known only from Olympus Massif from an area 979 to 1520 m .... ***P. lebasi* sp. nov.**, p. 260

Review of species

130. *Proformica chelmosensis* Lebas & Galkowski, 2019

(Figs 130.1-8)

Proformica chelmosensis Lebas & Galkowski, 2019 a: 218.

Distribution in Greece: Peloponnese (Lebas & Galkowski, 2019 a: 218-222, Borowiec & Salata 2021 b: 11).

Distribution in Europe and Mediterranean Basin: Endemic to Greece.

Description. Moderately large, polymorphic; minor workers HL: 0.770-1.016 (mean 0.996); HW: 0,521-0.984 (mean 0.760); SL: 0.679-0.984 (mean 0.854); EL: 0.225-0.311 (mean 0.272); ML: 1.08-1.62; MW: 0.46-0.79. **Color.** Head, mesosoma, petiolar scale and gaster brown to dark brown, pronotum and gaster often paler brown than rest of body, antennae yellow, apical 4-6 antennomeres not or only slightly infuscate, coxa brown, femora mostly dark brown with yellowish apex, tibiae yellowish brown to brown, often gradually paler from distal part to apex, tarsi yellow (Figs 130.1-4). **Head.** 1.3-1.5 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin convex (Fig. 130.4). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short, hardly visible appressed hairs, a row of 5 long setae close to anterior margin and one pair close to the base, the longest anterior seta with length 0.170-0.195. Head mostly microreticulate, without longitudinal striation but microsculpture in anterior half of head tends to form circular striation around antennal sockets, whole surface covered with very sparse and short appressed pubescence, with 1-5 short setae in interocular area and 1-3 very short setae in ocellar area, and in occipital part of head with 3-14 erected setae**,** gena lacking erected setae or 1-3 subdecumbent setae, ventral side of head with 6-8 erected setae. Scape moderately long, 1.1- 1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence on dorsal surface and partly decumbent pubescence on ventral side , without or with 1-3 short, suberect to erect setae. Funicular segments elongate, thin, first segment 2.9 times as long as wide and 2.3-2.4 times as long as second segment, the second funicular segment 1.4 times as long as wide, as long as third segment, the rest of funicular segments clearly longer than broad (Fig. 130.3). Eyes big, elongate oval, approximately 1.5 times longer than wide, 0.27 length of head. Mandibles long, with longitudinal sculpture but shiny, with large apical dent and four smaller, sharp denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.0-2.3 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly dull. In lateral view pronotum convex, metanotum and propodeum continuous with deep mesonotal groove (Fig. 130.2). Whole mesosomal surface covered with short and dense appressed pubescence, pronotum with 5-19, mesonotum 5-16, propodeum 4-14 long erected setae. **Waist and gaster.** Petiolar scale thick in lateral view but broad in anterior view, apex truncate or shallowly concave, without or with 2-6 long setae laterally. Gaster longer than mesosoma, first tergite with diffused microreticulation, subsequent tergites with diffused mixed microreticulation and transverse microstriation, surface shiny, covered with short and sparse appressed pubescence, distance between hairs as large as 1/2-2/3 whole length. First gastral tergite with 8-24 long erected setae and a row of long setae close to posterior margin, second gastral segment in the middle with few suberect setae and a row of long setae close to posterior margin. **Legs.** Ventral surface of fore femora with 5-6, of mid femora 3-4 and hind femora with 1-2 erected setae.

Major workers HL: 1.262-1.286 (mean 1.274); HW: 1.071-1.0.98 (mean 1.085); SL: 0.992-1.037 (mean 1.015); EL: 0.322-0.325 (mean 0.324); ML: 1.80-1.90; MW: 0.84-0.85.

Color. Head, mesosoma, petiolar scale and gaster mostly yellowish brown to brown, genae, pronotum and gaster sometimes slightly paler than the rest of body, antennae and legs yellowish to brown, femora darker than tibiae (Figs 130.5, 6). **Head.** 0.9- 1.1 times as long as wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin straight (Fig. 130.8). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short appressed hairs and a row of 5 long setae close to anterior margin, one pair of long setae in the middle and one pair close to posterior margin. Head with micropunctation and microreticulation between punctures, frons with microstriation, whole surface with sparse to moderately dense, short appressed pubescence and 1-8 long erected setae in interocular and ocellar areas and 8-18 suberect to erected setae in occipital part of head, and 4-6 setae on ventral side of head**.** Scape short, approximately 0.9 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence in basal half and slightly decumbent pubescence in apical half with 1-7 suberect to erect setae. Funicular segments elongate, first segment 2.1 times as long as second, the second funicular segment 1.3 times as long as wide, only slightly shorter than third segment, the rest of funicular segments longer than broad but less clearly as in minor worker (Fig. 130.7). Eyes big, elongate oval, approximately 1.5 times longer than wide, 0.25 length of head. Mandibles moderately long and broad, with longitudinal sculpture but shiny, with large blunt apical dent and 4 smaller blunt denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.1-2.2 times as long as wide**.** In lateral view promesonotum convex, mesonotal groove moderately deep, propodeum convex, whole surface of mesosoma microreticulate, appears indistinctly dull, covered with moderately long and moderately dense pubescence; pronotum with 14-28, mesonotum 10-20 and propodeum 10-29 long erected setae (Fig. 130.6). **Waist and gaster.** Petiolar scale thick in lateral view, broad in anterior view, widest in the middle then narrowed to base and apex, apical margin triangularly emarginate, apicolaterally with 6-8 long setae. Gaster shorter than mesosoma, slightly globular, first tergite with diffused microreticulation tending to form transverse striation in posterior half of the surface, subsequent tergites microreticulate tending to form transverse striation, surface shiny, covered with moderately long and moderately dense appressed pubescence, distance between hairs as large as 1/6-1/3 their length. First gastral 14-28 suberect to erected setae centrally and a row of long setae close to posterior margin, second and third gastral segment across the middle and close to posterior margin with a row of few long setae. **Legs.** Ventral surface of fore femora with 6, of mid femora 4-5 and hind femora 3 erected setae.

Comparative remarks. *Proformica chelmosensis* is the most setose of Greek species with promesonotum with at least 10 erected setae, and occipital part of head with few erected setae. Other Greek species have promesonoum with at most with 6 erected setae and occipital part of head lacking erected setae or with at most with 1-2 short setae in lateral corners.

Biological notes. Mountain species, collected in an open area above the upper edge of the forest at an altitude 1800-2270 m. Localities were rocky and open grazing sites overgrown with sparse vegetation. Numerous nests were placed in soil close from each other. Workers actively searched for food on vegetation. In the higher sites, nests had a shape of small mounds of earth (Lebas & Galkowski 2019 a: 218-222).

131. *Proformica lebasi* sp. nov.

(Figs 131.1-8)

Distribution in Greece: Sterea Ellas (new data); **Thessaly** (new data).

Distribution in Europe and Mediterranean Basin: Endemic to Greece.

Etymology. Dedicated to our French colleague Claude Lebas for his contribution to the knowledge of Greek species of the genus *Proformica*.

Type material. Holotype minor worker: GREECE, The., Larissa | Olympus, Vrisopoules loc. 1 | 40.03372/22.31675, 1550 m | 15 V 2019, L. Borowiec || Collection L. Borowiec | Formicidae | LBC-GR02888 (MNHW); 5 minor workers: the same data as holotype (MNHW, MHNG); 2 minor workers: GREECE, Thess., Mt. Olympus | 2.8 km W of EOCHO ski center | 40.0255 N / 22.30421 E | 9 V 2017, L. Borowiec. 1340 m || Collection L. Borowiec | Formicidae | LBC-GR02380 (MNHW); one minor and 2 major workers: Greece, Thessaly, 979 m | Mt. Olympus, 1 km N of | Kryovrysi, 32.989N/22.326E | 7 V 2017, C. Lebas || Collection L. Borowiec | Formicidae | LBC-GR02774 (MNHW).

Description. Moderately large, polymorphic; minor workers HL: 0.790-1.000 (mean 0.895); HW: 0,543-0.698 (mean 0.617); SL: 0.730-0.889 (mean 0.807); EL: 0.232-0.257 (mean 0.241); ML: 1.14-1.41; MW: 0.48-0.62. **Color.** Head, mesosoma, petiolar scale and gaster dark brown to black, gena usually paler than other parts of head, yellowish brown to brown with diffused border between dark and pale colors, antennae yellow, apical 5-6 antennomeres often indistinctly infuscated, coxa dark brown, femora mostly dark brown with yellowish apex, tibiae yellowish brown gradually paler from distal part to apex, tarsi yellow (Figs 131.1-4). **Head.** Approximately 1.5 times longer than wide, in front of eyes parallel-sided, behind eyes regularly rounded, occipital margin convex (Fig. 131.4). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short, hardly visible appressed hairs, a row of 4-5 long setae close to anterior margin and two pairs of erected setae, one pair close to anterior margin and the second pair close to base, the longest anterior seta with length 0.159-0.162. Head mostly microreticulate, without or with rudimental longitudinal striation between antennal sockets, with sparse and short appressed pubescence, erected setae absent or with 1-2 short setae in interocular area and 1-3 short setae in ocellar area, in occipital part of head lacking erected setae or in the largest minor workers with 1-2 setae laterally, gular area and ventral side of head lacking erected setae. Scape very long, approximately 1.3 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 1/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment approximately twice as long as second segment, the second segment 1.6 times as long as wide, slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 131.3). Eyes big, elongate oval, approximately 1.4 times longer than wide, 0.27 length of head. Mandibles long, with longitudinal sculpture but shiny, with large apical dent and smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.3 times as long as wide, dorsally and laterally distinctly microreticulated, surface indistinctly shiny. In lateral view pronotum convex, metanotum and propodeum almost continuous with shallow mesonotal groove. Whole mesosomal surface covered with very short and sparse

appressed pubescence, pronotum with (0)1-6, mesonotum with (1)3-5, propodeum 2-4 moderately longstanding setae, the longest setae with length 0.143 (Fig. 131.2). **Waist and gaster.** Petiolar scale thick in lateral view but broad in anterior view, sides rounded, apex truncate or shallowly concave, with 1-2 moderately long setae. Gaster longer than mesosoma, first tergite distinctly microreticulated, subsequent tergites with mixed microreticulation and diffused transverse microstriation, surface shiny, covered with long and moderately sparse appressed pubescence, distance between hairs as large as 0.2-0.3 length of hair. First tergite with row 2-3 erected setae anteriorly and row of 4 erected setae across middle, and row of moderately long setae close to posterior margin, second and third gastral segment across the middle with a row of 6-8 moderately long erected setae. **Legs.** Ventral surface of fore femora with 2-3, of mid and hind femora with 1-2 erected setae. The number of erected setae depends on the condition of the specimen and old workers may have fewer bristles than stated in the description or be completely bristled.

Major workers HL: 1.389-1.405 (mean 1.397); HW: 1.246-1.254 (mean 1.250); SL: 1.048-1.095 (mean 1.072); EL: 0.349-0.357 (mean 0.353); ML: 1.82-1.88; MW: 0.952. **Color.** Paler than minor workers, head, mesosoma, petiolar scale and gaster mostly yellowish brown to brown, sides of mesonotum and propodeum slightly darker, brown colored, antennae and legs yellowish, femora slightly darker than tibiae (Figs 131.5, 6). **Head.** Approximately 1.1 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin straight (Fig. 131.8). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short appressed hairs and a row of short setae close to anterior margin; both examined majors have no erected setae in central and posterior part of clypeus but it could be an artifact. Head with micropunctation and microreticulation between punctures, without distinct microstriation in interantennal and interocular area, but punctures tend to form longitudinal rows, with very sparse and short appressed pubescence, with 1-2 short erected setae in interocular and ocellar areas, without or with two very short setae in occipital part of head, and 2-5 setae on ventral side of head. Scape short, approximately 0.86 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.1 times as long as second, the second funicular segment 1.3 times as long as wide, only slightly shorter than third segment, the rest of funicular segments longer than broad but less clearly as in minor worker (Fig. 131.7). Eyes big, elongate oval, approximately 1.5 times longer than wide, 0.25 length of head. Mandibles moderately long and broad, with longitudinal sculpture but shiny, with large blunt apical dent and smaller blunt denticles on masticatory margin. **Waist and gaster.** Elongate, in dorsal view distinctly constricted in the middle, 1.9 times as long as wide**.** In lateral view pronotum convex, its surface mostly micropunctate with smooth and shiny interspaces, mesonotum at top micropunctate with shiny interspaces, on sides microreticulate and slightly dull, propodeum microreticulate and slightly dull, mesonotal groove moderately deep. Whole mesosoma surface covered with moderately long, on top sparse and on sides moderately dense appressed pubescence; pronotum with 4-5 moderately long, mesonotum 2-3 short and propodeum 1-5 very short standing setae (Fig. 131.5). **Abdomen.** Petiolar scale thin in lateral view but broad in anterior view, widest in the middle then narrowed to base and apex, apical margin triangularly emarginate, apicolaterally

with two short setae. Gaster shorter than mesosoma, slightly globular, first tergite micropunctate and with diffused microreticulation, subsequent tergites micropunctate and with more evident microreticulation but without transverse microstriation, surface shiny, covered with moderately long and moderately dense appressed pubescence, distance between hairs as large as 1/4-1/3 their length. First and second gastral tergite with 0-4 very short standing setae centrally and a row of short setae close to posterior margin, third gastral segment across the middle and close to posterior margin with a row of few short setae. **Legs.** Ventral surface of fore femora with 2-3, of mid and hind femora with 1-2 standing setae.

Comparative remarks. *Proformica lebasi* belongs to the species with sparsely setose mesosoma and occipital part of head without or at most with 1-2 setae in occipital corners. *Proformica striaticeps* differs in body of minor workers yellowish brown and distinctly striated frons and mesosoma and central part of first gastral tergite lacking erected setae or at most with 1-2 short erected setae, appressed pubescence on gastral tergites short and sparse, hardly visible while in *P. lebasi* workers are dark brown to black and striation on frons, if present, is diffused and covers only on central frons, pronotum and central part of first gastral tergite usually with few erected setae and appressed pubescence on gastral tergites short and sparse but well visible; *P. oculatissima* differs in sparser appressed pubescence (distance between hairs as large as 1/2 or whole length of hair), and more shiny body with diffused background microreticulation; additionally *P. oculatissima* differs in less evident mesosomal setation with number of setae on mesonotum and propodeum less than 3 and on pronotum usually less than 4.

Biological notes. Mountain species, collected on rocky pastures with sparse vegetation located above the upper edge of the forest at an altitude 979-1758 m. Nests were in ground and workers were active only in the midday hours with the strongest insolation.

132. *Proformica oculatissima* (Forel, 1886)

(Figs 132.1-8)

Formica oculatissima Forel, 1886 b: clxii.
? Formica aerea Roger, 1859: 237.

Distribution in Greece: Ionian Islands (Salata & Borowiec 2019 b: 114; **new data:** Cephalonia, Agios Andreas, 501 m, 14 VI 2021, 38.15943 / 20.59734; Cephalonia, Skala, 38 m, 6 VI 2019, 38.07823 / 20.79594; Cephalonia, 700 m NW of Skala, 40 m, 7 VI 2019, 38.08178 / 20.79275; Cephalonia, Ainos Mts, 1067 m, 15 VI 2021, 38.15996 / 20.62202; Cephalonia, Paralia Petani, 56 m, 13 VI 2021, 38.25966 / 20.37607); **Macedonia** (Legakis 2011: 36); **Peloponnese** (Lebas & Galkowski 2019 b: 294; **Sterea Ellas** (Forel 1886: clxii, Legakis 2011: 36; **new data:** Aetolia-Acarnania, Nafpaktos, Nafpaktos Castle, 125 m, 9 VI 2021, 38.39595 / 21.82464; Boeotia, Mt. Parnassos, 9 km N of Arachova, 1471 m, 38.558 / 22.549, 4w, leg. C. Lebas, Fokida, Mt Parnassos, ad ski center, 1758 m, 38.55506 / 22.57166, 17w, leg. C. Lebas); **Thessaly:** Larissa, Mt. Ossa ski center, 1520 m, 6 V 2017, 39.80844 / 22.68604, 3w, leg. L. Borowiec.

Distribution in Europe and Mediterranean Basin: Endemic to Greece.

Description. Large, polymorphic; minor workers HL: 0.817-1.214 (mean 0.983); HW: 0,492-0.952 (mean 0.697); SL: 0.730-1.024 (mean 0.878); EL: 0.219-0.325 (mean 0.278);

ML: 1.19-1.64; MW: 0.48-0.77. **Color.** Head, mesosoma, petiolar scale and gaster dark brown to black, gena usually as dark colored as other parts of head, antennae yellow, apical 5-6 antennomeres often indistinctly infuscated, coxa dark brown, femora mostly dark brown with yellowish apex, tibiae yellowish brown to brown, gradually paler from distal part to apex, tarsi yellow (Figs 132.1-4). **Head.** 1.2-1.7 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin convex (Fig. 132.4). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short appressed hairs, a row of 5 long setae close to anterior margin and a pair of erected setae close to posterior margin, the longest anterior seta with length 0.175. Head with diffused microreticulation , frontal area without longitudinal striation or only frons with diffused striation, whole surface with very sparse and short appressed pubescence, erected setae absent or only the largest minor workers in frontal area with 3-4 and in ocellar area with 1-2 very short erected setae, gena and ventral side of head lacking erected setae or only in the largest minor workers gular area with a pair of erected setae. Scape very long, 1.1-1.6 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 3.4 times as long as wide, 2.3 times as long as long as second segment; the second funicular segment 1.5 times as long as wide, as long as or only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 132.3). Eyes big, elongate oval, 1.3-1.5 times longer than wide, 0.28 length of head. Mandibles long, with longitudinal sculpture but shiny, with large apical dent and four smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.1-2.6 times as long as wide, dorsally and laterally with indistinctly diffused microreticulation, surface indistinctly shiny. In lateral view pronotum convex, metanotum and propodeum continuous with moderately deep mesonotal groove. Whole mesosomal surface covered with very short and sparse appressed pubescence, pronotum with up to 4 erected setae, occasionally in the largest minor workers to 6 setae, mesonotum and propodeum usually with 2 erected setae, occasionally 3 or without setae (Fig. 132.2). **Waist and gaster.** Petiolar scale thick in lateral view but broad in anterior view, apex truncate or shallowly concave, without or with 1-2 short setae laterally. Gaster longer than mesosoma, first tergite with diffused microreticulation, subsequent tergites with mixed microreticulation and diffused transverse microstriation, surface shiny, covered with short and sparse appressed pubescence, distance between hairs as large as 2/3 to whole their length. First and second gastral tergite lacking erected setae except row of moderately long setae close to posterior margin or occasionally with a pair of short setae centrally, third gastral segment across the middle with 2-4short erected setae. **Legs.** Ventral surface of fore femora with 4-5, of mid and hind femora with 1-2 erected setae.

Major workers HL: 1.349-1.413 (mean 1.378); HW: 1.190-1.294 (mean 1.235); SL: 1.111-1.190 (mean 1.153); EL: 0.368-0.413 (mean 0.387); ML: 1.84-1.90; MW: 0.89-0.94. **Color.** Head, meso- and metanotum, petiolar scale yellowish brown to brown, gaster brown, antennae and legs yellowish, femora often obscured in the middle on mostly yellowish brown with yellow apex, often distal antennomeres indistinctly infuscated (Figs 132.5-8). **Head.** Approximately 1.1 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin straight (Fig. 132.8). Clypeus on the whole surface with

distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short appressed hairs, a row of 5 long setae close to anterior margin, without or with a pair of erected setae close to posterior margin, the longest anterior seta with length 0.320. Head with micropunctation between punctures, without distinct microstriation in interantennal and interocular area, with very sparse and short appressed pubescence, with 1-3 short erected setae in interocular and ocellar areas, without setae in occipital part of head and on ventral side of head or with 1-2 very short setae in gular area. Scape short, approximately 0.94 times as long as width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.1 times as long as second, the second funicular segment 1.3 times as long as wide, only slightly shorter than third segment, the rest of funicular segments longer than broad but less clearly as in minor worker (Fig. 132.7). Eyes big, elongate oval, approximately 1.5 times longer than wide, 0.28 length of head. Mandibles broad, with longitudinal sculpture but shiny, with large, blunt apical dent and 4 smaller, blunt denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, approximately twice as long as wide, In lateral view pronotum convex, its surface mostly micropunctate with smooth and shiny interspaces, mesonotum at top micropunctate with shiny interspaces, on sides microreticulate and slightly dull, propodeum microreticulate and slightly dull, mesonotal groove deep. Whole mesosoma surface covered with moderately long, on top sparse and on sides moderately dense appressed pubescence; pronotum with 2-8 moderately long, mesonotum 3-5 short and propodeum 1-3 short erected setae (Fig. 132.6). **Waist and gaster.** Petiolar scale thin in lateral view but broad in anterior view, widest in the middle then narrowed to base and apex, apical margin triangularly emarginate, apicolaterally with two short setae. Gaster shorter than mesosoma, slightly globular, first tergite micropunctate with diffused microreticulation, subsequent tergites micropunctate with more evident microreticulation but without transverse microstriation, surface shiny, covered with moderately long and moderately dense appressed pubescence, distance between hairs as large as 1/5-1/3 their length. First and second gastral tergite without or at most with 2 very short erected setae centrally and a row of short setae close to posterior margin, third gastral segment with 4 short setae across the middle with a row of few short setae close to posterior margin. **Legs.** Ventral surface of fore femora with 4-6, of mid and hind femora with 0-1 erected setae.

Comparative remarks. *Proformica oculatissima* belongs to the species with sparsely setose mesosoma and occipital part of head without or with at most with 1-2 setae in occipital corners. *Proformica striaticeps* differs in body of minor workers yellowish brown and distinctly striated frons and appressed pubescence on gastral tergites short and sparse, hardly visible; *P. lebasi* differs in denser appressed pubescence (distance between hairs as large as 1/4-1/3 of their length), and less shiny body with well marked background microreticulation.

Biological notes. Extremely thermophilous species noted from open areas of lowlands and mountains. Biology of this species is little known, noted from ruderal area in tourist resort and on road in small gorge with mediterranean shrubs and on mountain pastures with scarce vegetation. The nest was placed directly in the compact red soil in a sunny position with sparse vegetation. Workers were active only in the midday hours. The collecting sites were at low to mid altitude between 38 and 1758 m.

133. *Proformica striaticeps* (Forel, 1911)

(Figs 133.1-9)

Proformica striaticeps Forel, 1911 a: 352.

Distribution in Greece: Greece generally (Roger 1859: 237 - as *Formica aerea*)*;* **Macedonia** (Legakis 2011: 36, Borowiec & Salata 2012: 532 - as *Proformica nasuta*); **Peloponnese** (Legakis 2011: 36, Borowiec & Salata 2021 b: 11).

Distribution in Europe and Mediterranean Basin: Bulgaria; Greece; North Macedonia; Serbia; Turkey.

Description. Moderately large, polymorphic; minor workers HL: 0.754-0.873 (mean 0.813); HW: 0,484-0.594 (mean 0.535); SL: 0.762-0.817 (mean 0.793); EL: 0.230-0.241 (mean 0.233); EW: 0.160-0.178 (mean 0.167); ML: 1.03-1.18; MW: 0.46-0.54. **Color.** Head, meso- and metanotum, petiolar scale brown, pronotum and gaster yellowish brown, antennae and legs yellowish, femora often obscured in the middle on mostly yellowish brown with yellow apex, often distal antennomeres indistinctly infuscated; sometimes pronotum yellow on the top with brownish spot of diffused borders; in many specimens surface of body with distinct cupreous tint (Figs 133.1-5). **Head.** Approximately 1.5 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin convex (Fig. 133.5). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with sparse and short appressed hairs, a row of 4 long setae close to anterior margin and few long erected setae centrally and close to posterior margin, the longest anterior seta with length 0.167. Head in frons and frons up to 1/3 eye length with well-marked longitudinal striation, rest of head microreticulate, with very sparse and short appressed pubescence, erected setae absent, no erected setae in ocellar and occipital part of head, gena and ventral side of head also lacking erected setae. Scape very long, approximately 1.5 times longer than width of head, thin, distinctly reaching beyond the occipital margin, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment 2.2 times as long as second, the second funicular segment 1.6 times as long as wide, as long as or only slightly shorter than third segment, the rest of funicular segments clearly longer than broad (Fig. 133.4). Eyes big, elongate oval, approximately 1.4 times longer than wide, 0.29 length of head. Mandibles long, with longitudinal sculpture but shiny, with large apical dent and smaller denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, 2.3 times as long as wide, dorsally and laterally with microreticulation, surface indistinctly shiny. In lateral view pronotum convex, metanotum and propodeum continuous with shallow mesonotal groove. Whole mesosomal surface covered with very short and sparse appressed pubescence, usually lacking erected setae, occasionally all mesonotal segments with 1 or 2 very short, hardly visible erected setae (Figs 133.2, 3). **Waist and gaster.** Petiolar scale thick in lateral view but broad in anterior view, apex truncate or shallowly concave, without or with 1-2 short setae. Gaster longer than mesosoma, first tergite distinctly microreticulated, subsequent tergites with mixed microreticulation and transverse microstriation, surface shiny, covered with very short and sparse, often hardly visible appressed pubescence, distance between hairs as large as 2/3 to whole length. First and second gastral tergite lacking erected setae except row of moderately long setae close to posterior

margin, third gastral segment across the middle with a row of few short erected setae. **Legs.** Ventral surface of fore femora with 2-3, of mid and hind femora with 1-2 erected setae.

Major workers HL: 1.238-1.460 (mean 1.335); HW: 1.039-1.269 (mean 1.131); SL: 1.060-1.127 (mean 1.090); EL: 0.336-0.365 (mean 0.351); ML: 1.80-1.93; MW: 0.84-0.97. **Color.** Head, pro-, meso- and metanotum, petiolar scale and gaster black, sometimes posterolateral parts of pronotum and sides of mesonotum with reddish brown spots of duffused borders, coxa, trochanters and femora brown, apes of femora usually yellowish brown, tibiae yellowish brown, antennae and tarsi yellowish, last six segments of funicle gradually darkened, from yellowish brown to brown (Figs 133.6-9). **Head.** Approximately 1.2 times longer than wide, in front of eyes parallelsided, behind eyes regularly rounded, occipital margin convex (Fig. 133.9). Clypeus on the whole surface with distinct longitudinal striation, slightly trapezoidal, its anterior margin convex, sides convergent posterad, posterior margin truncate in the middle, whole clypeal surface with very sparse and short appressed hairs, a row of 6 long setae close to anterior margin and a pair long erected setae centrally, the longest anterior seta with length 0.302. Frons in anterior half with well-marked longitudinal striation, sometimes striae occur only on sides of frons, rest of head microreticulate but shiny, with very sparse and short appressed pubescence, frons in the middle in a pairs of short erected setae and sometimes in frontal 1/3 length with additional pair of short erected setae, ocellar area without or with 1-2 very short erected setae, occipital part of head and gena lacking erected setae, ventral side of head with 4-6 long erected setae. Scape short, 0.9-1.0 times as long as width of head, thin,, distinctly, regularly widened from 2/3 of its length, its surface microreticulate but shiny, with short and sparse appressed pubescence. Funicular segments elongate, thin, first segment twice longer than second, the second funicular segment 1.3 times as long as wide, only slightly shorter than third segment, the rest of funicular segments longer than broad but less clearly as in minor worker. Eyes big, elongate oval, 0.26 length of head. Mandibles broad, with longitudinal sculpture but shiny, with large, blunt apical dent and 4 smaller, blunt denticles on masticatory margin. **Mesosoma.** Elongate, in dorsal view distinctly constricted in the middle, approximately twice as long as wide, In lateral view pronotum convex, its surface mostly microreticulate with smooth and shiny interspaces, mesonotum at top diffusely micropunctate with shiny interspaces, on sides distinctly microreticulate with shiny background, propodeum microreticulate and shiny, mesonotal groove deep (Fig. 133.7). Whole mesosoma surface covered with very short and sparse appressed pubescence; dorsum lacking erected setae (Fig. 133.6). **Waist and gaster.** Petiolar scale thin in lateral view but broad in anterior view, widest in the middle then narrowed to base and apex, apical margin triangularly emarginate, apicolaterally lacking erected setae. Gaster shorter than mesosoma, slightly globular, first tergite with diffused microreticulation tending to form transverse striation, subsequent tergites with more evident microreticulation tending to form transverse microstriation, surface shiny, covered with very short and sparse appressed pubescence, distance between hairs distinctly larger than their length. First and second gastral tergite without or at most with 2 short erected setae close to posterior margin and row of short setae at posterior margin, third gastral segment lacking erected setae centrally only with a row of few short setae close to posterior margin (Fig. 133.7). **Legs.** Ventral surface of fore femora with 2-4 erected setae, of mid and hind femora lacking erected setae.

Comparative remarks. *Proformica striaticeps* is the least setose of Greek species with mesosoma, head and first gastral tergite in small workers completely lacking erected setae

or sometimes with 1-2 short erected setae, and gastral tergites with short and sparse, hardly visible appressed hairs. Other species have pronotum with at least a pair of erected setae (often also other parts of mesosoma are setose) and their gastral tergites are covered with short and sparse but well visible appressed hairs. Major workers of *P. striaticeps* differs from other species in mesosoma lacking erected setae while in all three congeners ech segment of mesosoma is setose. In *P. striaticeps* frons are distinctly striate laterally and usually also centrally while in other species frons has no striation or only narrow patch of diffused striation is placed centrally.

Biological notes. Biology of this species is little known, collected on sandy roadside in mountain deciduous forest and along clay-gravel roadsides in mountain pastures. Nest in ground. The well documented localities were from an altitude 514 m to 1750 m.

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References

Agosti D., Collingwood C.A. 1987. A provisional list of the Balkan ants (Hym. Formicidae) and a key to the worker caste. I. Synonymic list. Mitteilungen der Schweizerischen Entomologischen Gesellschaft 60: 51–62.

Aktaç N., Radchenko A.G., Kiran K. 2004. On the taxonomy of the West Palaearctic Aenictinae ants (Hymenoptera: Formicidae). Annales Zoologici (Warsaw) 54: 361-364.

André E. 1881. Catalogue raisonné des Formicides provenant du voyage en Orient de M. Abeille de Perrin et description des espèces nouvelles. Annales de la Société Entomologique de France (6)(1): 53-78.

Arnoldi K. V. 1930. Studien über die Systematik der Ameisen. V. Der erste Vertreter der Tribe Proceratiini (Formicidae) in USSR. Zoologischer Anzeiger 91: 143-146.

Arnoldi K. V. 1932. Studien über die Systematik der Ameisen. VII. Die russischen Poneriden meiner Sammlung, teilweise biometrisch bearbeitet. Zoologischer Anzeiger 98: 49-68.

Arnoldi K. V. 1964. Higher and specialized representatives of the ant genus *Cataglyphis* (Hymenoptera, Formicidae) in the fauna of the USSR. Zoologicheskii Zhurnal 4 43: 1800-1815.

Arnoldi K. V. 1967. New data on the ant genus *Camponotus* (Hymenoptera, Formicidae) from the USSR fauna. 1. *Camponotus* (s. str.). Zoologicheskii Zhurnal 4 46: 1815-1830.

Arnoldi K. V. 1968. Important additions to the myrmecofauna (Hymenoptera, Formicidae) of the USS R, and descriptions of new forms. Zoologicheskii Zhurnal 4 47: 1800-1822.

Barandica J.M., López F., Martinez M.D., Ortuño V.M. 1994. The larvae of *Leptanilla charonea* and *Leptanilla zaballosi* (Hymenoptera, Formicidae). Deutsche Entomologische Zeitschrift 41: 147-153.

Baroni Urbani C. 1968. Studi sulla mirmecofauna d'Italia. IV. La fauna mirmecologica delle isole Maltesi ed il suo significato ecologico e biogeografico. Annali del Museo Civico di Storia Naturale "Giacomo Doria" 77: 408-559.

Baroni Urbani C. 1977. Materiali per una revisione della sottofamiglia Leptanillinae Emery, (Hymenoptera: Formicidae). Entomologica Basiliensia 2: 427-488.

Baroni Urbani C. 1978. Contributo alla conoscenza del genere *Amblyopone* Erichson (Hymenoptera: Formicidae). Mitteilungen der Schweizerischen Entomologischen Gesellschaft 51: 39-51.

Baroni Urbani C., de Andrade M. L. 2003. The ant genus *Proceratium* in the extant and fossil record (Hymenoptera: Formicidae). Museo Regionale di Scienze Naturali Monografie (Turin) 36:1-492.

Bernard F. 1950 [1946]. Notes sur les fourmis de France. II. Peuplement des montagnes méridionales. Annales de la Société Entomologique de France 115: 1-36.

Bernard F. 1953 [1952]. La réserve naturelle intégrale du Mt Nimba. XI. Hyménoptères Formicidae. Mémoires de l'Institut Français d'Afrique Noire 19: 165-270.

Betrem J. G. 1960. *Formica truncorum* F. niet inheems. Entomologische Berichten (Amsterdam) 20: 130-134.

Betrem J. G. 1962. Quelques remarques sur l'identité de la *Formica nigricans*. Entomologische Berichten (Amsterdam) 22: 38.

Boer P. 2003. First description of the worker caste of *Lasius viehmeyeri* Emery (Hymenoptera: Formicidae). Zoologische Mededelingen 77: 321-323.

Boer P. 2013. Revision of the European ants of the *Aphaenogaster testaceopilosa*-group (Hymenoptera: Formicidae). Tijdschrift voor Entomologie 156: 57-93.

Bolton B. 1990. The higher classification of the ant subfamily Leptanillinae (Hymenoptera Formicidae). Systematic Entomology 15: 267-282.

Bolton B., Fisher B.L. 2011. Taxonomy of Afrotropical and West Palaearctic ants of the ponerine genus *Hypoponera* Santschi (Hymenoptera: Formicidae). Zootaxa 2843: 1-118.

Bondroit J. 1912. Fourmis de Hautes-Fagnes. Annales de la Société Entomologique de Belgique 56: 351-352.

Bondroit J. 1917 a. Diagnoses de trois nouveaux *Formica* d'Europe (Hym.). Bulletin de la Société Entomologique de France 1917: 186-187.

Bondroit J. 1917 b. Notes sur quelques Formicidae de France (Hym.). Bulletin de la Société Entomologique de France 1917: 174-177.

Bondroit J. 1918. Les fourmis de France & de Belgique. Annales de la Société Entomologique de France 87: 1-174.

Bondroit J. 1920 [1919]. Notes diverses sur des fourmis d'Europe. Annales de la Société Entomologique de Belgique 59: 143-158.

Borowiec L. 2014. Catalogue of ants of Europe, the Mediterranean Basin and adjacent regions (Hymenoptera: Formicidae). Genus (monograph) 25: 1-340.

Borowiec L., Salata S. 2012. Ants of Greece – checklist, comments and new faunistic data (Hymenoptera: Formicidae). Genus 23: 461-563.

Borowiec L., Salata S. 2013. Ants of Greece – additions and corrections (Hymenoptera: Formicidae). Genus 24: 335-401.

Borowiec L. Salata S. 2014. Redescription of *Camponotus nitidescens* Forel, 1889, new status and notes on ants from Kefalonia, Greece (Hymenoptera: Formicidae). Genus 25: 499-517.

Borowiec L., Salata S. 2017 a. New records of ants (Hymenoptera: Formicidae) from Sterea Ellas, Greece. Acta Entomologica Silesiana 25 (online 020): 1-3.

Borowiec L., Salata S. 2017 b. Ants of the Peloponnese, Greece (Hymenoptera: Formicidae). Polish Journal of Entomology 86: 193-235.

Borowiec L., Salata S. 2018 a. New records of ants (Hymenoptera: Formicidae) from Epirus, Greece. Acta Entomologica Silesiana 26(online 001): 1-22.

Borowiec L., Salata S. 2018 b. Ants from Thessaly, Greece (Hymenoptera: Formicidae). Polish Journal of Entomology, 87(3): 217-248.

Borowiec L., Salata S. 2018 c. Notes on ants (Hymenoptera: Formicidae) of Samos Island, Greece. Annals of the Upper Silesian Museum in Bytom Entomology 27(online003): 1-13.

Borowiec L., Salata S. 2018 d. Notes on ants (Hymenoptera: Formicidae) of Zakynthos Island, Greece. Annals of the Upper Silesian Museum in Bytom Entomology 27(online004): 1-13.

Borowiec L., Salata S. 2018 e. Notes on ants (Hymenoptera: Formicidae) of the Euboea Island, Central Greece. Annals of the Upper Silesian Museum in Bytom Entomology 27(online005): 1-15.

Borowiec L., Salata S. 2021 a. Notes on ants (Hymenoptera: Formicidae) of Corfu Island, Greece. Annals of the Upper Silesian Museum in Bytom Entomology 30(online002): 1-19.

Borowiec L., Salata S. 2021 b. Notes on ants (Hymenoptera: Formicidae) from Western Greece. Annals of the Upper Silesian Museum in Bytom Entomology 30(online 005): 1-23.

Borowiec L., Salata S. 2022. Notes on ants (Hymenoptera: Formicidae) of Thassos Island, Greece. Annals of the Upper Silesian Museum in Bytom Entomology 31(online 002): 1-15.

Borowiec L., Salata S., Wieczorek K. 2021. Review of ants (Hymenoptera: Formicidae) of the Dodecanese Archipelago, Greece. Annals of the Upper Silesian Museum in Bytom Entomology 30(online 006): 1-33.

Boudinot B. E., Borowiec M. L., Prebus M. M. 2021. Phylogeny, evolution, and classification of the ant genus *Lasius*, the tribe Lasiini and the subfamily Formicinae (Hymenoptera: Formicidae). Systematic Entomology 47: 113-151.

Bračko G. 2017. First discoveries of colonies of the rare ant species *Camponotus tergestinus* Müller, 1921 (Hymenoptera: Formicidae) *in situ*. Natura Sloveniae 19(2): 5-14.

Bračko G., Kiran K., Karaman C., Salata S., Borowiec L. 2016. Survey of the ants (Hymenoptera: Formicidae) of the Greek Thrace. Biodiveristy Data Journal 4 (e7945): 1-44.

Brèthes J. 1914. Note sur quelques Dolichodérines argentines. Anales del Museo Nacional de Historia Natural de Buenos Aires 26: 93-96.

Brullé G. A. 1833 [1832]. Expédition scientifique de Morée. Section des sciences physiques. Tome III. Partie 1. Zoologie. Deuxième section - Des animaux articulés. [part]. Paris: Levrault, pp. 289-336.

Buckley S. B. 1866. Descriptions of new species of North American Formicidae. Proceedings of the Entomological Society of Philadelphia 6: 152-172.

Buschinger A., Douwes P. 1993. Socially parasitic ants of Greece. Biologia Gallo-Hellenica 20: 183-189.

Cagniant H. 1987 b [1986]. Contribution à la connaissance des fourmis marocaines. *Camponotus vagus ifranensis* n. ssp. (Hym. Formicidae). Bulletin de la Société Entomologique de France 91: 117-123.

Charsley R. S. 1877. A new species of ant found in Britain. Entomologist's Monthly Magazine 14: 162-163.

Chopard L. 1921. La fourmi d'Argentine *Iridomyrmex humilis* var. *arrogans* Santschi, dans le midi de la France. Annales des Epiphyties 7: 237-265.

Christ J. L. 1791. Naturgeschichte, Klassification und Nomenclatur der Insekten vom Bienen, Wespen und Ameisengeschlecht. Frankfurt: Hermann, 535 pp.

Collingwood C.A. 1993. A comparative study of the ant fauna of five Greek islands. Biologia Gallo-hellenica 20: 191-197.

Costa A. 1884. Notizie ed osservazioni sulla geo-fauna Sarda. Memoria terza. Risultamento delle ricerche fatte in Sardegna nella estate del 1883. Atti della Reale Accademia delle Scienze Fisiche e Matematiche. Napoli (2)1(9): 1-64.

Csősz S., Seifert B. 2003. *Ponera testacea* Emery, 1895 stat. n. – a sister species of *P. coarctata* (Latreille, 1802) (Hymenoptera, Formicidae). Acta Zoologica Academiae Scientiarum Hungaricae 49: 211-223.

Csösz S., Salata S., Borowiec L. 2018. Three Turano-European species of the *Temnothorax interruptus* group (Hymenoptera:Formicidae) demonstrated by quantitative morphology. Myrmecological News 26: 101-119.

Csősz S., Kiran K., Karaman C., Lapeva-Gjonova A. 2022. A striking color variation is detected in *Ponera testacea* Emery, 1895 (Hymenoptera, Formicidae) across its Western Palaearctic geographic range. ZooKeys 1084: 151-164.

Dalla Torre, K. W. von. 1893. Catalogus Hymenopterorum hucusque descriptorum systematicus & synonymicus. Vol. 7. Formicidae (Heterogyna). Leipzig: W. Engelmann, 289 pp.

Degueldre F., Mardulyn P., Kuhn A., Pinel A., Karaman C., Lebas C., Schifani E., Bracko G., Wagner H.C., Kiran K., Borowiec L., Passera L.,, Abril S., Espadaler X., Serge Aron S. 2020. Evolutionary history of inquiline social parasitism in *Plagiolepis* ants. Molecular Phylogenetics and Evolution online first 155 (107016): 1-6.

Del Toro I., Pacheco J. A., MacKay W. P. 2009. Revision of the ant genus *Liometopum* (Hymenoptera: Formicidae). Sociobiology 53: 299-369.

Dlussky G. M. 1964. The ants of the subgenus *Coptoformica* of the genus *Formica* (Hymenoptera, Formicidae) of the USSR. Zoologicheskii Zhurnal 4 43: 1026-1040.

Dlussky G. M. 1967. Ants of the genus *Formica* (Hymenoptera, Formicidae, g. *Formica*). Moskva: Nauka Publishing House, 236 pp.

Dlussky G. M. 1969. Ants of the genus *Proformica* Ruzs. of the USSR and contiguous countries (Hymenoptera, Formicidae). Zoologicheskii Zhurnal 48: 218-232.

Donisthorpe H. 1914. Myrmecophilous notes for 1913. Entomologist's Record and Journal of Variation 26: 37-45.

Donisthorpe H. 1926. Ants and myrmecophiles at Bordighera. [concl.]. Entomologist's Record and Journal of Variation 38: 17-18.

Donisthorpe H. 1950. Two more new ants from Turkey. Entomologist's Record and Journal of Variation 62: 68-69.

Douwes P., Jessen K., Buschinger A. 1988. *Epimyrma adlerzi* sp. n. (Hymenoptera: Formicidae) from Greece: morphology and life history. Entomologica Scandinavica 19: 239-249.

Emery C. 1869. Enumerazione dei formicidi che rinvengonsi nei contorni di Napoli con descrizioni di specie nuove o meno conosciute. Annali dell'Accademia degli Aspiranti Naturalisti. Secunda Era 2: 1-26.

Emery C. 1878. Catalogo delle formiche esistenti nelle collezioni del Museo Civico di Genova. Parte seconda. Formiche dell'Europa e delle regioni limitrofe in Africa e in Asia. [concl.]. Annali del Museo Civico di Storia Naturale 12: 44-59.

Emery C. 1894 a. Alcune formiche dell'isola di Creta. Bullettino della Società Entomologica Italiana. Resocónti di Adunanze 26: 7-10.

Emery C. 1894 b. Studi sulle formiche della fauna neotropica. VI-XVI. Bullettino della Società Entomologica Italiana 26: 137-241.

Emery C. 1895 a. Sopra alcune formiche della fauna mediterranea. Memorie della Reale Accademia delle Scienze dell'Istituto di Bologna (5)5: 59-75 (separates 291-307) + pl.

Emery C. 1895 b. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. (Schluss). Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere 8: 257-360.

Emery C. 1897. Anhang. Verzeichniss der auf der zweiten Reise nach Kleinasien (1897) gesammelten Ameisen, mit einer Neubeschreibung. P. 239 in: Escherich, K. Zur Kenntniss der Myrmecophilen Kleinasiens. I. Coleoptera. Wiener Entomologische Zeitung 16: 229-239.

Emery C. 1898. Beiträge zur Kenntniss der palaearktischen Ameisen. Öfversigt af Finska Vetenskaps-Societetens Förhandlingar 20: 124-151.

Emery C. 1901. Spicilegio mirmecologico. Bullettino della Società Entomologica Italiana 33: 57-63.

Emery C. 1905. Le forme paleartiche del *Camponotus maculatus* F. Rendiconti delle Sessioni della Reale Accademia delle Scienze dell'Istituto di Bologna (n.s.) 9: 27-44.

Emery C. 1906. Rassegna critica delle specie paleartiche del genere *Myrmecocystus*. Memorie della Reale Accademia delle Scienze dell'Istituto di Bologna (6)3: 47-61.

Emery C. 1908. Beiträge zur Monographie der Formiciden des paläarktischen Faunengebietes. Deutsche Entomologische Zeitschrift 1908: 165-205.

Emery C. 1909 a. Beiträge zur Monographie der Formiciden des paläarktischen Faunengebietes. (Hym.) Teil VII. Deutsche Entomologische Zeitschrift 1909: 179-204.

Emery C. 1909 b. Beiträge zur Monographie der Formiciden des paläarktischen Faunengebietes. (Hym.) Teil VIII. Deutsche Entomologische Zeitschrift 1909: 355-376.

Emery C. 1914. Wissenschaftliche Ergebnisse der Bearbeitung von O. Leonhard's Sammlungen. 5. Südeuropäische Ameisen (Hym.). Entomologische Mitteilungen 3: 156-159.

Emery C. 1915. Escursioni zoologiche del Dr. Enrico Festa nell'Isola di Rodi. XII. Formiche. Bollettino dei Musei di Zoologia ed Anatomia Comparata della Reale Università di Torino 30(701): 1-7.

Emery C. 1916 a [1915]. Fauna entomologica italiana. I. Hymenoptera.-Formicidae. Bullettino della Società Entomologica Italiana 47: 79-275.

Emery C. 1916 b. Formiche d'Italia nuove o critiche. Rendiconti delle Sessioni della Reale Accademia delle Scienze dell'Istituto di Bologna. Classe di Scienze Fisiche (n.s.) 20: 53-66.

Emery C. 1920. Studi sui *Camponotus*. Bullettino della Società Entomologica Italiana 52: 3-48.

Emery C. 1922. Il genere *Lasius* (F.) Mayr, e particolarmente le forme mediterranee del gruppo *umbratus* Nyl. Bollettino della Società Entomologica Italiana 54: 9-15.

Emery C. 1925 a. Les espèces européennes & orientales du genre *Bothriomyrmex*. Bulletin de la Société Vaudoise des Sciences Naturelles 56: 5-22.

Emery C. 1925 b. Revision des espèces paléarctiques du genre *Tapinoma*. Revue Suisse de Zoologie 32: 45-64.

Emery C. 1925 c. I *Camponotus* (*Myrmentoma*) paleartici del gruppo *lateralis*. Rendiconti delle Sessioni della Reale Accademia delle Scienze dell'Istituto di Bologna. Classe di Scienze Fisiche (n.s.) 29: 62-72.

Emery C. 1925 d. Hymenoptera. Fam. Formicidae. Subfam. Formicinae. Genera Insectorum 183: 1-302.

Faber W. 1967. Beiträge zur Kenntnis sozialparasitischer Ameisen. I. *Lasius* (*Austrolasius* n. sg.) *reginae* n. sp., eine neue temporär sozialparasitische Erdameise aus Österreich (Hym. Formicidae). Pflanzenschutz Berichte 36: 73-107.

Fabricius J. C. 1775. Systema entomologiae, sistens insectorum classes, ordines, genera, species adiectis synonymis, locis, descriptionibus, observationibus. Flensburgi & Lipsiae [= Flensburg and Leipzig]: Korte, 832 pp.

Fabricius J. C. 1782 [1781]. Species insectorum exhibentes eorum differentias specificas, synonyma, auctorum loca natalia, metamorphosin adiectis observationibus, descriptionibus. Tome I. Hamburgi & Kilonii [= Hamburg and Kiel]: C. E. Bohn, 552 pp.

Fabricius J. C. 1793. Entomologia systematica emendata & aucta. Secundum classes, ordines, genera, species, adjectis synonimis, locis observationibus, descriptionibus. Tome 2. Hafniae [= Copenhagen]: C. G. Proft, 519 pp.

Fabricius J. C. 1804. Systema Piezatorum secundum ordines, genera, species, adjectis synonymis, locis, observationibus, descriptionibus. Brunswick: C. Reichard, xiv + 15-439 + 30 pp.

Finzi B. 1928. Weitere Beiträge zur Kenntnis der Fauna Griechenlands und der Inseln des Aegäischen Meeres. 1. Ameisen aus Griechenland und von den Aegäischen Inseln. Sitzungsber. Sitzungsberichte der Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse. Abteilung I 137: 787-792.

Finzi B. 1930 a. Hymenopteren aus Palästina und Syrien. (Zoologische Studienreise von R. Ebner 1928 mit Unterstützung der Akademie der Wissenschaften in Wien.) Formicidae. Sitzungsberichte der Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse. Abteilung I 139: 22-24.

Finzi B. 1930 b. Zoologische Forschungsreise nach den Jonischen Inseln und dem Peloponnes. XII. Teil. Die Ameisen der Jonischen Inseln. Sitzungsberichte der Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse. Abteilung I 139: 309-319.

Finzi B. 1939. Ergebnisse der von Franz Werner und Otto v. Wettstein auf den Ägäischen Inseln unternommenen Sammelreisen. Ameisen. Sitzungsberichte der Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse. Abteilung I 148: 153-161.

Finzi B. 1940 [1939]. Formiche della Libia. Memorie della Società Entomologica Italiana 18: 155-166.

Forel A. 1874. Les fourmis de la Suisse. Systématique, notices anatomiques & physiologiques, architecture, distribution géographique, nouvelles expériences & observations de moeurs. Neue Denkschriften der Allgemeinen Schweizerischen Gesellschaft für die Gesammten Naturwissenschaften 26: 1-452.

Forel A. 1886 a. Études myrmécologiques en 1886. Annales de la Société Entomologique de Belgique 30: 131-215.

Forel A. 1886 b. Nouvelles fourmis de Grèce récoltées par M. E. von Oertzen. Annales de la Société Entomologique de Belgique 30: clix-clxviii.

Forel A. 1889 [1888]. Ameisen aus den Sporaden, den Cykladen und Griechenland, gesammelt 1887 von Herrn von Oertzen. Berliner Entomologische Zeitschrift 32: 255-265.

Forel A. 1892 a. Les Formicides. [concl.]. In: Grandidier, A. Histoire physique, naturelle, & politique de Madagascar. Volume XX. Histoire naturelle des Hyménoptères. Deuxième partie. Supplèment au 28e fascicule. Paris: Hachette & Cie, pp. 229-280.

Forel A. 1892 b. Die Ameisenfauna Bulgariens. (Nebst biologischen Beobachtungen.). Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 42: 305-318.

Forel A. 1892 c. Notes myrmécologiques. Annales de la Société Entomologique de Belgique 36: 38-43.

Forel A. 1893. Formicides de l'Antille St. Vincent, récoltées par Mons. H. H. Smith. Transactions of the Entomological Society of London 1893: 333-418.

Forel A. 1894 a. Les Formicides de la Province d'Oran (Algérie). Bulletin de la Société Vaudoise des Sciences Naturelles 30: 1-45.

Forel A. 1894 b. Les Formicides de l'Empire des Indes & de Ceylan. Part IV. Journal of the Bombay Natural History Society 8: 396-420.

Forel A. 1895 a. Südpalaearctische Ameisen. Mitteilungen der Schweizerischen Entomologischen Gesellschaft 9: 227-234.

Forel A. 1895 b. Nouvelles fourmis de diverses provenances, surtout d'Australie. Annales de la Société Entomologique de Belgique 39: 41-49.

Forel A. 1899. Trois notices myrmécologiques. Annales de la Société Entomologique de Belgique 43: 303-310.

Forel A. 1901. Formiciden des Naturhistorischen Museums zu Hamburg. Neue *Calyptomyrmex*-, *Dacryon*-, *Podomyrma*- und *Echinopla*-Arten. Mitteilungen aus dem Naturhistorischen Museum in Hamburg 18: 43-82.

Forel A. 1904 a. Miscellanea myrmécologiques. Revue Suisse de Zoologie 12: 1-52.

Forel A. 1904 b. Fourmis du Musée de Bruxelles. Annales de la Société Entomologique de Belgique 48: 168-177.

Forel A. 1904 c. Formiciden aus Ägypten und dem Sudan. In Jägerskiöld, L. A. Results of the Swedish Zoological Expedition toEgypt and the White Nile, 1901, 1 (no. 9), Uppsala, Sweden, 11 pp.

Forel A. 1906. Fourmis d'Asie mineure & de la Dobrudscha récoltées par M. le Dr. Oscar Vogt & Mme Cécile Vogt, Dr. méd. Annales de la Société Entomologique de Belgique 50: 187-190.

Forel A. 1908 a. Fourmis de Costa-Rica récoltées par M. Paul Biolley. Bull. Soc. Vaudoise Sci. Nat. 44: 35-72.

Forel A. 1908 b. Ameisen aus Sao Paulo (Brasilien), Paraguay etc. gesammelt von Prof. Herm. v. Ihering, Dr. Lutz, Dr. Fiebrig, etc. Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 58: 340-418.

Forel A. 1909. Fourmis d'Espagne récoltées par M. O. Vogt & Mme Cécile Vogt, Docteurs en médecine. Annales de la Société Entomologique de Belgique 53: 103-106.

Forel A. 1910. Glanures myrmécologiques. Annales de la Société Entomologique de Belgique 54: 6-32.

Forel A. 1911 a. Fourmis nouvelles ou intéressantes. Bulletin de la Société Vaudoise des Sciences Naturelles 47: 331-400.

Forel A. 1911 b. Die Ameisen des K. Zoologischen Museums in München. Sitzungsberichte der Mathematischen-Physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften zu München 11: 249-303.

Forel A. 1912. Formicides néotropiques. Part V. 4me sous-famille Dolichoderinae Forel. Mémoires de la Société Entomologique de Belgique 20: 33-58.

Forel A. 1913 a. Ameisen aus Rhodesia, Kapland usw. (Hym.) gesammelt von Herrn G. Arnold, Dr. H. Brauns und Anderen. Deutsche Entomologische Zeitschrift 1913(Suppl.): 203-225.

Forel A. 1913 b. Fourmis d'Argentine, du Brésil, du Guatémala & de Cuba reçues de M. M. Bruch, Prof. v. Ihering, Mlle Baez, M. Peper et M. Rovereto. Bulletin de la Société Vaudoise des Sciences Naturelles 49: 203-250.

Forel A. 1913 c. Fourmis de la faune méditerranéenne récoltées par MM. U. & J. Sahlberg. Revue Suisse de Zoologie 21: 427-438.

Forel A. 1913 d. Notes sur quelques *Formica*. Annales de la Société Entomologique de Belgique 57: 360-361.

Forel A. 1914. Formicides d'Afrique & d'Amérique nouveaux ou peu connus. Bulletin de la Société Vaudoise des Sciences Naturelles 50: 211-288.

Forel A. 1916. Fourmis du Congo et d'autres provenances récoltées par MM. Hermann Kohl, Luja, Mayné, etc. Revue Suisse de Zoologie 24: 397-460.

Förster A. 1850 a. Hymenopterologische Studien. 1. Formicariae. Aachen: Ernst Ter Meer, 74 pp.

Förster A. 1850 b. Eine Centurie neuer Hymenopteren. Zweite Dekade. Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westfalens 7: 485-500.

Geoffroy E. L. 1785. [Untitled. Descriptions of new taxa, attributable to Geoffroy.]. In: Fourcroy, A. F. de. Entomologia parisiensis, sive catalogus insectorum quae in agro parisiensi reperiuntur. Pars secunda. Paris: Via & Aedibus Serpentineis, [1] + pp. 233-544.

Gösswald K. 1932. Ökologische Studien über die Ameisenfauna des mittleren Maingebietes. Zeitschrift für Wissenschaftliche Zoologie 142: 1-156.

Gösswald K. 1941. Rassenstudien an der roten Waldameise *Formica rufa* L. auf systematischer, ökologischer, physiologischer und biologischer Grundlage. Zeitschrift für Angewandte Entomologie 28: 62-124.

Gösswald K. 1951. Zur Biologie, Ökologie und Morphologie einer neuen Varietät der Kleinen Roten Waldameise: *Formica minor pratensoides*. Zeitschrift für Angewandte Entomologie 32: 433-457.

Gredler M. V. 1858. Die Ameisen von Tirol. Achtes Programm des Gymnasiums in Bozen. Bozen: Ebersche Buchdruckerei, 34 pp.

Griebenov Z. 2020. Delimitation of tribes in the subfamily Leptanillinae (Hymenoptera: Formicidae), with a description of the male of *Protanilla lini* Terayama, 2009. Myrmecological News 30: 229-250.

Hamann H. H. F., Klemm W. 1976. Ergebnisse der von Dr. O. Paget und Dr. E. Kritscher auf Rhodos durchgeführten zoologischen Exkursionen. XVI. Formicidae. Annalen des Naturhistorischen Museums in Wien 80: 669-679.

Hölldobler B., Wilson E.O. 1990. The ants. Harvard University Press, Cambridge, Mass, xii + 732 pp.

Ionescu-Hirsch A. 2010 [2009]. An annotated list of *Camponotus* of Israel (Hymenoptera: Formicidae), with a key and descriptions of new species. Israel Journal of Entomology 39: 57-98.

Jerdon T. C. 1851. A catalogue of the species of ants found in Southern India. Madras Journal of Literature and Science 17: 103-127.

Kallal R. J., LaPolla J. S. 2012. Monograph of *Nylanderia* (Hymenoptera: Formicidae) of the World, Part II: *Nylanderia* in the Nearctic. Zootaxa (Monograph) 3508: 1-64.

Karaman M. G., Aktaç N. 2013. Descriptions of four new species of *Camponotus* Mayr (Hymenoptera: Formicidae), with a key for the worker caste of the *Camponotus* of Turkey. Journal of the Kansas Entomological Society 86: 36-56.

Karavaiev V. 1912. Ameisen aus dem paläarktischen Faunengebiete. Russkoe Entomologicheskoe Obozrenie 12: 581-596.

Karavaiev V. 1926. Beiträge zur Ameisenfauna des Kaukasus, nebst einigen Bemerkungen über andere palaearktische Formen. (Schluss). Konowia 5: 187-199.

Karavaiev V. 1927. Ameisen aus dem paläarktischen Gebiet. II. Zbirnyk Prats' Zoolohichnoho Muzeyu 2: 89-104 [=Trudy. Ukrains'ka Akademiya Nauk. Fizichno-Matematichnoho Viddilu 4: 333-348].

Karavaiev V. 1929. Myrmekologische Fragmente. II. Zbirnyk Prats' Zoolohichnoho Muzeyu 7: 205-220 [=Trudy. Ukrains'ka Akademiya Nauk. Fizichno-Matematichnoho Viddilu 13: 203-218].

Karavaiev V. 1930. Beitrag zur Ameisenfauna der schwedischen Inseln Gotland und Oeland. Zb. Prats Zool. Muz. 8: 5-46 [=Trudy. Ukrains'ka Akademiya Nauk. Fizichno-Matematichnoho Viddilu 15: 109-150].

Karavaiev V. 1931 [1930]. Myrmekologische Fragmente, III. Zoologischer Anzeiger 92: 309-317.

Karavaiev V. 1932. Zwei neue Ameisen aus Aserbeidschan (Transkaukasien). Zoologischer Anzeiger 98: 248-250.

Karavaiev V. 1937. Ants collected in the nature reserves of Kinburnskaya Peninsula and Burkuty. Zbirnyk Prats' Zoolohichnoho Muzeyu 19: 171-181.

Kratochvíl J. 1941. [Untitled. New variety, *Formica cinerera* var. *novaki*, attributed to Kratochvíl.]. P. 106 in: Novák, V., Sadil, J. Klíc k urcování mravencu strední Evropy se zvlástním zretelem k mravencí zvírene Cech a Moravy. Entomologické Listy 4: 65-115.

Kratochvíl J. 1944. Mravenci mohelnské reservace. Rozbor taxonomicky, faunistickooekologicky, sociologicky a zoogeograficky. Pp. 9-102 in: Kratochvíl, J.,

Novák, V., Snoflák, J. Mohelno. Soubor práci venoványch studiu vyznamne památky prírodní. 5. Hymenoptera - Aculeata. Formicidae - Apidae - Vespidae. Archiv Svazu na Ochranu Prírody a Domoviny na Moravé 6:1-155.

Krausse A. H. 1911 [1909]. Über *Messor structor* Ltr. und einige andere Ameisen auf Sardinien. Bullettino della Società Entomologica Italiana 41: 14-18.

Krausse A. H. 1922. *Formica rufa pratensis incisa* m. v. n. Entomologisches Jahrbuch 31: 155.

Krausse A. H. 1926 a. *Formica rufa* an Weidenkätzchen. Internationale Entomologische Zeitschrift 20: 107-108.

Krausse A. H. 1926 b. Waldameisen-Varietäten. Internationale Entomologische Zeitschrift 20: 114-115.

Kugler J. 1986. The Leptanillinae (Hymenoptera: Formicidae) of Israel and a description of s new species from India. Israel Journal of Entomology 20: 45-57.

Kugler J. 1988. The zoogeography of social insects of Israel and Sinai. Monographiae Biologicae 62: 251–276.

Kuhn A., Darras H., Paknia O., Aron S. 2019. Repeated evolution of queen parthenogenesis and social hybridogenesis in *Cataglyphis* desert ants. Molecular Ecology 29: 549-564.

Kulmatycki W. 1922. Przycznek do fauny mrówek Wielkopolski i Pomorza. Sprawozdania Komisji Fizjograficznej oraz Materjały do Fizjografji Kraju 55-56: 71-86.

Kutter H. 1967 [1966]. Einige Ergebnisse weiterer *Coptoformica*-Studien. Insectes Sociaux 13: 227-240.

Kuznetsov-Ugamsky N. N. 1923. The ant fauna of Tashkent district. Trudy Turkestanskogo Nauchnogo Obshchestva 1: 239-558.

Kuznetsov-Ugamsky N. N. 1926. Contributions to the knoMLedge of the myrmecology of Turkestan. I. Russkoe Entomologicheskoe Obozrenie 20: 93-100.

Kuznetsov-Ugamsky N. N. 1927 a. Contributions to the knoMLedge of the myrmecology of Turkestan. II. Russkoe Entomologicheskoe Obozrenie 21: 33-42.

Kuznetsov-Ugamsky N. N. 1927 b. Contributions to the knoMLedge of the myrmecology of Turkestan. III. Russkoe Entomologicheskoe Obozrenie 21: 186-196.

Kuznetsov-Ugamsky N. N. 1928. Ants of the South Ussuri Region. Zapiski Vladivostokskogo Otdela Gosudarstvennogo Russkogo Geograficheskogo Obshchvestva 1(1)18: 1-47.

Kuznetsov-Ugamsky N. N. 1929 a. Die Gattung *Acantholepis* in Turkestan. Zoologischer Anzeiger 82: 477-492.

Kuznetsov-Ugamsky N. N. 1929 b. Die Ameisenfauna Daghestans. Zoologischer Anzeiger 83: 34-45.

LaPolla J.S., Fisher B.L. 2014. Then there were five: a reexamination of the ant genus *Paratrechina* (Hymenoptera, Formicidae). ZooKeys 422: 35-48.

LaPolla J.S., Hawkes P.G., Fisher B.L. 2011. Monograph of *Nylanderia* (Hymenoptera: Formicidae) of the World, Part I: *Nylanderia* in the Afrotropics. Zootaxa 3110: 10-36.

Latreille P. A. 1798. Essai sur l'histoire des fourmis de la France. Brive: F. Bourdeaux, 50 pp.

Latreille P. A. 1802 a. Histoire naturelle des fourmis, et recueil de mémoires et d'observations sur les abeilles, les araignées, les faucheurs, et autres insectes. Paris: Impr. Crapelet (chez T. Barrois), xvi + 445 pp.

Latreille P. A. 1802 b. Description d'une nouvelle espèce de fourmi. Bulletin des Sciences par la Société Philomathique de Paris 3: 65-66.

Leach W. E. 1825. Descriptions of thirteen species of *Formica* and three species of Culex found in the environs of Nice. Zoological Journal. London 2: 289-293.

Lebas C., Galkowski C. 2019 a. Notes sur le genre *Proformica* Ruzsky (Hymenoptera, Formicidae). Revue de l'Association Roussillonnaise d'Entomologie 28: 218-222.

Lebas C., Galkowski C. 2019 b. Notes sur le genre *Proformica* Ruzsky, 1902 (Hymenoptera, Formicidae) : redécouverte en Grèce de *Proformica oculatissima* (Forel, 1886). Bulletin de la Société linnéenne de Bordeaux, nouv. série 47(3/4): 293-298.

Legakis A. 1983. First contribution to the study of the ants (Hymenoptera, Formicidae) of the Zagori region (Epirus, Greece): an annotated list of species. Entomologia hellenica 1(1): 3-6.

Legakis A. 1984. The Zoological Museum of the University of Athens. 2. The collection of ants from Greece. Biologia Gallo-Hellenica. 11(1): 85-87.

Legakis A. 2011. Annotated list of the ants (Hymenoptera, Formicidae) of Greece. Hellenic Zoological Archives 7: 1-55.

Lepeletier de Saint-Fargeau A. 1835 [1836]. Histoire naturelle des insectes. Hyménoptères. Tome I. Paris: Roret, 547 pp.

Linnaeus C. 1758. Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata. Holmiae [= Stockholm]: L. Salvii, 824 pp.

Linnaeus C. 1761. Fauna suecica sistens animalia Sueciae regni: Mammalia, Aves, Amphibia, Pisces, Insecta, Vermes. Editio altera, auctior. Stockholmiae [=Stockholm]: L. Salvii, 48 + 578 pp.

Linnaeus C. 1771. Mantissa plantarum altera generum editionis VI & specierum editionis II. Holmiae [= Stockholm]: Laurentii Salvii, [6] + 143-587 pp.

Lomnicki J. 1925 a [1924]. Przeglad polskich gatunków rodzaju mrówki (*Formica* Linné). Polskie Pismo Entomologiczne 3: 151-182.

Lomnicki J. 1925 b. *Plagiolepis vindobonensis* n. sp. (Hym. Formicidae). Polskie Pismo Entomologiczne 4: 77-79.

López F., Martinez M.D., Barandica J.M. 1994. Four new species of the genus Leptanilla 9Hymenoptera: Formicidae) from Spain – relationships to other species and ecological issues. Sociobiology 24: 179-212.

Losana M. 1834. Saggio sopra le formiche indigene del Piemonte. Memorie della Reale Accademia delle Scienze di Torino 37: 307-333.

Lucas M.H. 1854. Essai dur les animaux articulés qui hebitent l'ile de Crète. Revue et Magasin de Zoologie pure et appliquée 6: 487-491.

Mayr G. 1853 a. Einige neue Ameisen. Verhandlungen der Zoologisch-Botanischen Vereins in Wien 2: 143-150.

Mayr G. 1853 b. Beschreibungen einiger neuer Ameisen. Verhandlungen der Zoologisch-Botanischen Vereins in Wien 3: 277-286.

Mayr G. 1855. Formicina austriaca. Beschreibung der bisher im österreichischen Kaiserstaate aufgefundenen Ameisen, nebst Hinzufügung jener in Deutschland, in der Schweiz und in Italien vorkommenden Arten. Verhandlungen der Zoologisch-Botanischen Vereins in Wien Wien 5: 273-478.

Mayr G. 1861. Die europäischen Formiciden. Nach der analytischen Methode bearbeitet. Wien: C. Gerolds Sohn, 80 pp.

Mayr G. 1868. Formicidae novae Americanae collectae a Prof. P. de Strobel. Annuario della Società dei Naturalisti e Matematici, Modena 3: 161-178.

Mayr G. 1870. Neue Formiciden. Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 20: 939-996.

Mayr G. 1904. Formiciden aus Ägypten und dem Sudan. In: Jägerskiöld, L. A. Results of the Swedish Zoological Expedition to Egypt and the White Nile, 1901. Part 1 (no. 9). Uppsala: Library of the Royal University of Uppsala, 11 pp.

Mei M. 1998. *Lasius* (*Cautolasius*) *myrmidon* n. sp.: a new hypogaeic ant from Greece (Hymenoptera Formicidae). Bollettino della Società Entomologica Italiana 130: 177-182.

Menozzi C. 1922 b. Nota complementare per la distinzione specifica dei *Camponotus herculeanus* L. e *ligniperda* Latr. (Hym.-Formic.). Bollettino della Società Entomologica Italiana 54: 141-145.

Menozzi C. 1925 [1924]. Res mutinenses. Formicidae (Hymenoptera). Atti della Società dei Naturalisti e Matematici di Modena 55[=(6)3 3: 22-47.

Menozzi C. 1936. Nuovi contributi alla conoscenza della fauna delle Isole italiane dell'Egeo. VI. Hymenoptera - Formicidae. Bollettino del Laboratorio di Zoologia Generale e Agraria della Reale Scuola Superiore d'Agricoltura. Portici 29: 262-311.

Motschoulsky V. de. 1863. Essai d'un catalogue des insectes de l'île Ceylan (suite). Bulletin de la Société Impériale des Naturalistes de Moscou 36(3 3: 1-153.

Nadig A. 1918. Alcune note sulla fauna dell'alta Valsesia. Formicidae. Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 56: 331-341.

Nasonov N. V. 1889. Contribution to the natural history of the ants primarily of Russia. 1. Contribution to the ant fauna of Russia. Izvestiya Imperatorskago Obshchestva Lyubitelei Estestvoznaniya Antropologii i Etnografii pri Imperatorskom Moskovskom Universitete 58: 1-78.

Novák V. 1941. *Dolichoderus* (subgen. *Hypoclinea*) *quadripunctatus* var. *kratochvíli* var. nova. (Formicoidea, Dolichoderidae). Casopis Ceskoslovenské Spolecnosti Entomologické 38: 45-48.

Novák V., Sadil J. 1941. Klíc k urcování mravencu strední Evropy se zvlástním zretelem k mravencí zvírene Cech a Moravy. Entomologické Listy 4: 65-115.

Nylander W. 1846 a. Adnotationes in monographiam formicarum borealium Europae. Acta Societatis Scientiarum Fennicae 2: 875-944.

Nylander W. 1846 b. Additamentum adnotationum in monographiam formicarum borealium Europae. Acta Societatis Scientiarum Fennicae 2 2: 1041-1062.

Nylander W. 1849 [1848]. Additamentum alterum adnotationum in monographiam formicarum borealium. Acta Societatis Scientiarum Fennicae 3: 25-48.

Nylander W. 1856. Synopsis des Formicides de France & d'Algérie. Annales des Sciences Naturelles, Zoologie (4) 5: 51-109.

Olivier A. G. 1792. Encyclopédie méthodique. Histoire naturelle. Insectes. Tome 6. (pt. 2). Paris: Panckoucke, pp. 369-704.

Panzer G. W. F. 1798. Fauna insectorum germanicae initia, oder Deutschlands Insecten. Heft 54. Nürnberg: Felssecker, 24 pp., 24 pls.

Perris E. 1878 [1877]. Rectifications et additions à mes promenades entomologiques. Annales de la Société Entomologique de France (5)(7): 379-386.

Petrov I.Z., Legakis A. 1996. Contribution to the myrmecofauna (Formicidae, Hymenoptera) of Greece. Archives of Biological Sciences, Belgrade 48(3-4): 31-32.

Petrov I. Z., Collingwood C. A. 1993. *Formica Balkanina* sp. n., a new species related to the *Formica cinerea*-group (Hymenoptera: Formicidae). European Journal of Entomology 90: 349-354.

Phillips S. J., Anderson R. P., Schapire R. E.. 2006. Maximum entropy modeling of species geographic distributions. Ecological Modelling 190: 231-259.

Radchenko A. G. 1996 a. Ants of the genus *Plagiolepis* Mayr (Hymenoptera, Formicidae) of central and southern Palearctic. Entomologicheskoe Obozrenie 75: 178-187.

Radchenko A. G. 1996 b. A key to the ant genus *Camponotus* (Hymenoptera, Formicidae) in Palearctic Asia. Zoologicheskii Zhurnal 7 75: 1195-1203.

Radchenko A. G. 1997. Review of ants of the aubgenus *Myrmentoma* genus *Camponotus* (Hymenoptera, Formicidae) of the Asian Palearctic. [In Russian.]. Zoologicheskii Zhurnal 76: 703-711.

Radchenko, A. G. 1998. A key to the ants of the genus *Cataglyphis* Foerster (Hymenoptera, Formicidae) of Asia. [In Russian.]. Entomologicheskoe Obozrenie 77:502-508.

Razoumowsky G. de. 1789. Histoire naturelle du Jorat et de ses environs; et celle des trois lacs de Neufchatel, Morat et Bienne. Tome premier. Lausanne: J. Mourer, xvi + 322 pp.

Retzius A. J. 1783. Caroli de Geer. Genera & species insectorum e generosissimi auctoris scriptis extraxit, digessit, Latine quoad partem reddidit, & terminologiam insectorum Linneanam addidit. Lipsiae [= Leipzig]: Cruse, 220 pp.

Roger J. 1859. Beiträge zur Kenntniss der Ameisenfauna der Mittelmeerländer. I. Berliner Entomologische Zeitschrift 3: 225-259.

Roger J. 1860. Die *Ponera*-artigen Ameisen. Berliner Entomologische Zeitschrift 4: 278-312.

Roger J. 1862. Beiträge zur Kenntniss der Ameisenfauna der Mittelmeerländer. II. Berliner Entomologische Zeitschrift 6: 255-262.

Röszler P. 1942 a [1941-42]. Myrmekologische Mitteilungen 1939. Mitteilungen der Arbeitsgemeinschaft für Naturwissenschaften. Sibiu-Hermannstadt 91- 92: 27-41.

Röszler P. 1942 b. Myrmecologisches 1938. Tijdschrift voor Entomologie 85: 50-71.

Röszler P. 1943. Ameisen aus Siebenbürgen mit der Beschreibung ihrer Lebensweise. Zoologischer Anzeiger 144: 41-48.

Ruzsky M. 1896. Verzeichniss der Ameisen des östlichen Russlands und des Uralgebirges. Berliner Entomologische Zeitschrift 41: 67-74.

Ruzsky M. 1902 a. Formicidae. Pp. 15-16 in: Report on the recorded animal life of Moscow province (No. 4). Izvestiya Imperatorskago Obshchestva Lyubitelei Estestvoznaniya Antropologii i Etnografii pri Imperatorskom Moskovskom Universitete 98(4): 6-18 [=Dnevnik' Zoologicheskago Otdeleniya Imperatorskago Obshchestva Lyubitelei Estestvoznaniya, Antropologii i Etnografii] 3(4):6-18].

Ruzsky M. 1902 b. Neue Ameisen aus Russland. Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere 17: 469-484.

Ruzsky M. 1902 c. Material on the ant fauna of the Caucasus and the Crimea. Protokoly Obshchestva Estestvoispytatelei pri Imperatorskom Kazanskom Universitete 206(su suppl: 1-33.

Ruzsky M. 1903 a. Ants of the Transbaikalian region. Russkoe Entomologicheskoe Obozrenie 3: 205-207.

Ruzsky M. 1903 b. Essay on the myrmecofauna of the Kirghiz steppe. Trudy Russkago Entomologicheskago Obshchestva 36: 294-316.

Ruzsky M. 1904. On ants from Archangel province. Zapiski Imperatorskago Russkago Geograficheskago Obshchestva po Obshchei Geografii 41: 287-294.

Ruzsky M. 1905. The ants of Russia. (Formicariae Imperii Rossici). Systematics, geography and data on the biology of Russian ants. Part I. Trudy Obshchestva Estestvoispytatelei pri Imperatorskom Kazanskom Universitete 38(4-6): 1-800.

Ruzsky M. 1907. The ants of Russia. (Formicariae Imperii Rossici). Systematics, geography and data on the biology of Russian ants. Part II. Trudy Obshchestva Estestvoispytatelei pri Imperatorskom Kazanskom Universitete 40(4): 1-122 + 3.

Ruzsky M. 1914. Ants of Surgut district, Tobolsk province. Russkoe Entomologicheskoe Obozrenie 14: 100-105.

Ruzsky, M. 1926. A systematic list of the ants found in Siberia. I. Review of the species of the genera *Camponotus* (s. ext.) and *Formica* (s. str.). Izvestiya Tomskogo Gosudarstvennogo Universiteta 77: 107-111.

Sadil J. V. 1953. Príspevek k poznání mravencí zvíreny nasich hor (Hym., Formicoidea). Rocenka Ceskoslovenské Spolecnosti Entomologické 50: 197-202.

Salata S., Borowiec L. 2015 a. Redescription of *Crematogaster cypria* Santschi, 1930, new status, with description of two new related species from Greece and Turkey (Hymenoptera, Formicidae). ZooKeys 505: 59-78.

Salata S., Borowiec L. 2015 b. A taxonomic revision of the genus *Oxyopomyrmex* André, 1881 (Hymenoptera: Formicidae). Zootaxa (Monograph) 4025 (1): 1-66.

Salata S., Borowiec L. 2015 c. Redescription of *Temnothorax antigoni* (Forel, 1911) and description of its new social parasite *Temnothorax curtisetosus* sp. n. from Turkey (Hymenoptera, Formicidae). ZooKeys 523: 129-148.

Salata S., Borowiec L. 2016 a. A new species of the *Aphaenogaster cecconii* group (Hymenoptera: Formicidae) from Rhodes. Zootaxa 4170(1): 194-200.

Salata S., Borowiec L. 2016 b. A new species of the *Aphaenogaster cecconii* group (Hymenoptera: Formicidae) from Rhodes. Zootaxa 4170 (1): 194-200.

Salata S., Borowiec L. 2017. Species of *Tetramorium semilaeve* complex from Balkans and western Turkey, with description of two new species of (Hymenoptera: Formicidae: Myrmicinae). Annales Zoologici 67 (2): 279-313.

Salata S., Borowiec L. 2018 a. Taxonomic and faunistic notes on Greek ants (Hymenoptera: Formicidae). Ann. Upper Silesian Museum Bytom Entomology 27(online008): 1-51.

Salata S., Borowiec L. 2018 b. A new species of the ant genus *Lasius* Fabricius, 1804 from Crete (Hymenoptera, Formicidae). ZooKeys 789: 139-159.

Salata S., Borowiec L. 2019 a. Preliminary contributions toward a revision of Greek *Messor* Forel, 1890 (Hymenoptera: Formicidae). Turkish Journal of Zoology, 43: 52-67.

Salata S., Borowiec L. 2019 b. Preliminary division of not socially parasitic Greek *Temnothorax* Mayr, 1861 (Hymenoptera, Formicidae) with a description**.** of three new species. ZooKeys 877: 81-131.

Salata S., Borowiec L., Radchenko A. 2018 a. Description of *Plagiolepis perperamus*, a new species from east-mediterranean and redescription of *Plagiolepis pallescens* Forel, 1889 (Hymenoptera: Formicidae). Annales Zoologici 68: 809-824.

Salata S., Borowiec L., Trichas A. 2018 b. Taxonomic revision of the Cretan fauna of the genus *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae), with notes on on the endemism of ant fauna of Crete. Annales Zoologici (Warsaw) 68 (4): 769-808.

Salata S., Georgiadis C., Borowiec L., 2019 a. Invasive ant species (Hymenoptera: Formicidae) of Greece and Cyprus. North-Western Journal of Zoology 15(1): 13-23.

Salata S., Loss A.C., Karaman C., Kiran K., Borowiec L. 2019 b. Review of the *Camponotus kiesenwetteri* group (Hymenoptera, Formicidae) in the Aegean with the description of a new species. ZooKeys 899: 85-107.

Salata S., Borowiec L., Trichas A. 2020 a. Review of ants (Hymenoptera: Formicidae) of Crete, with keys to species determination and zoogeographical remarks. Monographs of the Upper Silesian Museum No 12: 5-296 pp.

Salata S., Khalili-Moghadam A., Borowiec L. 2020 b. Review of the *Camponotus samius* complex (Hymenoptera: Formicidae) in the Turano-Balkan region, with the description of a new species from Iran. Zootaxa 4673(4): 545-562.

Salata, S., Karaman C., Kiran K., Borowiec L. 2021. Review of the *Aphaenogaster splendida* species-group (Hymenoptera: Formicidae). Annales Zoologici 71: 297-343.

Samsinák K. 1951. *Formica fusca* r. *lemani* Bondr. (Hym. Formic.). Casopis Ceskoslovenské Spolecnosti Entomologické 48: 122-127.

Santschi F. 1908. Nouvelles fourmis de l'Afrique du Nord (Égypte, Canaries, Tunisie). Annales de la Société Entomologique de France 77: 517-534.

Santschi F. 1911 a. Nouvelles fourmis du Congo & du Benguela. Revue Zoologique Africaine (Brussels) 1: 204-217.

Santschi F. 1911 b. Une nouvelle variété de *Formica rufa* L. (Hym. Formicidae). Bulletin de la Société Entomologique de France 1911: 349-350.

Santschi F. 1912 a. Nouvelles fourmis de Tunisie récoltées par le Dr. Normand. Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord 3: 172-175.

Santschi F. 1912 b. Fourmis d'Afrique et de Madagascar. Annales de la Société Entomologique de Belgique 56: 150-167.

Santschi F. 1914 a. Voyage de Ch. Alluaud & R. Jeannel en Afrique Orientale, 1911-1912. Résultats scientifiques. Insectes Hyménoptères. II. Formicidae. Paris: Libr. A. Schulz, pp. 41-148.

Santschi F. 1914 b. Formicides de l'Afrique occidentale & australe du voyage de Mr. le Professeur F. Silvestri. Bollettino del Laboratorio di Zoologia Generale e Agraria della Reale Scuola Superiore d'Agricoltura. Portici 8: 309-385.

Santschi F. 1915. Nouvelles fourmis d'Afrique. Annales de la Société Entomologique de France 84: 244-282.

Santschi F. 1916. Formicides sudaméricains nouveaux ou peu connus. Physis (B. Aires) 2: 365-399.

Santschi F. 1917. *Acantholepis Frauenfeldi* Mayr, et ses variétés. Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord 8: 42-48.

Santschi F. 1919 a. Fourmis du genre *Bothriomyrmex* Emery. (Systématique & moeurs.). Revue Zoologique Africaine (Brussels) 7: 201-224.

Santschi F. 1919 b. Nouveaux formicides de la République Argentine. Anales de la Sociedad Cientifica Argentina 87: 37-57.

Santschi F. 1920. Cinq nouvelles notes sur les fourmis. Bulletin de la Société Vaudoise des Sciences Naturelles 53: 163-186

Santschi F. 1921 a. Notes sur les fourmis paléarctiques. II. Fourmis d'Asie Mineure récoltées par M. H. Gadeau de Kerville. Boletín de la Real Sociedad Española de Historia Natural 21: 110-116.

Santschi F. 1921 b. Nouvelles fourmis paléarctiques. 3ème. note. Boletín de la Real Sociedad Española de Historia Natural 21: 165-170.

Santschi F. 1921 c. Notes sur les fourmis paléarctiques. I. Quelques fourmis du nord de l'Afrique & des Canaries. Memorias de la Real Sociedad Española de Historia Natural Tomo del Cincuentenario: 424-436.

Santschi F. 1922 a. Quelques nouvelles variétés de fourmis paléarctiques. Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord 13: 66-68.

Santschi F. 1923 a. Notes sur les fourmis paléarctiques. 4ème note. Boletín de la Real Sociedad Española de Historia Natural 23: 133-137.

Santschi F. 1923 b. Pheidole et quelques autres fourmis néotropiques. Annales de la Société Entomologique de Belgique 63: 45-69.

Santschi F. 1925. Fourmis d'Espagne et autres espèces paléarctiques (Hymenopt.). EOS. Revista Española de Entomología 1: 339-360.

Santschi F. 1926. Travaux scientifiques de l'Armée d'Orient (1916-1918). Fourmis. Bulletin du Muséum National d'Histoire Naturelle 32: 286-293.

Santschi F. 1927 d. Revision des *Messor* du groupe *instabilis* Sm. (Hymenopt.). Boletín de la Real Sociedad Española de Historia Natural 27: 225-250.

Santschi F. 1928. Nouvelles fourmis de Chine et du Turkestan Russe. Bulletin et Annales de la Société Entomologique de Belgique 68: 31-46.

Santschi F. 1929 a. Fourmis du Maroc, d'Algérie et de Tunisie. Bulletin et Annales de la Société Entomologique de Belgique 69: 138-165.

Santschi F. 1929 b. Nouvelles fourmis de la République Argentine et du Brésil. Anales de la Sociedad Cientifica Argentina 107: 273-316.

Santschi F. 1929 c. Étude sur les *Cataglyphis*. Revue Suisse de Zoologie 36: 25-70.

Santschi F. 1931 b. Inventa entomologica itineris Hispanici & Maroccani, quod a. 1926 fecerunt Harald & Håkan Lindberg. Fourmis du Bassin Méditerranéen occidental & du Maroc récoltées par MM. Lindberg. Commentationes Biologicae 3(1) 14: 1-13.

Santschi F. 1933. Étude sur le sous-genre *Aphaenogaster* Mayr. Revue Suisse de Zoologie 40: 389-408.

Santschi F. 1934. Fourmis d'une croisière. Bulletin et Annales de la Société Entomologique de Belgique 74: 273-282.

Santschi F. 1936. Liste et descriptions de fourmis du Maroc. Bulletin de la Société des Sciences Naturelles du Maroc 16: 198-210.

Santschi F. 1939 a. Notes sur des *Camponotus* & autres fourmis de l'Afrique Mineure. Bulletin de la Société des Sciences Naturelles du Maroc 19: 66-87.

Santschi F. 1939 b. Trois notes sur quelques fourmis du Musée Royal d'Histoire Naturelle de Belgique. Bulletin du Musée Royal d'Histoire Naturelle de Belgique 15(1 14: 1-15.

Schenck, C. F. 1852. Beschreibung nassauischer Ameisenarten. Jahrbuch des Vereins für Naturkunde im Herzogthum Nassau. Wiesbaden 8: 1-149.

Schilling P. S. 1839. Bemerkungen über die in Schlesien und der Grafschaft Glatz vorgefundenen Arten der Ameisen. Uebersicht der Arbeiten und Veränderungen der Schlesischen Gesellschaft für Vaterländische Kultur 1838: 51-56.

Scholz E. J. R. 1924. *Formica exsecta* Nyl. var. *sudetica* nov. var. Neue Beiträge zur Systematischen Insektenkunde 3: 48.

Schulz A. 1994. *Aphaenogaster graeca* nova species (Hym: Formicidae) aus dem Olymp-Gebirge (Griechenland) und eine Gliederung der Gattung *Aphaenogaster*. Beiträge zur Entomologie 44: 417-429.

Scopoli J. A. 1763. Entomologia carniolica exhibens insecta Carnioliae indigena & distributa in ordines, genera, species, varietates. Methodo Linnaeana. Vindobonae [=Vienna]: J. Trattner, xxxvi + 420 pp.

Scupola A., Ballarin R. 2009. The genus *Leptanilla* Emery, 1870 in Sicily (Hymenoptera: Formicidae). Myrmecological News 12: 129-132.

Seifert B. 1984. A method for differentiation of the female castes of *Tapinoma ambiguum* Emery and *Tapinoma erraticum* (Latr.) and remarks on their distribution in Europe north of the Mediterranean region. Faunistische Abhandlungen (Dresden) 11:151-155

Seifert B. 1982. *Lasius* (*Chthonolasius*) *jensi* n. sp. - eine neue temporär sozialparasitische Erdameise aus Mitteleuropa (Hymenoptera, Formicidae). Reichenbachia 20: 85-96.

Seifert B. 1988. A revision of the European species of the ant subgenus *Chthonolasius* (Insecta, Hymenoptera, Formicidae). Entomologische Abhandlungen. Staatliches Museum für Tierkunde Dresden 51: 143-180.

Seifert B. 1991. *Lasius platythorax* n. sp., a widespread sibling species of *Lasius niger* (Hymenoptera: Formicidae). Entomologia Generalis 16: 69-81.

Seifert B. 1992. A taxonomic revision of the Palaearctic members of the ant subgenus *Lasius* s.str. (Hymenoptera: Formicidae). Abhandlungen und Berichte des Naturkundemuseums Görlitz 66(5): 1-67.

Seifert B. 1996. Ameisen beobachten, bestimmen. Augsburg: Naturbuch Verlag, 351 pp.

Seifert B. 1997 a. *Formica lusatica* n. sp. - a sympatric sibling species of *Formica cunicularia* and *Formica rufibarbis* (Hymenoptera, Formicidae). Abhandlungen und Berichte des Naturkundemuseums Görlitz 69(5): 3-16.

Seifert B. 1997 b. *Lasius nitidigaster* n. sp. – a new ant of the subgenus *Chthonolasius* Ruzsky (Hymenoptera: Formicidae). Annales Zoologici 46: 201-205.

Seifert B 2000. A taxonomic revision of the ant subgenus *Coptoformica* Mueller, 1923 (Hymenoptera: Formicidae). Zoosystema 22: 517-568.

Seifert B. 2002. A taxonomic revision of the *Formica cinerea* group (Hymenoptera: Formicidae). Abhandlungen und Berichte des Naturkundemuseums Görlitz 74(2): 245-272.

Seifert B. 2003. *Hypoponera punctatissima* (Roger) and *H. schauinslandi* (Emery) - two morphologically and biologically distinct species (Hymenoptera: Formicidae). Abhandlungen und Berichte des Naturkundemuseums Görlitz 75(1): 61-81.

Seifert B. 2007. Die Ameisen Mittel- und Nordeuropas. Lutra Verlags- und Vertriebsgesselschaft, Görlitz, 368 pp.

Seifert B. 2012 a. A review of the West Palaearctic species of the ant genus *Bothriomyrmex* Emery, 1869 (Hymenoptera: Formicidae). Myrmecological News 17: 91-104.

Seifert B. 2012 b. Clarifying naming and identification of the outdoor species of the ant genus *Tapinoma* Förster, 1850 (Hymenoptera: Formicidae) in Europe north of the Mediterranean region with description of a new species. Myrmecological News., 16: 139-147.

Seifert B. 2013. *Hypoponera ergatandria* (Forel, 1893) – a cosmopolitan tramp species different from *H. punctatissima* (Roger, 1859) (Hymenoptera: Formicidae. Soil Organisms 85: 189-201.

Seifert B. 2018. The ants of Central and North Europe. Lutra Verlags- und Vertriebsgesselschaft, Boxberg, 407 pp.

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

Seifert B. 2020 b. Revision of the *Plagiolepis schmitzii* group with description of *Pl. invadens* sp. nov. – a new invasive supercolonial species (Hymenoptera: Formicidae). Deutsche Entomologische Zeitschrift 67 (2): 183-196.

Seifert B., Galkowski C. 2016. The Westpapearctic *Lasius paralienus* complex (Hymenoptera: Formicidae) contains three species. Zootaxa 4132(1): 44-58.

Seifert B., Schultz R. 2009. A taxonomic revision of the *Formica rufibarbis* Fabricius, 1793 group (Hymenoptera: Formicidae). Myrmecological News 12: 255-272.

Seifert B., Schultz R. 2021. A taxonomic revision of the Palaearctic ant subgenus *Coptoformica* Müller, 1923 (Hymenoptera, Formicidae). Contributions to Entomology 71: 177-220.

Smith F. 1855 a. Essay on the genera and species of British Formicidae. [part]. Transactions of the Entomological Society of London (2) 3: 95-112.

Smith F. 1857. Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore, by A. R. Wallace. [part]. Journal and Proceedings of the Linnean Society of London. Zoology 2: 42-88.

Smith F. 1858. Catalogue of hymenopterous insects in the collection of the British Museum. Part VI. Formicidae. London: British Museum, 216 pp.

Smith F. 1878. Scientific results of the Second Yarkand Mission; based upon the collections and notes of the late Ferdinand Stoliczka, Ph.D. Hymenoptera. Calcutta: Superintendent of Government Printing (Government of India), 22 pp.

Soudek S. 1925 a [1924]. *Bothriomyrmex meridionalis gibbus* n. ssp., novy mravenec z Moravy. Casopis Moravského Zemského Musea v Brne 22: 216-232.

Spinola M. 1808. Insectorum Liguriae species novae aut rariores, quae in agro ligustico nuper detexit, descripsit & iconibus illustravit Maximilianus Spinola, adjecto catalogo specierum auctoribus jam enumeratarum, quae in eadam regione passim occurrent. Genova: Y. Gravier, pp. 207-262.

Stärcke A. 1936. Retouches sur quelques fourmis d'Europe. I. *Plagiolepis xene* nov. sp. et *Pl. vindobonensis* Lomnicki. Entomologische Berichten (Amsterdam) 9: 277-279.

Stärcke A. 1937. Retouches sur quelques fourmis d'Europe. II. *Lasius* groupe *umbratus* Nylander. Tijdschrift voor Entomologie 80: 38-72.

Stärcke A. 1942 a. Drie nog onbeschreven Europeesche miervormen. Tijdschrift voor Entomologie 85: 24-29.

Stärcke A. 1942 b. Definities van species (soort), subspecies (ras, stirps), variëteit en aberratie. Entomologische Berichten (Amsterdam) 11: 40-48.

Stärcke A. 1942 c. Ants, collected by Dr. C. F. Engelhard at Stockmarknes (Island Hadsekoy, Vesterale Archipelago circa 68°50' Lat. N. Norway) and between 64° and 66° Lat. N. on the western coast of Norway, July 1932. Entomologische Berichten (Amsterdam) 11: 21-23.

Stärcke A. 1944. Retouches sur quelques fourmis d'Europe. III. Autres *Lasius*. Entomologische Berichten (Amsterdam) 11: 153-158.

Stärcke A. 1947. Die boreale vorm van de roode boschmier (*Formica rufa rufa* Nyl.) op de Hooge Veluwe. Entomologische Berichten (Amsterdam) 12: 144-146.

Stefani R. 1970 [1968]. Contributo alla conoscenza dei formicidi cavernicoli dell Sardegna. Rendiconti del Seminario della Facoltà di Scienze dell'Università di Cagliari 38 (suppl.): 1-5.

Stitz H. 1930. Entomologische Ergebnisse der Deutsch-Russischen Alai-Pamir Expedition 1928 (1). 5. Hymenoptera III. Formicidae. Mitteilungen aus dem Zoologischen Museum in Berlin 16: 238-240.

Tohmé G., Tohmé H. 2000 [1999]. Redescription de *Camponotus festai* Emery, 1894, et description de *C. sannini* n. sp., deux fourmis du Liban at de la Syrie (Hymenoptera, Formicidae). Bulletin de la Société Entomologique de France 104: 473-480.

Van Loon A. J., Boomsma J. J., Andrasfalvy A. 1990. A new polygynous *Lasius* species (Hymenoptera: Formicidae) from central Europe. I. Description and general biology. Insectes Sociaux 37: 348-362.

Vashkevich A. F. 1924. On the ant fauna of north Tobolsk province. Izvestiya Tomskogo Gosudarstvennogo Universiteta 74: 146-149.

Ward P. S., Sumnicht T. P. 2012. Molecular and morphological evidence for three sympatric species of *Leptanilla* (Hymenoptera: Formicidae) on the Greek island of Rhodes. Myrmecological News 17: 5-11.

Ward P. S., Blaimer B. B., Fisher B. L. 2016. A revised phylogenetic classification of the ant subfamily Formicinae (Hymenoptera: Formicidae), with resurrection of the enera *Colobopsis* and *Dinomyrmex*. Zootaxa 4072 (3): 343-357.

Weber N. A. 1942. New doryline, cerapachyine and ponerine ants from the Imatong Mountains, Anglo-Egyptian Sudan. Proceedings of the Entomological Society of Washington 44: 40-49.

Wetterer J.K. 2008. Worldwide spread of the longhorn crazy ant, *Paratrechina longicornis*. Myrmecological News 11:137-149

Wetterer J.K., Wild A.L., Suarez A.V., Roura-Pascual N., Espadaler X. 2009. Worldwide spread of the Argentine ant, *Linepithema humile* (Hymenoptera: Formicidae). Myrmecological News 12: 187-194.

Wheeler W. M. 1906. The ants of the Bermudas. Bulletin of the American Museum of Natural History 22: 347-352.

Wheeler W. M. 1909. A decade of North American Formicidae. Journal of the New York Entomological Society 17: 77-90.

Wheeler W. M. 1913. A revision of the ants of the genus *Formica* (Linné) Mayr. Bulletin of the Museum of Comparative Zoology 53: 379-565.

Wheeler W. M. 1926. Ants of the Balearic Islands. Folia Myrmecologica et Termitologica 1: 1-6.

Wheeler W. M. 1927. The ants of Lord Howe Island and Norfolk Island. Proceedings of the American Academy of Arts and Sciences 62: 121-153.

Wheeler W. M. 1933. A new species of *Ponera* and other records of ants from the Marquesas Islands. Bulletin of the Bernice Pauahi Bishop Museum 114: 141-144.

Wheeler W. M., Mann W. M. 1916. The ants of the Phillips Expedition to Palestine during 1914. Bulletin of the Museum of Comparative Zoology 60: 167-174.

White W. F. 1884. Ants and their ways. With illustrations, and an appendix giving a complete list of genera and species of the British ants. London: Religious Tract Society, 279 pp

Zetterstedt J. W. 1838. Insecta Lapponica. Sectio secunda. Hymenoptera. Lipsiae [=Leipzig]: L. Voss, pp. 317-475.

Zimmermann S. 1935 [1934]. Beitrag zur Kenntnis der Ameisenfauna Süddalmatiens. Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien 84: 1-65.

Index of Latin names

(valid names, page with description and pages with photos in bold, synonyms, unvalid and unavailable names in italics)